US Army Corps of Engineers
Sacramento District

LOWER CACHE CREEK, YOLO COUNTY, CA
CITY OF WOODLAND AND VICINITY

DRAFT ENVIRONMENTAL IMPACT STATEMENT/ ENVIRONMENTAL IMPACT REPORT FOR POTENTIAL FLOOD DAMAGE REDUCTION PROJECT

Cache Creek Levee Failure, January 27, 1983, looking south towards Woodland.

MARCH 2003

State Clearinghouse #2000062064

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Proposed Action:	The U.S. Army Corps of Engineers, Sacramento District and the Reclamation Board of the State of California are proposing to implement a plan that would reduce flood damage to the City of Woodland resulting from flooding from lower Cache Creek that has a 1 in 100 percent chance of occurrence in any given year.
Types of Statements:	Draft Environmental Impact Statement/ Environmental Impact Report (EIS/EIR)
Lead Agencies:	U.S. Army Corps of Engineers, Sacramento District (Federal)/ State Reclamation Board of California
Cooperating Agency:	City of Woodland
Geographical Location:	Lower Cache Creek, Yolo County, CA City of Woodland and Vicinity
Contact for Additional Information/ Send Comments to:	Patti Johnson USACE, Sacramento District (CESPK-PD) 1325 J Street, Sacramento, CA 95814-2922: phone (916) 557-6611
CEQA Lead Agency Contact:	Karen Enstrom Department of Water Resources Division of Flood Management 3310 El Camino Ave., Sacramento, CA 95821-6340: phone: (916) 574-0372 E-mail: kenstrom@water.ca.gov
Comment Period:	The official closing date for receipt of comments on this Draft EIS/EIR is May 5, 2003. Comments received will be used in preparing the Final EIS/EIR.
Abstract	This Draft EIS/EIR describes and evaluates the potential environmental, social, and economic effects of alternatives to reduce flood damage potential from Lower Cache Creek. Three alternative plans, the No-Action, Lower Cache Creek Flood Barrier (LCCFB), and Modified Wide Setback Levee Plans were analyzed for potential direct, indirect, and cumulative environmental effects. The potential benefits of the alternative plans were identified as well as mitigation measures for any adverse affects. Most effects would either be short term or would be reduced to a less-than-significant level with the use of best management practices. The LCCFB and Modified Wide Setback Levee Plans would cause significant unavoidable effects on esthetics and prime farmland; indirect effects on transportation (LCCFB only); and temporary effects on noise and air quality. Based on the effects assessment, including environmental and socioeconomic considerations, the LCCFB is the least environmentally damaging alternative.

LOWER CACHE CREEK, YOLO COUNTY, CA
CITY OF WOODLAND AND VICINITY

DRAFT ENVIRONMENTAL IMPACT STATEMENT/
ENVIRONMENTAL IMPACT REPORT
FOR POTENTIAL
FLOOD DAMAGE REDUCTION PROJECT

Executive Summary

EXECUTIVE SUMMARY

PURPOSE OF STUDY AND EIS/EIR

The Lower Cache Creek, Yolo County, California City of Woodland and Vicinity Draft Feasibility Report for Potential Flood Damage Reduction Project (Feasibility Report) addresses flooding problems in the lower reach of Cache Creek. This project is being 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. A cost-share agreement between the Corps and the Board has resulted in a joint Environmental Impact Statement/Environmental Impact Report (EIS/EIR). This Draft EIS/EIR summarizes the existing resources in the study area, evaluates the potential effects of alternative plans on these resources, and describes mitigation measures that could be used to minimize or offset adverse effects.

STUDY AREA

The study 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 project area, which is the lower reach of Cache Creek, the city of Woodland, and adjacent unincorporated areas of Yolo County. The project area is the area confined by Cache Creek to the north and west, the Cache Creek Settling Basin (settling basin) to the east, and Woodland city limits to the south.

NEED FOR ACTION

Lower Cache Creek has a history of flooding. Although flooding has not occurred within the city of Woodland, a flood threat exists. Twenty severe floods have occurred since 1900 in the Cache Creek basin. The most severe floods of recent years downstream from Clear Lake occurred in 1955,1956, 1958, 1964,1965, 1970, 1983, 1995, and 1997. In 1983, a levee failure near County Road (CR) 102 caused flooding in the area, which is now Woodland's industrial area.

According to the April 2001 FEMA Flood Insurance Study, the city of Woodland has no recorded history of flooding. However, in 1958, 1983, and 1995, Cache Creek rose to the top of both levees and overflowed its banks toward Woodland. In 1995, the overland flow came within 1 block of Woodland. In 1983, overland flow flooded areas in the easterly part of what is now in the city limits of Woodland. According to the USGS, the peak flow in January 1983 at the Rumsey gage was estimated to be 53,000 cfs, which is a 1 in 50 chance event at this location. There was a levee break downstream from County Road CR 102 during this flood. Federal, State, and local agencies patched levee

boils at that time to prevent additional levee breaks along both sides of the Cache Creek levee system.

The peak flow at CR 94B in January 1995 was approximately 48,000 cfs. An estimated 3,800 cfs overflowed the south bank and almost nothing overflowed the north bank upstream of the levee system. The total flow (approximately 48,000 cfs, peak) represents a 1 in 40 chance event. The volume of the flood hydrograph was approximately a 1 in 20 chance event. The City of Woodland observed and prepared a sketch of high-water marks in the vicinity of the city of Woodland for the March 1995 event. These observations do not define the full extent of the flood boundary.

Without a flood damage reduction project, damages to real property from overflows from Cache Creek could be expected to be about $12 million averaged annually. Other losses or adverse effects could include the potential for flood-related loss of life, contamination from sanitary sewage and hazardous materials, and the extended closure of the section of I-5 east of the city of Woodland.

Draft Flood Insurance Rate Maps (FIRM's) were first issued by FEMA in September 1998 show a significant increase in the areas of Yolo County and the city of Woodland that are subject to floods that have a 1 in 100 chance of occurring in any given year. (The town of Yolo and areas to the north of Cache Creek were not included in the FEMA analysis.) The city of Woodland and surrounding local areas seek to reduce pending flood hazards. The purpose of the Lower Cache Creek Potential Flood Damage Reduction Project is to provide an economically feasible and environmentally sensitive method to alleviate flood-related damages.

SIGNIFICANT ISSUES

Significant issues for the purpose of this Draft EIS/EIR are defined as topics that were taken into account during the development and refinement of the alternative plans. Hydrology, land use, transportation, environmental constraints, and public support are factors that influenced the project feasibility.

Currently, the creek channel and existing levee system do not provide a sufficient conveyance capacity to provide protection from floods that have a 1 in 100 chance of occurring in any given year for the city of Woodland. Without this protection, citizens within the 1 in 100 chance flood plain (as mapped by FEMA) would be required to obtain flood insurance. If the existing levee system fails or overtops, the elevated grades of I-5 and the California Northern Railroad, in addition to the west levee of the Cache Creek settling basin would direct the escaped floodwaters toward the city of Woodland, threatening life safety, and causing further financial burdens associated with the lack of flood protection.

The primary objective of this project is to improve flood protection to the city of Woodland. This city is the most highly populated, urban, commercial, and industrial development in the study area. The population of Woodland is projected to continue growing at approximately 1.7 percent per year. However, the recent designation of the

city within the FEMA 100-year flood plain now requires new developments to be in accordance with the National Flood Insurance Program. This significantly increases development costs.

Unincorporated private agricultural lands comprise approximately 60 percent of the project area. Construction of a new flood protection system would require takings of some private agricultural land. Furthermore, the placement of this system would also influence the location and amount of land provided with flood protection; some areas would be removed from the FEMA 1 in 100 chance flood plain. Modifications and/or relocation of buildings may be required for structures within the unprotected flood plain.

Other constraints include the bridges in the project area. The current levee system, which is adjacent to the terminus of the bridges, prevents flooding along the roadways for equal or lesser flows than for the flow that has a 1 in 10 chance of occurring in any given year[1]. A new flood protection system offering a higher degree of protection by containing the flow in the creek would have to comply with the current dimensions of the bridges for this flood protection to continue and the existing bridge to be maintained. The relatively narrow openings of these bridges constrict the flood plain within the proximity of the bridges, resulting in relatively high flow velocities through these narrow sections during flooding. Consequently, if the roadways and bridges are to be protected, bank protection is required for these narrow openings.

Bank protection (riprap) in addition to other alterations near the bank of the creek would require environmental mitigation. The shaded riverine aquatic habitat (SRA) along the creek and the abundant number of elderberry bushes along the creek bank (the habitat of the endangered valley elderberry longhorn beetle), increase the sensitivity of this area. Other environmental considerations include the presence of habitat within the project area for the following potentially affected species: giant garter snake, Swainson's hawk, bank swallow, northwestern pond turtle, Central Valley Steelhead, and chinook salmon.

Public opinions and concerns were identified during two public workshops held on May 30, 2000 and May 31, 2001. Since that point, the alternative plans have been modified in order to address public comment as well as comply with the above-mentioned significant issues.

FLOOD DAMAGE REDUCTION MEASURES AND PRELIMINARY PLANS

Based on the objectives and constraints, previous studies, local interest, and public comments, a variety of flood damage reduction measures were identified, screened, and either not considered further or developed/combined into several preliminary plans to reduce flood damages in the project area. Both nonstructural and structural measures were considered and evaluated based on their costs, environmental and socioeconomic effects, and potential for combining with other measures. Nonstructural measures included raising/flood proofing structures, relocating structures, and a flood warning

[1] Although designed for a flow capacity of a 1 in 10 chance of occurring, the existing levee system has historically contained flow events of a 1 in 20 chance of occurring in any given year.

system. Structural measures included storage, channel improvements, levee modification, setback levees, and backup levee.

The screening of the measures and public comments resulted in five preliminary flood damage reduction plans for lower Cache Creek. In addition to the No-Action Plan, they include Channel Clearing, Raising Existing Levees and Constructing New Levees, Channelization and Constructing New Levees, Constructing Setback Levees and Raising Existing Levees, and Constructing a Flood Barrier Levee.

Based on a comparison of costs and ability to meet the planning criteria, constructing setback levees and raising existing levees (Setback Levees) and the flood barrier levee (Lower Cache Creek Flood Barrier or LCCFB) were selected for further study. Two initial setback plans, the Narrow and Wide Setback Levee Plans, were evaluated prior to the development of the third plan, Modified Wide Setback Levee Plan. These two initial plans were not considered further due to high cost and potential adverse significant environmental effects on biological resources and social and economic resources. Therefore, the LCCFB and the Modified Wide Setback Levee Plans are the two final plans carried forward for a detailed analysis in this Draft EIS/EIR.

The environmental analysis was prepared for a range of levee crown widths between 12 and 20 feet for the Modified Wide Setback Levee and the LCCFB plans. Crown widths will be refined for the selected plan.

ALTERNATIVE PLANS

The alternative plans listed below are evaluated throughout this Draft EIS/EIR.

No-Action Plan

The No-Action Plan serves as a basis for comparison against which the effects and benefits of the action plans are evaluated. It is assumed that the Federal Government would take no action to implement a specific plan to reduce the chance of flooding of unincorporated areas of Yolo County and the city of Woodland. The existing Cache Creek levee system would continue to contain floods that have a 1 in10 to 1 in 20 chance of occurring in any given year.

Lower Cache Creek Flood Barrier Plan (LCCFB)

Features

- The LCCFB would extend 6 miles from the intersection of County Road (CR) 19B and CR 96B to the Cache Creek settling basin, just north of the city of Woodland.

- An inlet weir, similar to the existing outlet weir in the settling basin, would be constructed in the west levee of the settling basin.

- Highway closure and stoplog structures would be provided at road and railroad crossings.

- A flood warning system would be incorporated to initiate evacuation of the flood plain and closure of crossings.

Accomplishments

- The LCCFB Plan would remove the city of Woodland and an area of Yolo County south of the barrier from the flood plain.

- Due to the large flood plain between the creek and the flood barrier, the flood barrier would serve as a reliable flood protection alternative by withstanding floods that have, at a minimum, a 1 in 100 chance of occurring in any given year.

- The existing levee system would be maintained to provide protection from floods with a 1 in 10 to 1 in 20 chance of occurring in any given year to unincorporated areas adjacent to lower Cache Creek.

- The LCCFB Plan involves less direct effects to the Cache Creek biological environment than the Modified Wide Setback Levee Plan.

- The LCCFB Plan involves the relocation of significantly fewer residences than the Modified Wide Setback Levee Plan.

- The LCCFB Plan minimizes impacts to Prime Farmland.

Modified Wide Setback Levee Plan

Features

- About 19 miles of flood control levees, consisting of a combination of new setback levees and modifications to the existing levees, would be constructed.

- The levees would extend from the settling basin inlet to high ground near CR 94B.

- Bridges would be extended using viaducts to allow for increased overbank flow areas.

Accomplishments

- The Modified Wide Setback Levee Plan would remove the city of Woodland, the town of Yolo, and a large portion of the unincorporated land north and south of Cache Creek from the flood plain.

- The Modified Wide Setback Levee Plan would allow for future restoration of Cache Creek.

- The Modified Wide Setback Levee Plan involves fewer transportation effects from flooding than the LCCFB Plan.

AFFECTED ENVIRONMENT

Environmental resources not affected by the project alternatives include climate; topography; geology and soils; recreation; hazardous, toxic, and radiological waste; public health vectors and vector control; and fisheries. Resources that may be significantly affected by the project include socioeconomics, land use, prime and unique farmlands, transportation, noise, air quality, water quality, vegetation and wildlife, special-status species, cultural resources, and esthetic/visual resources.

ENVIRONMENTAL EFFECTS AND MITIGATION

Tables ES-1 and ES-2 summarize the environmental effects of the LCCFB and the Modified Wide Setback Levee Plans on the resources mentioned above as well as potential mitigation measures. Those resources that would experience significant unavoidable effects from the LCCFB and Modified Wide Setback Levee Plans are land use, prime and unique farmlands, esthetics, noise, and air quality. Mitigation, in the form of best management practices (BMP's), for both plans would serve to lessen adverse effects. BMP's would be included in construction practices for transportation, water quality, noise, air quality, and cultural resources. Agency recommended mitigation/conservation/permit requirements would apply to vegetation and wildlife, special-status species, and water quality.

ENVIRONMENTAL COMMITMENTS

The environmental commitments to mitigate the direct effects of the project alternative plans are listed below.

Transportation

- The lead agency would develop a traffic management plan and implement precautions such as posted construction zones, reduced speed limits, flagmen, and construction quality control monitors to ensure public safety on the roadways. Traffic would be rerouted when necessary to avoid construction zones.

- Contractors would avoid public roads as much as feasible when hauling materials to the construction site. Any damage to roadway surfaces from the operation of heavy equipment would be repaired.

Noise

- During project construction, noise-generating equipment would be limited to work during daytime hours only.

- Additionally, all mobile equipment would be fitted with mufflers consistent with the best noise reduction technology.

Air Quality

- The lead agency would provide a dust suppression plan that would likely include the following measures:
    - All construction areas, unpaved access roads, and staging areas would be watered as needed when soil is dry.
    - All trucks hauling soil or other loose material would be covered or have at least 2 feet of freeboard. Construction vehicles would use paved roads to access the construction site wherever possible.
    - Vehicle speeds would be limited to 15 mph on unpaved roads and construction areas, or as required to control dust.
    - Streets would be cleaned daily if visible soil material is carried onto adjacent public streets.
    - Exposed stockpiles of soil and other excavated materials would be enclosed, covered, and watered twice daily as needed.
    - Vegetation would be replanted in disturbed areas as quickly as possible following the completion of construction.
- All standard practices and procedures set by the Yolo-Solano Air Quality Management District, the Air Resources Board, and the guidelines provided by the U.S. EPA to minimize emissions would be used during construction.
- According to the results of the conformity review process, a conformity determination is not needed.

Water Quality

- The lead agency would prepare a stormwater pollution prevention plan. A portion of this plan would specifically address erosion and sediment control, including the following measures:
    - Regular watering of construction surfaces with water trucks to prevent wind erosion of dust into water resources.
    - Construction crews would install erosion controls such as hay bales, water bars, covers, sediment fences, and sensitive-area access restrictions where necessary and appropriate before initiating extensive clearing and grading to prevent materials from eroding in or near water resources.

- The refueling of equipment in designated staging areas.
- The regular monitoring and maintenance of equipment for fuel leaks.
- Reseeding soil areas with native grass to prevent soil erosion from surface water runoff.

- The lead agency would prepare a Hazardous Substance Control and Emergency Response Plan.
- The lead agency would comply with all Section 404 requirements.

Vegetation and Wildlife

- Limiting construction crews to the right-of-way and confinement of disturbance to as small an area as possible;
- Requiring construction crews to maintain a 15-m.p.h. speed limit on all unpaved roads to reduce the chance of wildlife being mortally wounded if struck by construction equipment;
- Avoidance of effects to Cache Creek's water quality by taking appropriate measures to prevent construction materials (fuels, oils, and lubricants) from spilling or otherwise entering the creek;
- Avoidance of effects to woody vegetation at all construction sites, staging areas, borrow sites, and haul routes by fencing them with orange construction fencing;
- Minimization of effects to trees along the construction area by having all trimming performed by a qualified arborist to ensure tree survival after the project;
- Conducting of nest surveys prior to the removal of any trees or scrub shrub to ensure migratory birds would not be lost during construction, pursuant to the Migratory Bird Treaty Act; and
- Revegetation of borrow, staging, turn-arounds, and any other disturbed areas with native grasses and forbs.
- Development of a mitigation and remediation plan for the project by the lead agency.

Special-Status Species

The conservation measures for the giant garter snake include those taken from the "Programmatic Formal Consultation for U.S. Army Corps of Engineers 404 Permitted Projects with Relatively Small Effects on the Giant Garter Snake within Butte, Colusa,

Glenn, Fresno, Merced, Sacramento, San Joaquin, Solano, Stanislaus, and Yolo Counties, California," (November 13, 1997). Measures include:

- Seasonal restrictions (construction from May 1 to October 1 only) to avoid overwintering giant garter snakes;
- Ensuring that dewatered habitat remains dry for at least 15 consecutive days after April 15 and prior to excavation or filling;
- An environmental awareness program for construction workers;
- Avoidance of giant garter snake identified during completion of pre-construction surveys 24 hours prior to commencement of construction by a qualified biologist, who would remain available thereafter to provide additional services should a snake be encountered during construction;
- Halting of all construction activities within the area should a giant garter snake be encountered during construction until the snake has had time to move away from the area;
- Confinement of construction activities to the minimal area necessary to facilitate construction;
- Flagging and avoidance of areas that would not be affected by construction and are designated Environmentally Sensitive to the giant garter snake;
- Restoration of all riprap areas to upland habitat by placing at least an 18- to 24-inch layer of soil over the rock and reseeding the area with native grasses and forbs; and
- Compensation of lost habitat according to ratios agreed upon by the Corps and the USFWS.

Conservation measures for chinook salmon and steelhead are based on the recommendations outlined in the "Guidelines for Salmonid Passage at Stream Crossings," (September, 2001). In addition to guidance specific to culverts, the following general conservation measures would be observed (the final determination of specific conservation measures would be determined during consultation with NMFS):

- Minimization of erosion and sediment delivery through the use of erosion control devices such as hay bales, water bars, covers, and sediment fences where necessary and appropriate;
- Restriction of access to sensitive-areas to minimize streamside habitat effects;
- Installation of culverts in a de-watered site with a sediment control and flow routing plan;

- Use of pumps with fish screens to dewater the site; and

- Restoration of the affected area to pre-project conditions including reseeding using locally native riparian and other vegetation.

Conservation measures for Swainson's hawks would include:

- Replacement of non-native trees at a 1:1 ratio and native trees at a 5:1 ratio.

- Avoidance of hawks identified during pre-construction surveys conducted according to Swainson's Hawk Technical Advisory Committee guidelines (2000); and

- Prohibition of construction activities within one-half mile of a nesting hawk until young fledge.

The following conservation measures for the valley elderberry longhorn beetle include those taken from the "Conservation Guidelines for the Valley Elderberry Longhorn Beetle," (July 9, 1999). Measures include:

- All areas to be avoided during construction activities would be fenced at 100-feet from the dripline of each elderberry plant;

- Signs would be erected along the edge of the avoidance area designating the area as environmentally sensitive for the valley elderberry longhorn beetle;

- An environmental awareness program for construction workers; and

- Compensation of lost habitat according to ratios agreed upon by the Corps and the USFWS.

These conservation measures for the giant garter snake would provide sufficient conservation measures for the northwestern pond turtle.

Cultural Resources

- If previously unidentified cultural materials and/or features are discovered during construction, all work in the immediate area would cease and a cultural resources specialist would be immediately contacted for identification and evaluation.

- If materials and/or features are determined to be significant and cannot be avoided, a site-specific mitigation plan would be prepared in consultation with interested parties and the SHPO.

- If human remains are encountered, a cultural resources specialist and county coroner would be contacted in compliance with State law.

COMPLIANCE WITH APPLICABLE LAWS, POLICIES, AND PLANS

This document would be adopted as a joint EIS/EIR and would fully comply with National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) requirements. The project would comply with all Federal laws, regulations, and Executive orders. In addition, the non-Federal sponsor would comply with all State and local laws and permit requirements.

MAJOR CONCLUSIONS AND FINDINGS

The existing lower Cache Creek levee system provides reliable protection from floods that have a 1 in 10 to 1 in 20 chance of occurring in any given year to unincorporated areas and the city of Woodland. The three plans considered in this Draft EIS/EIR are No-Action, Lower Cache Creek Flood Barrier, and Modified Wide Setback Levee Plans. The two latter plans would increase protection from floods from Cache Creek that have at a minimum a 1 in 100 chance of occurring in any given year. The Lower Cache Creek Potential Flood Damage Reduction Project evaluates the environmental effects of these plans as well as the No-Action Plan.

The No-Action Plan would continue to provide reliable protection from floods from Cache Creek that have a 1 in 10 to 1 in 20 chance of occurring in any given year. Within the FEMA 1 in 100 chance flood plain, this would require residences that have Federally-insured mortgages and some businesses/facilities to acquire flood insurance. These structures would remain subject to future flood damages. The socioeconomic effects of this would be significant. Frequent flood fighting (greater than floods that have approximately a 1 in 10 chance of occurring in any given year) would be necessary, and bank erosion/undercutting of the existing levee system would continue to require repairs that may lead to further degradation of the creek environment. According to project objectives, this plan is unacceptable.

The LCCFB Plan would provide the city of Woodland and unincorporated areas south of the LCCFB with protection from floods from Cache Creek that have at a minimum, a 1 in 100 chance of occurring in any given year. This would eliminate federal flood insurance requirements for residences and businesses within city limits. Unincorporated areas to the north of the flood barrier and to the north of Cache Creek would remain within the FEMA 100-year flood plain, but would continue to have reliable protection from floods with a 1 in 10 to 1 in 20 chance of occurring in any given year by the existing system. Although not part of the LCCFB Plan, continued flood fighting would be necessary for greater floods and bank erosion/undercutting of the existing levee system would continue to require repairs that may lead to further degradation of the creek environment. This plan is consistent with the City and County's General Plans through construction of the flood control facility along the urban limit line. The LCCFB would significantly affect transportation (an indirect effect), esthetics, and 100 acres of prime farmland and 2 acres of locally important farmland through conversion for flood control purposes. Construction of the LCCFB would also cause temporary, but significant, effects to noise and air quality.

The Modified Wide Setback Levee Plan would provide the city of Woodland and the unincorporated land to the north and south of the levee system with protection from floods from Cache Creek with a 1 in 100 chance of occurring in any given year. This plan would eliminate federal flood insurance requirements for residences and businesses in this area, including the town of Yolo. It would also reduce the risk of flooding and closure of the transportation system, including Interstate-5 (I-5). Continued maintenance of the existing levee system would not be necessary and the creek would be allowed to meander. This plan would have significantly greater effects to biological resources and sensitive species, requiring extensive mitigation costs. Although no sponsor has been identified, the plan would allow restoration of the creek environment. The Modified Wide Setback Levee Plan would significantly affect esthetics and 158 acres of prime farmland through conversion for flood control purposes. Construction of the setback levees would also cause temporary, but significant, effects to noise and air quality during construction.

Least Environmentally Damaging Plan

The following factors served as a basis in the determination of the least environmentally damaging plan: 1) The LCCFB would remove less acres of farmland, including prime farmland, than the Modified Wide Setback Levees, 2) Construction of the LCCFB would result in less required mitigation for adverse effects on vegetation and wildlife than the Modified Wide Setback Levees, 3) Construction of the LCCFB, as compared to construction of the Modified Wide Setback Levees, would require fewer project-related vehicles on the roadways, 4) Combustion emissions from construction equipment necessary to build the LCCFB would be less than the pollutants emitted from construction of the Modified Wide Setback Levees, 5) The Modified Wide Setback Levee Plan would have adverse effects on Cache Creek due to construction within the creek channel; construction of the LCCFB would only temporarily affect the Creek due to a haul route which would be removed upon project completion, and 6) The Modified Wide Setback Levee Plan would require many homes and farm support structures to be relocated as compared to the LCCFB Plan which would require the relocation of only one home. Based on the comparative effects assessment, including environmental and socioeconomic considerations, the LCCFB Plan is the least environmentally damaging plan.

PUBLIC INVOLVEMENT

The Corps published a Notice of Intent to prepare the Draft EIS in the Federal Register on May 5, 2000. The Board delivered a Notice of Preparation of an EIR to the California State Clearinghouse on June 11, 2000. Primary coordination activities included the May 30, 2000 and May 31, 2001 public workshops and the February 8, 2001 City of Woodland Flood Task Force meeting. The Corps and the Board met numerous times with public and private parties to identify and discuss concerns, tailor actions, and expand insight into the flood control management process. Public and private parties include private landowners, a private gravel mining company, and Sacramento and Yolo County Farm Bureaus. This project was heard twice at public meetings before the Board on June 13, 2001, and December 21, 2001. Members of the public, as well as other public and

private entities, were invited to express concerns during the proceedings. After the Draft EIS/EIR is made available to the public, there is a required review period during which comments can be submitted for consideration and inclusion in the Final EIS/EIR. Public hearings will also be held on the Draft and Final EIS/EIR.

UNRESOLVED ISSUES

Unresolved issues are defined as subject matter that requires further information or areas where a consensus needs to be made in order to make a final determination on a given issue.

Currently there is little information on the hydraulic effects on sedimentation within the settling basin. Studies would be conducted in the planning, engineering, and design (PED) phase to detail operational impacts and to describe modified O&M for sedimentation in the settling basin. The planning team has also recommended that additional information on basin sediment characteristics be obtained by DWR.

Potential conservation measures to reduce effects on special-status species due to the construction of the LCCFB are identified in the Special-Status Species Technical Appendix (Appendix B). The Special-Status Species Technical Appendix, along with the rest of the draft EIS/EIR will be used as supporting documents for a biological assessment. The purpose of the Biological Assessment is to request concurrence from USFWS with the Corps' determination of no effect or not likely to adversely affect the palmate-bracted bird's beak and valley elderberry longhorn beetle due to construction of the LCCFB. The Biological Assessment would also serve as a request to initiate formal Section 7 and Essential Fish Habitat consultation on the giant garter snake, chinook salmon, and steelhead. The USFWS and NMFS would use the Biological Assessment as the basis for their Biological Opinions. It is expected that these Biological Opinions would be rendered before the completion of the Final EIS/EIR. Neither the Corps nor the Board would approve the initiation of construction on the proposed action prior to consideration of these Biological Opinions.

There are a number of historic buildings within the project area. These buildings may require flood proofing. If action is taken to protect these buildings from flood damage, then consultation with the California State Historic Preservation Officer (SHPO) would need to be initiated. Under Section 106 of the National Historic Preservation Act, an extensive cultural resources inventory and evaluation would need to be conducted.

In the March 5, 2002 election, three measures were included on the ballot in regards to the financing of the City share of the Lower Cache Creek Flood Damage Reduction Project. One was a local sales tax extension and the remaining two were advisory measures related to the sunsetting of the sales tax measure if the setback levee were the selected plan, or if the flood barrier were the selected plan. The funding measure was put on the ballot in advance of release of the Draft Feasibility Report and Draft EIS/EIR in order to facilitate seeking federal funding support in 2002. All three measures were voted down. Release and public review of the Draft Feasibility Report

and Draft EIS/EIR are expected to clarify and address concerns raised during the March 2002 election process.

The environmental analysis was prepared for a range of levee crown widths between 12 and 20 feet for the Modified Wide Setback Levee and the LCCFB. Crown widths will be refined for the selected alternative.

RECOMMENDED PLAN

To this stage of the planning process, the study team has focused on the development and evaluation of an array of alternative plans to reduce flood damages in Woodland and vicinity, consistent with protecting the environment and with pertinent laws, regulations, and policies. Based on the evaluation of estimated costs and benefits, and potential environmental and socioeconomic conditions and effects, the LCCFB Plan has been identified by the study team as the Tentatively Recommended Plan. The partners for the potential project (the Corps, the Board, and the City of Woodland) will fully consider the comments received from the public regarding this Draft Feasibility Report and Draft EIS/EIR before formally selecting a Recommended Plan in the Final EIS/EIR. Based on the evaluation of all environmental and socioeconomic conditions, the LCCFB Plan has been determined to be the least environmentally damaging alternative.

Table ES-1. Summary of Environmental Effects and Mitigation – LCCFB Plan

Significant Effects	Mitigation and Best Management Practices	Level of Significance with Mitigation
Social and Economic Resources		
Project-induced flooding on some lands north of the flood barrier would cause a potential decrease in land value.	Agricultural landowners would be compensated for land value effects/takings to the extent required by law.	LTS[1]
One home would be relocated.	Land and home owner would be compensated for land/home value effects/takings.	LTS
Land Use		
The flood barrier footprint would convert 100 acres of row crop, 2 acres of orchard, and 2 acres of agricultural support lands for flood control purposes.	This effect represents an incompatible land use change and is a significant effect that cannot be mitigated.	SU[2]
Agriculture, Prime and Unique Farmlands		
The flood barrier would result in a loss of 100 acres of prime farmland and 2 acres of statewide important/locally important farmland.	The conversion of prime farmlands represents an effect that cannot be mitigated.	SU
Transportation		
Temporary direct transportation effects would include lane closure during road repair, roadway safety hazards, and an increase in traffic volume.	• Lead agency to provide traffic management plan. • Contractors would use construction easements as much as feasible when hauling materials to the construction site. • Traffic would be rerouted when necessary to avoid construction areas. • Flaggers would be stationed to slow or stop approaching vehicles to avoid conflicts with construction vehicles or equipment.	LTS

[1] LTS = Less than significant
[2] SU = Significant unavoidable

Table ES-1. Summary of Environmental Effects and Mitigation – LCCFB Plan

Significant Effects	Mitigation and Best Management Practices	Level of Significance with Mitigation
Transportation (continued)		
Indirect transportation effects result from the flooding of CR 102 for a greater length of time than under existing conditions. Under existing conditions, a 5' levee perpendicular to CR 102 would cause flooding of the roadway. With project conditions, the levee height would be increased to 18', increasing the depth and duration of flooding at CR 102. This impact would occur for floods that have greater than a 1 in 40 chance of occurring. These road closures could cause lengthened response times for emergency vehicles traveling to residents northeast of the city of Woodland.	The mitigation listed below would reduce the effects, but not to a less-than-significant level. • Detours would be available to circumvent flooded roadways.	SU
Noise		
Construction of the flood barrier would temporarily produce decibel levels above the significance threshold for some sensitive receptors during construction.	The mitigation listed below would reduce the effects, but not to a less-than-significant level. • Construction equipment would be outfitted and maintained with noise-reduction devices such as mufflers. • Construction would be limited to daytime hours.	SU
Air Quality		
NO_x emissions would exceed the significance thresholds established by the Yolo-Solano Air Quality Management District (YSAQMD). The exceedence would be a temporary effect during construction.	The mitigation listed below would reduce NO_x emissions, but not to a less-than-significant level. • Incorporate NO_x mitigation measures into construction plans and specifications.	SU

Table ES-1. Summary of Environmental Effects and Mitigation – LCCFB Plan

Significant Effects	Mitigation and Best Management Practices	Level of Significance with Mitigation
Air Quality (continued)		
PM_{10} emissions would exceed the significance thresholds established by the YSAQMD. The exceedence would be a temporary effect during construction. Sensitive receptors would also be exposed to the high levels of fugitive dust emissions.	The mitigation listed below would reduce PM_{10} emissions, but not to a less-than-significant level. The lead agency would provide a dust suppression plan that would likely include the following measures: • All construction areas, unpaved access roads, and staging areas would be watered as needed during dry soil conditions, or soil stabilizers would be applied. • All trucks hauling soil or other loose material would be covered or have at least 2 feet of freeboard. Construction vehicles would use paved roads to access the construction site wherever possible. • Vehicle speeds would be limited to 15 mph on unpaved roads and construction areas, or as required to control dust. • Streets would be cleaned daily if visible soil material is carried onto adjacent public streets. • Soil stabilizers would be applied to inactive construction areas on an as-needed basis. • Exposed stockpiles of soil and other excavated materials would be enclosed, covered, watered, or applied with soil binders as needed. • Vegetation would be replanted in disturbed areas as quickly as possible following the completion of construction.	SU
Settling Basin		
The removal of the training levee could alter the distribution of sedimentation in the settling basin.	Design of the LCCFB Plan would incorporate the function of the settling basin.	LTS

Table ES-1. Summary of Environmental Effects and Mitigation – LCCFB Plan

Significant Effects	Mitigation and Best Management Practices	Level of Significance with Mitigation
Water Quality		
Pollutants from construction equipment and erosion at the construction site could temporarily degrade the water quality of local runoff during construction.	The proper permitting procedures would be adhered to. In addition, appropriate best management practices and monitoring would be implemented to preserve the quality of surface runoff.	LTS
Vegetation and Wildlife		
Project-related effects, as determined by the USFWS in its draft CAR would include the loss of 122 acres of agricultural habitat, 100 native and non-native trees, 0.52 acre of upland habitat, and 0.28 acre of scrub shrub.	Mitigation for habitat loss has been outlined by the Fish and Wildlife Service in its Coordination Act Report (Appendix A).	LTS
Construction-related effects would include disturbance from equipment and crews and potential disturbance of species.	Mitigation measures include: • Restricting construction crews to the right-of-way and confinement of disturbance to as small an area as possible; • Requiring construction crews to maintain a 15 m.p.h. speed limit on all unpaved roads to reduce the chance of wildlife being mortally wounded if struck by construction equipment; and • Conducting of nest surveys prior to the removal of any trees or scrub shrub to ensure migratory birds would not be lost during construction, pursuant to the Migratory Bird Treaty Act.	LTS

Table ES-1. Summary of Environmental Effects and Mitigation – LCCFB Plan

Significant Effects	Mitigation and Best Management Practices	Level of Significance with Mitigation
Special-Status Species		
Project-related effects to special-status species (Swainson's hawk, giant garter snake, northwestern pond turtle, chinook salmon, steelhead) would include temporary and permanent loss of habitat.	Incidental Take Conditions for effects to special-status species would be determined through formal consultation with the Fish and Wildlife Service and National Marine Fisheries Service and outlined in their Biological Opinion. Proposed conservation measures are outlined in Section 5.7.	LTS
Construction-related effects would include disturbance from equipment and crews and potential take of species.	Incidental Take Conditions for effects to special-status species would be determined through formal consultation with the Fish and Wildlife Service and National Marine Fisheries Service and outlined in their Biological Opinion. Incidental Take Conditions for effects to State special-status species would also be determined through formal consultation with the California Department of Fish and Game. Proposed conservation measures are outlined in Section 5.7.	LTS
Cultural Resources		
Increased flooding may occur at sites between the creek and barrier.	Mitigation measures would be developed in consultation with the State Historic Preservation Office and could include flood proofing some structures.	LTS
Esthetic and Visual Resources		
The flood barrier would create a new linear feature and a view block to residents.	The LCCFB would be reseeded with grasses and forbs; however, this would not reduce the overall effect to less-than-significant.	SU

Table ES-2. Summary of Environmental Effects and Mitigation - Modified Wide Setback Levee Plan

Significant Effects	Mitigation and Best Management Practices	Level of Significance with Mitigation
Social and Economic Resources		
The proposed setback alignment would result in the relocation of 32 residences and up to 182 farm structures.	Land and homeowners would be compensated for land and home value effects/takings to the extent required by law.	LTS[1]
Land Use		
The levee system would convert 123 acres of row crop, 35 acres of orchard, 11 acres of riparian, and 47 acres of agricultural support lands. Potential conversion of an additional 2,135 acres of land confined between the levees.	This effect represents an incompatible land use and is a significant effect that cannot be mitigated.	SU[2]
Agriculture, Prime and Unique Farmlands		
The setback levee would result in a loss of 158 acres of prime farmland. A total of 1,254 acres of prime farmland confined by the levee system has the potential of conversion (to native habitat) due to indirect effects (inability to farm due to size, accessibility, or other factors).	The conversion of prime farmlands represents an effect that cannot be mitigated.	SU
Transportation		
Temporary direct transportation effects would include lane closure during road repair, roadway safety hazards, and an increase in traffic volume.	• Lead agency to provide traffic management plan. • Contractors would use construction easements as much as feasible when hauling materials to the construction site. • Traffic would be rerouted when necessary to avoid construction areas. • Flaggers would be stationed to slow or stop approaching vehicles to avoid conflicts with construction vehicles or equipment.	LTS

[1] LTS = Less than significant
[2] SU = Significant unavoidable

Table ES-2. Summary of Environmental Effects and Mitigation - Modified Wide Setback Levee Plan

Significant Effects	Mitigation and Best Management Practices	Level of Significance with Mitigation
Noise		
Construction of the setback levees would temporarily produce decibel levels above the significance threshold for some sensitive receptors during construction.	Mitigation would reduce the effects, but not to a less-than-significant level. • Construction equipment would be outfitted and maintained with noise-reduction devices such as mufflers. • Construction would be limited to daytime hours.	SU
Air Quality		
NO_x emissions would exceed the significance thresholds established by the YSAQMD. The exceedence would be a temporary effect during construction.	The following mitigation would reduce NO_x emissions, but not to a less-than-significant level. Incorporate NO_x mitigation measures into construction plans and specifications.	SU
PM_{10} emissions would exceed the significance thresholds established by the YSAQMD. The exceedence would be a temporary effect during construction. Sensitive receptors would also be exposed to the high levels of fugitive dust emissions.	The following mitigation would reduce PM_{10} emissions, but not to a less-than-significant level. The lead agency would provide a dust suppression plan that would likely include the following measures: • All construction areas, unpaved access roads, and staging areas would be watered as needed during dry soil conditions, or soil stabilizers would be applied. • All trucks hauling soil or other loose material would be covered or have at least 2 feet of freeboard. Construction vehicles would use paved roads to access the construction site wherever possible. • Vehicle speeds would be limited to 15 mph on unpaved roads and construction areas, or as required to control dust. • Streets would be cleaned daily if visible soil material were carried onto adjacent public streets. • Soil stabilizers would be applied to inactive construction areas on an as-needed basis.	SU

Table ES-2. Summary of Environmental Effects and Mitigation - Modified Wide Setback Levee Plan

Significant Effects	Mitigation and Best Management Practices	Level of Significance with Mitigation
Air Quality (continued)		
	• Exposed stockpiles of soil and other excavated materials would be enclosed, covered, watered, or applied with soil binders as needed. • Vegetation would be replanted in disturbed areas as quickly as possible following the completion of construction.	
Settling Basin		
The removal of the training levee could alter the distribution of sedimentation in the settling basin.	Design of the Modified Wide Setback Levee Plan would incorporate the function of the settling basin.	LTS
Water Quality		
Pollutants from construction equipment and erosion at the construction site could temporarily degrade the water quality of local runoff during construction.	The proper permitting procedures would be adhered to. In addition, appropriate best management practices and monitoring would be implemented to preserve the quality of surface runoff.	LTS
Vegetation and Wildlife		
Project-related effects, as identified by the USFWS in its draft CAR, would include loss of 174 acres of agricultural habitat, 49 acres of orchard trees, 9.01 acres of riparian habitat, and 0.69 acres of shaded riverine aquatic habitat.	Mitigation for habitat loss would be outlined by the Fish and Wildlife Service according to guidelines detailed in the CAR. (Appendix A)	LTS

Table ES-2. Summary of Environmental Effects and Mitigation - Modified Wide Setback Levee Plan

Significant Effects	Mitigation and Best Management Practices	Level of Significance with Mitigation
Vegetation and Wildlife (continued.)		
Construction-related effects would include disturbance from equipment and crews and potential disturbance of species.	Mitigation measures include: • Restricting construction crews to the right-of-way and confinement of disturbance to as small an area as possible; • Requiring construction crews to maintain a 15 m.p.h. speed limit on all unpaved roads to reduce the chance of wildlife being mortally wounded if struck by construction equipment; and • Conducting of nest surveys prior to the removal of any trees or scrub shrub to ensure migratory birds would not be lost during construction, pursuant to the Migratory Bird Treaty Act.	LTS
Special-Status Species		
Project-related effects to special-status species (valley elderberry longhorn beetle, Swainson's hawk, giant garter snake, northwestern pond turtle, chinook salmon, steelhead) would include loss of habitat.	Incidental Take Conditions for effects to Federal special-status species would be determined through formal consultation with the Fish and Wildlife Service and National Marine Fisheries Service and outlined in their Biological Opinion. Incidental Take Conditions for effects to State special-status species would also be determined through formal consultation with the California Department of Fish and Game. Proposed conservation measures are outlined in Section 5.7.	LTS
Construction-related effects would include disturbance from equipment and crews and potential take of species	Incidental Take Conditions for effects to special-status species would be determined through formal consultation with the Fish and Wildlife Service and National Marine Fisheries Service and outlined in their Biological Opinion. Incidental Take Conditions for effects to State special-status species would also be determined through formal consultation with the California Department of Fish and Game. Proposed conservation measures are outlined in Section 5.7.	LTS

Table ES-2. Summary of Environmental Effects and Mitigation - Modified Wide Setback Levee Plan

Significant Effects	Mitigation and Best Management Practices	Level of Significance with Mitigation
Cultural Resources		
Archeological and historic sites could be affected by levee construction, degradation of the present levee, and accelerated erosion.	Mitigation measures could consist of avoidance; data recovery; and, for structures, recordation under the Historic American Buildings Survey/Historic American Engineering Recordation criteria.	LTS
Esthetic and Visual Resources		
Effects would include the extension of bridges and the presence of a new viewblock to numerous rural residences.	Mitigation measures would include reseeding the new levees; however, this would not reduce the effect to a less-than-significant level.	SU

LOWER CACHE CREEK, YOLO COUNTY, CA
CITY OF WOODLAND AND VICINITY

DRAFT ENVIRONMENTAL IMPACT STATEMENT/
ENVIRONMENTAL IMPACT REPORT
FOR POTENTIAL
FLOOD DAMAGE REDUCTION PROJECT

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AADT	annual average daily traffic volumes
AAHU	annual average habitat unit
ADT	average daily traffic volumes
AF	acre-foot
AFB	alternative formulation briefing
AHPA	Archaeological and Historic Preservation Act
APE	area of potential effect
AQMD	air quality management district
BMP	best management practice
CAA	Clean Air Act
CalTrans	California Department of Transportation
CAR	Coordination Act Report
CCR	California Code of Regulations
CCRMP	Cache Creek Resource Management Plan
CCSB	Cache Creek settling basin
CDC	California Department of Conservation
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code Federal Regulation
cfs	cubic feet per second
city	City of Woodland
CNEL	community noise exposure L_{dn}
CR	county road
dB	decibels
dBA	A-weighted decibels
DFG	California Department of Fish and Game
DWR	California Department of Water Resources
EDR	Environmental Data Resources, Inc.
EIR	environmental impact report
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Maps
GGS	giant garter snake
HCP	habitat conservation plan
HEP	habitat evaluation procedure
HSI	habitat suitability index
HTRW	hazardous, toxic, radiological waste
HU	habitat unit
HWY	highway
LCCFB	Lower Cache Creek flood barrier
msl	mean sea level
NAVD	North America vertical datum

NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	U.S. National Marine Fisheries Service
NPDES	National Pollution Discharge Elimination System
NRCS	USDA Natural Resources Conservation Service
NRHP	National Register of Historic Places
OCMP	Off-Channel Mining Plan
O&M	operations and maintenance
PA	programmatic agreement
PCB	polychloride biphenyls
PED	preconstruction engineering and design
PM_{10}	suspended particulates
ppm	parts per million
PNP	probable nonfailure point
ROG	reactive organic gases
RWQCB	Regional Water Quality Control Board
SCAQMD	Sacramento County Air Quality Management District
SEIR	supplemental environmental impact report
SH	State highway
SHPO	State Historic Preservation Officer
SMARA	Surface Mining and Reclamation Act
SRA	shaded riverine aquatic
SWPPP	storm water pollution prevention plan
SWRCB	State Water Resources Control Board
TMDL	total maximum daily load
UPNCRR	Union Pacific Northern California Railroad
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VEC	valued ecosystem component
VELB	valley elderberry longhorn beetle
VMT	vehicle mile traveled
WDR	waste discharge requirement
YSAQMD	Yolo-Solano Air Quality Management District

LOWER CACHE CREEK, YOLO COUNTY, CA
CITY OF WOODLAND AND VICINITY

DRAFT ENVIRONMENTAL IMPACT STATEMENT/
ENVIRONMENTAL IMPACT REPORT
FOR POTENTIAL
FLOOD DAMAGE REDUCTION PROJECT

Chapter 1

CHAPTER 1
PURPOSE AND NEED FOR THE PROPOSED ACTION

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

Downstream from right bank at Olivers in 1995.

Highway 99, upstream of East Frontage Road in 1995.

CHAPTER 1.0

PURPOSE AND NEED FOR THE PROPOSED ACTION

1.1 Introduction

The Lower Cache Creek, Yolo County, California City of Woodland and Vicinity Draft Feasibility Report for Potential Flood Damage Reduction Project (Feasibility Report) addresses flooding problems in the lower reach of Cache Creek. This project is being 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 National Environmental Policy Act (NEPA) ensures that Federal agencies will consider the environmental effects of their actions. It also requires that an Environmental Impact Statement (EIS) be included in every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment. The California Environmental Quality Act (CEQA) charges public agencies with avoiding or substantially reducing significant environmental damage where feasible. The Environmental Impact Report (EIR) is an informational document that informs public agency decision makers and the general public of the significant environmental effects of a proposed project. A cost-share agreement between the Corps and the Board has resulted in a joint EIS/EIR. The Corps is the lead agency under NEPA, and the Board is the lead agency under CEQA. The City of Woodland is a cooperating agency under CEQA.

This Draft EIS/EIR summarizes the results of the Feasibility Report. Chapter 1 is an overview of this environmental document, including information on the report's purpose, the authorization for the project, description of the project area, and the purpose and need for the project. It also includes a brief overview of the proposed project's background and history, and it identifies significant issues. Sections including the decisions to be made based on this analysis and the organization of this Draft EIS/EIR are also included.

1.2 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, and Federal interest was found in proceeding with a feasibility level-investigation of flood damage reduction 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.

1.3 Study and Project Area Location and Descriptions

The study area addressed in this report includes the entire Cache Creek watershed from the eastern foothills of the Coast Range to the western levees of the Yolo Bypass. The area includes parts of Yolo, Colusa, and Lake Counties (Figure 1-1). The focus of the report is flood damage reduction opportunities specific to the project area, which is the lower reach of Cache Creek and the city of Woodland in Yolo County (Figure 1-2).

Cache Creek originates below the outlet channel of Clear Lake on the western foothills of the Coast Range and is fed by North Fork Cache Creek (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. When there is adequate flow, Cache Creek is connected to the Sacramento River via the Yolo Bypass and a 400 cubic feet per second (cfs) low-flow culvert that passes through the east levee of the settling basin, south of the over flow weir. In addition to providing water and shelter 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 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 over use and livestock in the rangeland portion of the creek, and nonnative plant introduction of species such as tamarisk and giant reed.

1.4 Hydrology in Project Area

The project area includes the lower planar reach of Cache Creek. This encompasses gravel mining and agricultural areas, the city of Woodland, the town of Yolo, and the settling basin. Prior to significant gravel mining, Cache Creek is described as being a wide, relatively steep braided channel upstream from Yolo and a narrow, incised channel flowing in fine-grained overbank deposits and tule marsh downstream from Yolo (EIP Associates, 1995). In general, average channel width in gravel-mined reaches of Cache Creek has decreased from this historic condition due to bridge and levee construction and aggregate extraction. Conversely, average channel depths have increased as a result of channel degradation and confinement by levees and bridges. General comments regarding the geomorphic characteristics of the project area are listed below:

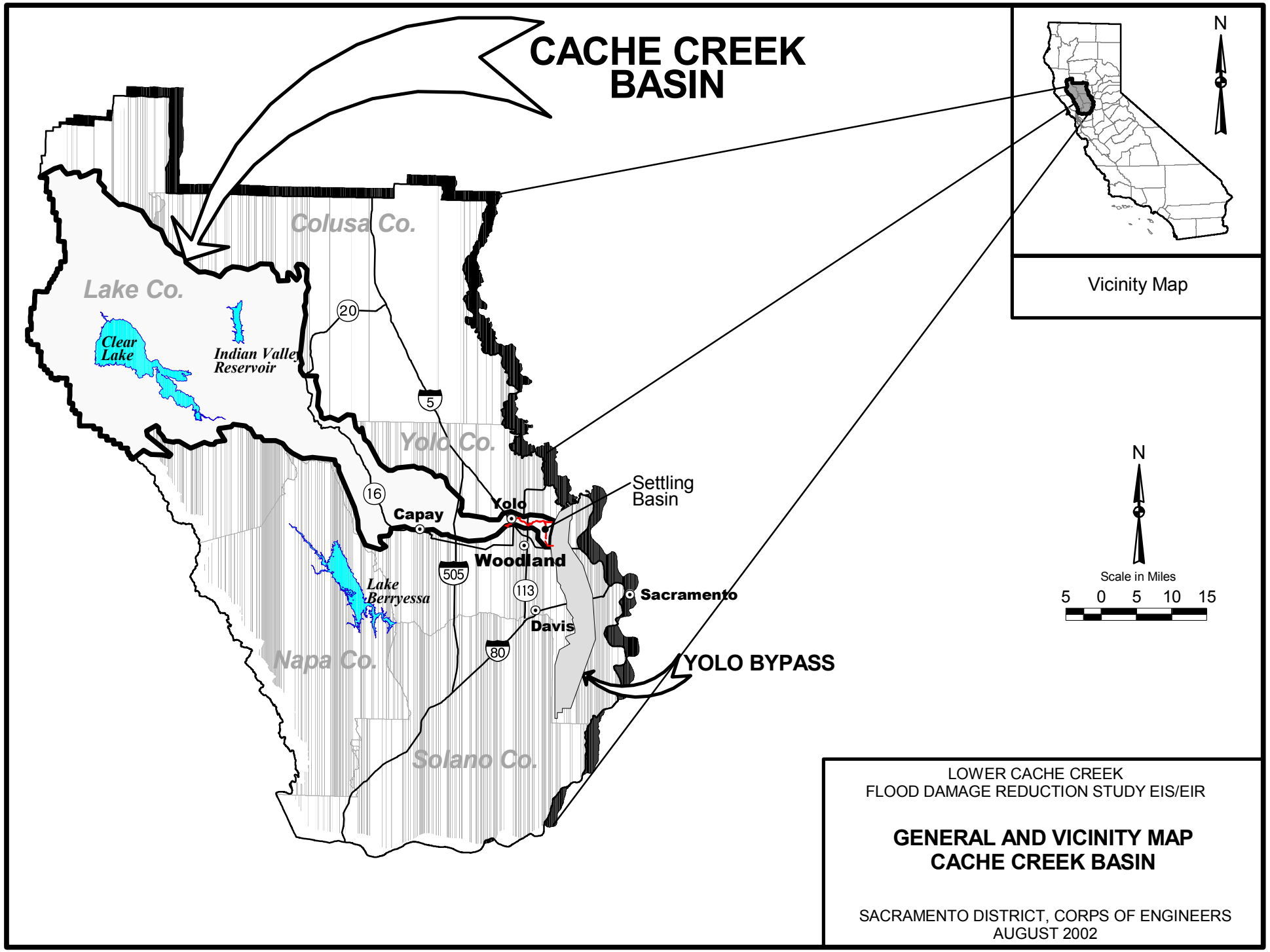

CACHE CREEK BASIN
Colusa Co.
Lake Co.
Clear Lake
Indian Valley Reservoir
20
5
Yolo Co.
16
Capay
Yolo
Settling Basin
Woodland
505
113
Davis
Sacramento
Lake Berryessa
80
Napa Co.
YOLO BYPASS
Solano Co.
N
Vicinity Map
N
Scale in Miles
5 0 5 10 15
LOWER CACHE CREEK
FLOOD DAMAGE REDUCTION STUDY EIS/EIR
GENERAL AND VICINITY MAP
CACHE CREEK BASIN
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
AUGUST 2002

Figure 1-1

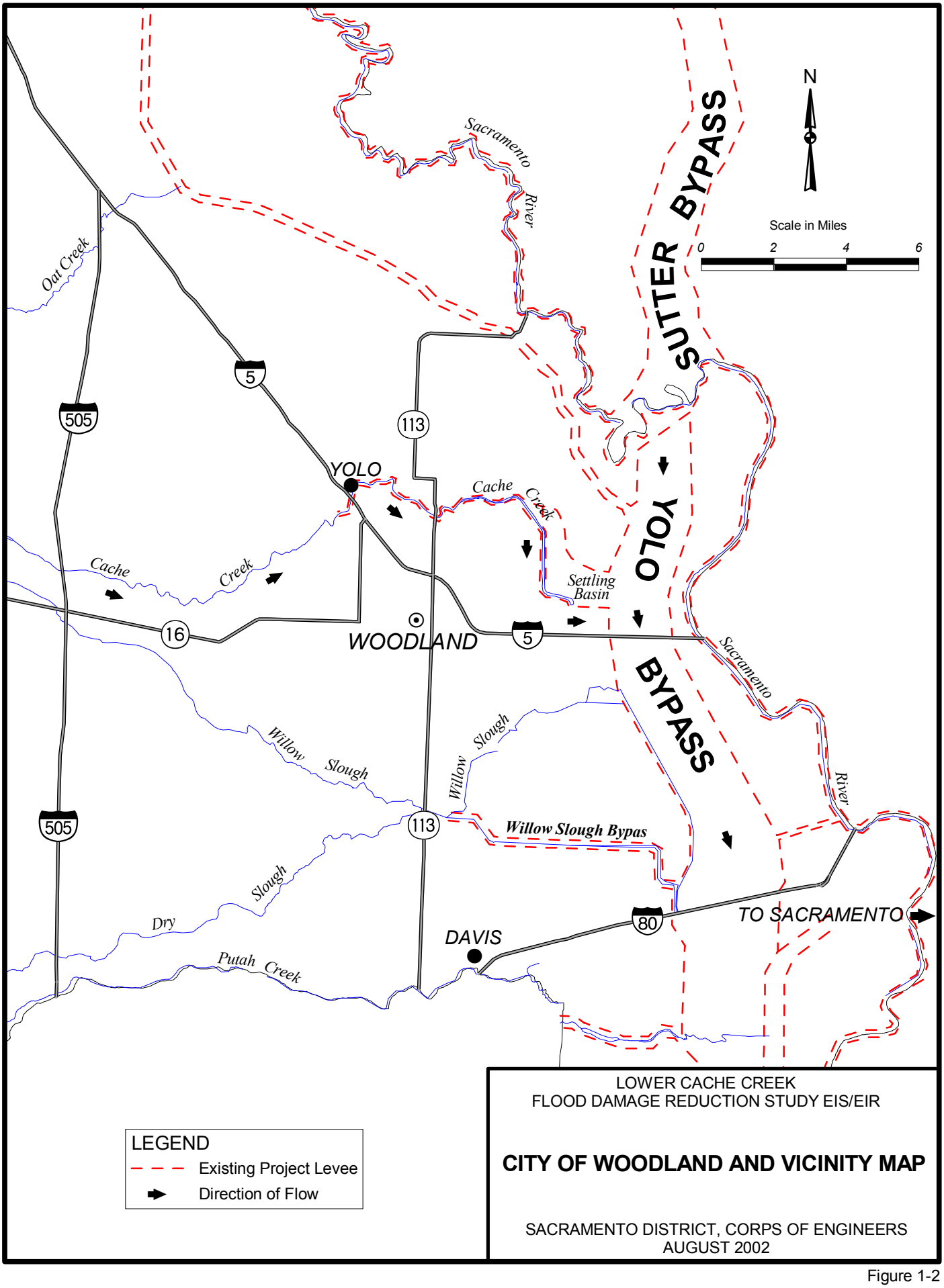

N
Scale in Miles
0 2 4 6
SUTTER BYPASS
YOLO BYPASS
Sacramento River
Oat Creek
5
505
113
YOLO
Cache Creek
Settling Basin
Cache Creek
16
WOODLAND
5
Sacramento River
Willow Slough
Willow Slough
505
113
Willow Slough Bypas
Slough
Dry
80
TO SACRAMENTO
DAVIS
Putah Creek
LEGEND
Existing Project Levee
Direction of Flow
LOWER CACHE CREEK
FLOOD DAMAGE REDUCTION STUDY EIS/EIR
CITY OF WOODLAND AND VICINITY MAP
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
AUGUST 2002

Figure 1-2

- Stream gradient on lower Cache Creek varies from about 0.0015 upstream from I-5 to about 0.00011 near the settling basin.

- The active channel width appears to have decreased since 1937. However, the course of the creek has remained relatively constant.

- Cache Creek exhibits a widening trend with distance upstream from the Interstate 5 (I-5) bridge.

- The frequency and severity of bank erosion and bank instability in the project area increases with distance upstream from the settling basin (with exception to the gravel mines). Likewise, channel bed lowering increases with distance upstream from the settling basin. The channel head has lowered 4 to 26 feet since 1955. This has resulted in channel banks that are generally higher, steeper, and more prone to bank erosion and instability with distance upstream.

- Bank instability is characterized primarily by areas of active bank erosion and by bank slumping. Areas of active bank erosion typically exhibit nearly vertical banks of exposed sediment, indicative of recent erosion. Bank slumping is evidenced by single or multiple vertical scarps (2 to 3 feet high) at varying levels on the bank slope, indicating slumping and subsequent erosion of the down slope segment of the bank.

- Historically, numerous bank protection projects have been constructed, primarily in river bends. Thus, bank stability in these areas is due to artificial bank protection rather than inherent stream stability. Future maintenance of existing and construction of new bank protection projects would be necessary in the project area, for without-project conditions.

According to the April 2001 FEMA Flood Insurance Study, the city of Woodland has no recorded history of flooding. However, in 1958, 1983, and 1995, Cache Creek rose to the top of both levees and overflowed its banks toward the city of Woodland. In 1995, the overland flow came within 1 block of Woodland. In 1983, overland flow flooded areas in the easterly part of what is now within the city limits of Woodland. According to the USGS, the peak flow in January 1983 at the Rumsey gage was estimated to be 53,000 cfs, which is a 1 in 50 chance event at this location. There was a levee break downstream from County Road CR 102 during this flood. Federal, State, and local agencies patched levee boils at that time to prevent additional levee breaks along both sides of the Cache Creek levee system.

Upon levee failure, the distribution of the sheet flow would vary depending on the location of failure. For purpose of discussion, the project area has been divided into four sections: area north of Cache Creek, agricultural plain east of I-5, agricultural area west of I-5, and the existing Woodland storm drainage system.

1.4.1 The Area North of Cache Creek

The area north of Cache Creek includes the town of Yolo and many agricultural fields. Existing levees are maintained from I-5 to the settling basin. Floodwaters that exceed the existing levee system flow to the northeast toward Knights Landing and the Yolo Bypass. Under current conditions, the town of Yolo would have reliable protection from floods that have a 1 in 10 chance of occurring in any given year and less reliable protection for floods that have up to a 1 in 20 chance of occurring in any given year.

1.4.2 The West Section

The west section includes the area between the intersection of County Road (CR) 94B and Cache Creek and where I-5 crosses the creek. Existing levees extend up approximately half of the left (north) bank and a smaller portion on the right (south) bank near I-5. Gravel has been mined since the 1930's from Capay to the town of Yolo (14.4 miles). This mining area comprises much of this section. Waters that overtop the right (south) levee flow southeast toward the city of Woodland. The elevated berm of I-5 initially serves as a hydraulic barrier, directing some of the water to the western section of Woodland. If floodwater exceeds the elevation of the highway, it would overtop the highway as it did during the 1995 flood event.

1.4.3 The East Section

The east section extends from the I-5 and railroad crossings to the outflow from the settling basin into the Yolo Bypass. The existing levee system borders the entire creek and the settling basin. Floodwaters that overtop the right bank of the existing levee system would flow southeast toward the eastern portion of Woodland.

The existing settling basin was constructed to minimize the adverse effect on the hydraulic capacity of the Yolo Bypass caused by excess sediment deposition by allowing sediment carried by Cache Creek to settle out before entering the Yolo Bypass. The settling basin is bounded by levees on all sides and covers 3,600 acres. The Corps originally constructed the basin in 1937. The levee heights and locations have been modified several times to control sediment deposition and increase sediment storage capacity.

In 1991, modifications to the settling basin included 50-year storage capacity with an average of 340 acre-feet of sediment accumulation per year. This corresponds to an average trapping efficiency of 55 percent, assuming existing levee project conditions and a Cache Creek channel conveyance of 30,000 cfs. Flows from Cache Creek enter the northwest corner of the settling basin and exit via two structures in the southeast corner of the basin: (1) a 1,700-foot concrete weir and (2) a grated 400-cfs double-box culvert low-flow outlet. The crest elevation of the weir is currently set at an approximate elevation of 35 feet (North American Vertical Datum of 1988, NAVD88), approximately 11 feet above ground surface downstream. It is planned that the weir would be raised 6 feet in 2017 or when the basin fills with sediment such that the trap efficiency decreases to less than 30 percent.

A training levee adjacent to the west levee of the settling basin ties into the end of the left levee of Cache Creek. The training levee was designed to direct the flow to the southern portion of the settling basin, maintaining the flow velocity and preventing sediment deposition and clogging near the inlet of the basin. At the release point of the training levee, the flow "spreads out," reducing the flow velocity and increasing sedimentation. The release point of the training levee is planned to be removed in increments, encouraging an even distribution of sediment deposition across the basin.

1.4.4 Existing Storm Drain System for the City of Woodland

The City of Woodland has evaluated the existing storm drainage system serving the city and the portions of Yolo County located between the city and the Cache Creek System. The purpose of the evaluation has been to identify existing storm drainage problems and to develop a storm drainage facilities master plan. These efforts only consider local runoff. The evaluation is presented in the report entitled "City of Woodland Storm Drainage Facilities Master Plan," December 1999, Borcalli and Associates.

In general, the storm drain system conveys runoff by gravity flow from west to east. The agricultural lands are served by a minimal drainage system, whereas the city is served by piped trunk systems. The trunk systems discharge into the North or the South Canals, conveying the runoff to the city's three pump stations. The pump stations discharge into the Outfall Channel, which conveys runoff to the Yolo Bypass.

The city's existing trunk system is inadequate to accept the runoff from the agricultural areas on the west and south sides of the city, resulting in overflow onto the city streets. Inadequate trunk capacity results in street flooding for floods with a 1 in 2 or 1 in 10 chance of occurring in any given year. The extent and magnitude of street flooding increases significantly between these events. When flows reaching the North Canal and South Canal Pump Stations exceed their pumping capacities, the results are high stages and ponding in the North and South Canals.

1.5 Purpose and Need for the Action

The Corps and the non-Federal cost-sharing partners are seeking to develop and implement a plan that would reduce flood damage to the City of Woodland resulting from flooding from lower Cache Creek. The purpose of this document is to consider the environmental effects in the decision making process and provide full disclosure of these effects to the public.

Lower Cache Creek has a history of flooding. Four major flood periods have been documented for the Cache Creek basin during the last half of the 20th century, and 20 severe floods have occurred since 1900. The most severe floods of recent years in the Cache Creek basin downstream from Clear Lake occurred in 1939,1955, 1956, 1958, 1964 and 1965, 1970, 1983, 1995, and 1997.

According to the April 2001 FEMA Flood Insurance Study, the city of Woodland has no recorded history of flooding. However, in 1958, 1983, and 1995, Cache Creek

rose to the top of both levees and overflowed its banks toward the cities of Woodland and Davis. In 1995, the overland flow came within 1 block of Woodland. In 1983, overland flow flooded areas in the easterly part of what is now in the city limits of Woodland. According to the USGS, the peak flow in January 1983 at the Rumsey gage was estimated to be 53,000 cfs, which is a 1 in 50 chance event at this location. There was a levee break downstream from County Road CR 102 during this flood. Federal, State, and local agencies patched levee boils at that time to prevent additional levee breaks along both sides of the Cache Creek levee system.

The peak flow at CR 94B in January 1995 was approximately 48,000 cfs. An estimated 3,800 cfs overflowed the south bank and almost nothing overflowed the north bank upstream of the levee system. The total flow (approximately 48,000 cfs, peak) represents a 1 in 40 chance event. The volume of the flood hydrograph was approximately a 1 in 20 chance event. The City of Woodland observed and prepared a sketch of high-water marks in the vicinity of the city of Woodland for the March 1995 event. These observations do not define the full extent of the flood boundary.

Without a flood damage reduction project, annual damages to real property from overflows from Cache Creek would be expected to continue to be about $12 million. Other losses or adverse effects would continue to include the potential for flood-related loss of life, contamination from sanitary sewage and hazardous materials, and the extended closure of the section of I-5 east of the city of Woodland.

The city of Woodland and surrounding local areas seek to reduce pending flood hazards. The purpose of the Lower Cache Creek Potential Flood Damage Reduction Project is to provide an economically feasible and environmentally sensitive method to alleviate flood-related damages.

1.6 Significant Issues

Significant issues for the purpose of this Draft EIS/EIR are defined as topics that were taken into account during the development of the alternative plans. Hydrology, land use, transportation, environmental constraints, and public support are factors that influenced the project feasibility.

Currently, the creek channel and existing levee system do not provide a sufficient conveyance capacity to provide protection from floods that have a 1 in 100 chance of occurring in any given year for the city of Woodland. Without this protection, citizens within the 1 in 100 chance flood plain (as mapped by FEMA) would be required to obtain flood insurance. If the existing levee system fails or overtops, the elevated grades of I-5 and the California Northern Railroad, in addition to the west levee of the settling basin, would direct the escaped floodwaters toward the city of Woodland, causing further financial burdens associated with the lack of flood protection.

The primary objective of this project is to improve flood protection to the city of Woodland. This city is the most highly populated, urban, commercial, and industrial development in the study area. The population of Woodland is projected to continue

growing at approximately 2 percent per year. However, the recent designation of the city within the FEMA 1 in 100 chance flood plain now requires new developments to be in accordance with the Federal Flood Insurance Program. This significantly increases development costs.

Unincorporated private agricultural lands comprise approximately 60% of the project area. Construction of a new flood protection system would require takings of some private agricultural land. Furthermore, the placement of this system would also influence the location and amount of land provided with flood protection; some areas would be removed from the FEMA 1 in 100 chance flood plain. Modifications and/or relocation of buildings may be required for structures within the unprotected flood plain.

Other constraints include the bridges in the project area. The current levee system, which is adjacent to the terminus of the bridges, prevents flooding along the roadways for equal or lesser flows than for the flow that has a 1 in 20 chance of occurring in any given year[1]. A new flood protection system offering a higher degree of protection by containing the flow in the creek would have to comply with the current dimensions of the bridges for this flood protection to continue and the existing bridge to be maintained. The relatively narrow openings of these bridges constrict the flood plain within the proximity of the bridges, resulting in relatively high flow velocities through these narrow sections during flooding. Consequently, if the roadways and bridges are to be protected, rock slope protection is required for these narrow openings.

Rock slope protection (riprap) in addition to other alterations near the bank of the creek would require environmental mitigation. The shaded riverine aquatic habitat (SRA) along the creek and the abundant number of elderberry bushes along the creek bank (the habitat of the endangered valley elderberry longhorn beetle), increase the sensitivity of this area. Other environmental considerations include the presence of habitat within the project area for the following potentially affected species: giant garter snake, Swainson's hawk, bank swallow, northwestern pond turtle, Central Valley steelhead, and chinook salmon.

Public opinions and concerns were identified during two public workshops held on May 30, 2000 and May 31, 2001. Since that point, the alternative plans have been modified in order to address public comment as well as comply with the above-mentioned significant issues.

1.7 The Decisions to be Made Based on This Analysis

The District Engineer of the Sacramento District of the Corps must decide whether or not to recommend that a plan described in this report be authorized for implementation as a Federal project, with modifications at the discretion of the Chief of Engineers. The City of Woodland must decide whether to implement the recommended plan.

[1] Although designed for a flow capacity of a 1 in 10 chance of occurring, the existing levee system has historically contained flow events of a 1 in 20 chance of occurring in any given year.

1.8 Organization of the Draft EIS/EIR

This report is organized into eight chapters:

- Chapter 1 is the introduction;
- Chapter 2 describes the plan formulation and alternative plans considered for this project;
- Chapter 3 discusses the existing environmental setting and baseline conditions;
- Chapter 4 discusses the effects of the proposed alternative plans on the affected environment and describes mitigation;
- Chapter 5 presents other required disclosures including public involvement and cumulative effects;
- Chapter 6 is the list of preparers;
- Chapter 7 lists the references; and
- Chapter 8 is the index.

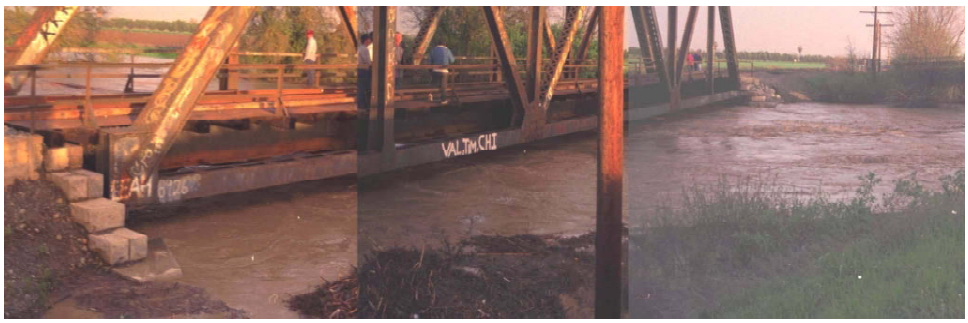
LOWER CACHE CREEK, YOLO COUNTY, CA
CITY OF WOODLAND AND VICINITY

DRAFT ENVIRONMENTAL IMPACT STATEMENT/
ENVIRONMENTAL IMPACT REPORT
FOR POTENTIAL
FLOOD DAMAGE REDUCTION PROJECT

Chapter 2

CHAPTER 2
ALTERNATIVE PLANS INCLUDING THE PROPOSED ACTION

Overbank spill upstream of existing project, just west of I-5 in 1995.



Upstream of railroad bridge near town of Yolo in 1995.

CHAPTER 2.0

ALTERNATIVE PLANS INCLUDING THE PROPOSED ACTION

2.1 Introduction

This chapter describes alternative plans and summarizes their potential environmental effects and mitigation requirements.

2.2 Plan Formulation and Evaluation

Plan formulation describes the process of identifying objectives, constraints, and planning criteria in order to establish the most effective project alternatives. The plan formulation process is explained in detail in the "Lower Cache Creek, Yolo County, CA City of Woodland and Vicinity Draft Feasibility Report for Potential Flood Damage Reduction Project".

The City of Woodland, the Board, and the Corps have identified the following objectives for formulating flood damage reduction plans. The objectives were limited to flood damage reduction, not ecosystem restoration. The local sponsor's primary interest at this time is flood damage reduction. Although several agencies and potential sponsors are aware of this project, none have expressed an interest in being an ecosystem restoration project sponsor. The objectives of the Lower Cache Creek Potential Flood Damage Reduction Project are as follows:

- Provide flood damage reduction to the city of Woodland from Cache Creek. Plans were formulated according to the Federal objective of water and related land resource planning, which requires water resources projects to contribute to the national economic benefit while protecting the Nation's environmental resources, consistent with Federal, State, and local laws, regulations, and policies.

- Maximize the use of existing flood damage reduction facilities prior to constructing new facilities.

Plans were formulated to address congressional direction and current applicable laws, regulations, and policies. Constraints to the plan formulation and alternative evaluation process were identified as follows:

- Minimize the associated costs of the flood damage reduction system.

- Minimize adverse effects to the area's residents as well as environmental, cultural, and agricultural resources.

2.3 Flood Damage Reduction Measures and Preliminary Plans

Based on the objectives and constraints, previous studies, local interest, and public comments, a variety of flood reduction measures were identified, screened, and either not considered further or developed/combined into several preliminary plans to reduce flood damages in the project area.

2.3.1 Flood Damage Reduction Measures

Both nonstructural and structural measures were considered and evaluated based on their costs, environmental and socioeconomic effects, and potential for combining with other measures. Nonstructural measures included raising/flood proofing structures, relocating structures, and a flood warning system. Although deemed infeasible on a large scale, raising/floodproofing and relocating structures in sparsely populated areas were considered further to mitigate project-induced effects. In addition, a floodwarning system was considered further as means to reduce flood damages and ensure public safety.

Structural measures included storage, channel improvements, levee modification, setback levees, and backup levee. Previous studies had evaluated several potential dam sites, as well as combinations of storage and downstream objective releases. Among these sites were Bear Creek, Wilson Valley, just downstream from the Capay Diversion Dam, and Blue Ridge. All of these sites were eventually deemed infeasible due to storage limitations, foundation or seismic problems, construction or operational difficulties, high costs, or lack of local support. As a result, this measure was not considered further. Channel improvements such as clearing, reseeding, and slope protection were considered further in response to the interest expressed by some of the landowners adjacent to the creek. Modifying existing levees or constructing new streambank, setback, or backup levees were all considered further as ways to contain floodflows and reduce flood damages.

2.3.2 Preliminary Plans

Based on the screening of measures and public comments, five preliminary flood damage reduction plans were developed for lower Cache Creek. In addition to the no-action plan, they include channel clearing, raising existing levees and construct new levees, channelization and constructing new levees, constructing setback levees and raising existing levees, and constructing a flood barrier levee.

Channel Clearing

This plan would include clearing the existing channel and improving the conveyance of floodwater within the channel by removing riparian vegetation, sediment deposits, and other obstructions. The cleared area would be reseeded with grass, and rock slope protection would be placed where required.

Studies indicated that although this plan would improve the conveyance capacity of the channel, it would still not provide a sufficient level of flood damage reduction and

would also significantly affect the environment. As a result, this plan was not considered further in the feasibility report.

Raising Existing Levees and Construct New Levees

This plan would involve raising the existing levees along approximately 8 miles of Cache Creek from CR 97A to the settling basin. Levees would be raised on both sides of the creek, and new levees would be constructed on the south bank of the levee from CR 97A upstream 2 miles. On the north bank of the levee upstream from CR 97A, 1 mile of project levee would be raised, and approximately 1 mile would be newly constructed. This plan would involve bridge replacement and slope protection where required.

Studies indicated that hydraulic effects associated this plan would include higher channel velocities and increased peak flows entering the settling basin. Requirements for slope protection would result in the significant loss of riparian habitat. The mitigation for the loss of overall habitat would be very extensive. As a result, this plan was not considered further in the feasibility report.

Channelization and Constructing New Levees

This plan would combine (1) excavating a bench along the channel and (2) constructing a new levee adjacent to the bench. These features would be constructed along a 9.3-mile reach of Cache Creek from roughly 1 mile west of CR 97A to the settling basin. The channel bench would be constructed at approximately the water-surface elevation associated with the flood event that has a 1 in 2 chance of occurring in any given year and would be wide enough to maintain the design water-surface elevation at or below the probable non-failure point of the remaining levee. Where required, the existing levee affected by the bench would be removed and reconstructed adjacent to the bench. Bridge replacements and slope protection would be constructed as required.

Although channelization and levee construction would be required for the most part on only one side of the channel, the overall land requirements for this alternative would still be high given the requirement for 500 to 700 feet of terraced land adjacent to the channel. Additionally, high floodflow velocities would require slope protection at various locations and the removal of some riparian habitat. These requirements would cause significant environmental damage to the creek channel. As a result, this plan was not considered further in the feasibility report.

Constructing Setback Levees and Raising Existing Levees

This plan would involve installation of approximately 6.5 miles of setback levees on either one or the other side of Cache Creek and raising existing levees on the opposing side as required. In addition, adjacent to the 6.5-mile area, this plan would include approximately 3 miles of newly constructed levee on both sides of the channel banks downstream from Road 96. Bridge replacements and slope protection would be constructed as required.

Constructing a Flood Barrier Levee

This plan would consist of constructing approximately 6.7 miles of new levee from CR 96 (1.5 miles east of CR 97A) to the west levee of the Cache Creek Settling Basin. Approximately a 4,000-foot section of the west levee of the settling basin levee would be removed. Overflows from Cache Creek would generally flow from west to east over lands currently subject to flooding and discharge by gravity into the settling basin. Culverts would be placed at road and railroad crossings, and closure structures would be constructed as required at all crossings. Provisions would be made to protect homes and structures within the associated flood plain. A flood warning system would also be implemented.

2.4 Alternative Plans Considered in Detail

Based on a comparison of costs and ability to meet the planning criteria, Constructing Setback Levees and Raising Existing Levees (Setback Levees) and the Flood Barrier Levee (Lower Cache Creek Flood Barrier or LCCFB) were selected for further study as final plans. These two plans, as well as the No-Action Plan are considered in detail in this section and retained for effects assessment in this Draft EIS/EIR. For a more complete comparative analysis of the preliminary plans, refer to the "Lower Cache Creek, Yolo County, CA City of Woodland and Vicinity Draft Feasibility Report for Potential Flood Damage Reduction Project".

2.4.1 No-Action Plan

The No-Action Plan is the same as the without-project future condition. This alternative serves as the baseline against which the effects and benefits of the action plans are evaluated. Under the No-Action Plan, the Federal Government would take no action to implement a specific plan to reduce flooding of the city of Woodland, and the existing Cache Creek levee system would continue to provide reliable protection from a flood that has a 1 in 10 chance of occurring in any given year (existing levees have historically contained floods that have up to a 1 in 20 chance of occurrence). Damages to real property from overflows from Cache Creek would be expected to be about $12 million averaged annually. Other loses or adverse effects would continue to include the potential for flood-related loss of life, contamination from sanitary sewage and hazardous materials, and the closure of sections of I-5 located both north and east of the city of Woodland.

This plan would include the stabilization of Cache Creek. (Refer to the Feasibility Report). Over the project life of 50 years, bank stabilization and setbacks from erosion areas as well as flood fighting would be required. Table 2-1 shows the proposed future repairs of the existing Cache Creek levee system. These repairs are not currently agreed upon, but would be likely to occur. Over the 50-year life of the project, repairs would include 2,100 lineal feet of slope protection and 30,750 lineal feet of 150-foot setback levee. Operation and maintenance (O&M) activities also consist of vegetation clearing on the levees and within the stream channel to reduce any hindrances to flow. The repairs and O&M activities would require a subsequent need for environmental mitigation.

Table 2-1. Proposed Future Repairs of the Existing Cache Creek Levee System

Year		Feature	Location
2009		1,400 Lineal Feet of Slope Protection	Through I-5 Bridges
2009		700 Lineal Feet of Slope Protection	Bend near town of Yolo
2011		6,500 Lineal Feet of 150-foot Setback Levee	Upstream from I-5 on Left Bank
2024		1,500 Lineal Feet of 150-foot Setback Levee	Downstream from I-5
2024		4,000 Lineal Feet of 150-foot Setback Levee	Downstream from I-5
2024		3,000 Lineal Feet of 150-foot Setback Levee	Upstream from SH 113
2024		6,000 Lineal Feet of 150-foot Setback Levee	Downstream from SH 113
2024		1,000 Lineal Feet of 150-foot Setback Levee	Upstream from CR 102
2044		8,750 Lineal Feet of 150-foot Setback, Extend Project Levee Upstream	Upstream from I-5 and existing project on right bank

2.4.2 Lower Cache Creek Flood Barrier Plan

Features

The proposed Lower Cache Creek Flood Barrier (LCCFB) Plan would include constructing a levee along the northern urban limit line of the city of Woodland. The LCCFB would extend 6 miles, originating near the intersection of CR 19B and CR 96B and extending to the settling basin, just north of the city of Woodland. The general plan is shown in Figure 2-1.

The LCCFB would vary from 2.5 feet above the road surface at CR 96B to 18 feet in height at the west levee of settling basin. Existing roads would be raised to match the top of levee elevation of the LCCFB where possible. Where roads cannot be raised sufficiently, stoplog structures would be constructed to provide closure in the gap in the levee. Stop log structures would be constructed for CR 102, 101, 99 and SH 113, and at the California Northern Railroad opening in the I-5 embankment. A 350-cfs drainage canal would be constructed on the waterside of the LCCFB to serve internal drainage requirements of normal rainfall events and a 12-foot bench would separate the drainage channel from the LCCFB. Figure 2-2 displays a cross section of the drainage canal and LCCFB. Culverts would be constructed under all roads including I-5, SH 113, and railroads to facilitate drainage underneath these hydraulic barriers.

Five hundred feet north of where the flood barrier intersects the existing west levee of the settling basin, a 3,000-foot section of the west levee would be degraded to

ground level and an inlet weir would be installed to a crest elevation of 45 ft msl (NAVD88), allowing flood flows to drain by gravity from the flood plain into the settling basin. Water below the weir crest elevation would drain into the settling basin though triple (low-level drainage structure) box culverts. Flapgates would be installed to prevent backflow from the settling basin into the area west of the settling basin. Gated culverts would also be installed through the flood barrier levee to convey water to Woodland's pumping station.

In addition, a 5,250-foot section of the training levee within the settling basin would be removed. A haul route across the low-flow channel of Cache Creek would be necessary for removal of the training levee. This haul route would be 30 feet wide, 400 feet long, and located at the southern or downstream end of the existing west levee and training levee. Typically, the channel in this area is shallow with a soft, muddy bottom and patches of emergent vegetation. Surface water may not be present by late summer or early fall. Approximately 1,500 cubic yards of clean rock/cobble would be placed in the channel around three 24 inch CMP culverts. The rock would be capped by 2 feet of earth fill (1,000 cubic yards) and 6 inches of aggregate base. A layer of geotextile fabric would be placed between the culverts and the earth material.

The portion of the west levee of the settling basin east of CR 102 to the new inlet weir would be improved as follows: The sideslope on the west side of this levee would be flattened from 2H:1V to 3H:1V. Slope protection (riprap) would be added north of the intersection of the flood barrier along the western slope of the west levee of the settling basin approximately 12,000 feet and then west along the right bank of the existing Cache Creek levee to CR 102. The slope protection would be placed on the landside of these levees for protection against wave damage. Additionally, slope protection as shown in Figure 2-1 would be placed on the flood barrier (waterside only) from CR 101 to the intersection with the west levee of the settling basin for protection against wave damage during periods of ponding. Slope protection would also be added to the embankment of Interstate 5 where overtopping occurs. A 40-foot-deep slurry wall was also assumed for 15 percent of the flood barrier between CR 101 and the west levee of the settling basin.

Similar to pre-project conditions, under post-project conditions, the existing levee system would still contain flood events within a flow range of 30,000 to 36,000 cfs. (Although 30,000 cfs is the design flow, the levee system has contained events up to 36,000 cfs.) If this range is exceeded (a flood that has a 1 in 20 chance of occurring in any given year), the risk of overtopping and/or levee failure would significantly increase. Upon levee overtopping and/or levee failure, water would spill out of Cache Creek and flow northerly and (within the project area) in a southeast direction. Potential areas of ponding are shown in Figure 2-3.

N

1 0 1 Miles

YOLO

WOODLAND

CACHE CREEK SETTLING BASIN

Cache Creek

I-5

RD 17

RD 18

RD 18A

RD 18B

RD 18C

RD 94B

RD 96B

RD 97A

RD 98

RD 99

RD 99E

RD 101

RD 102

RD 19A

RD 19B

RD 20

RD 24

HWY 16

HWY 113

CALIFORNIA NORTHERN RR

CHURCHILL DOWNS

KENTUCKY AVE

MAIN ST

GIBSON RD

LEGEND

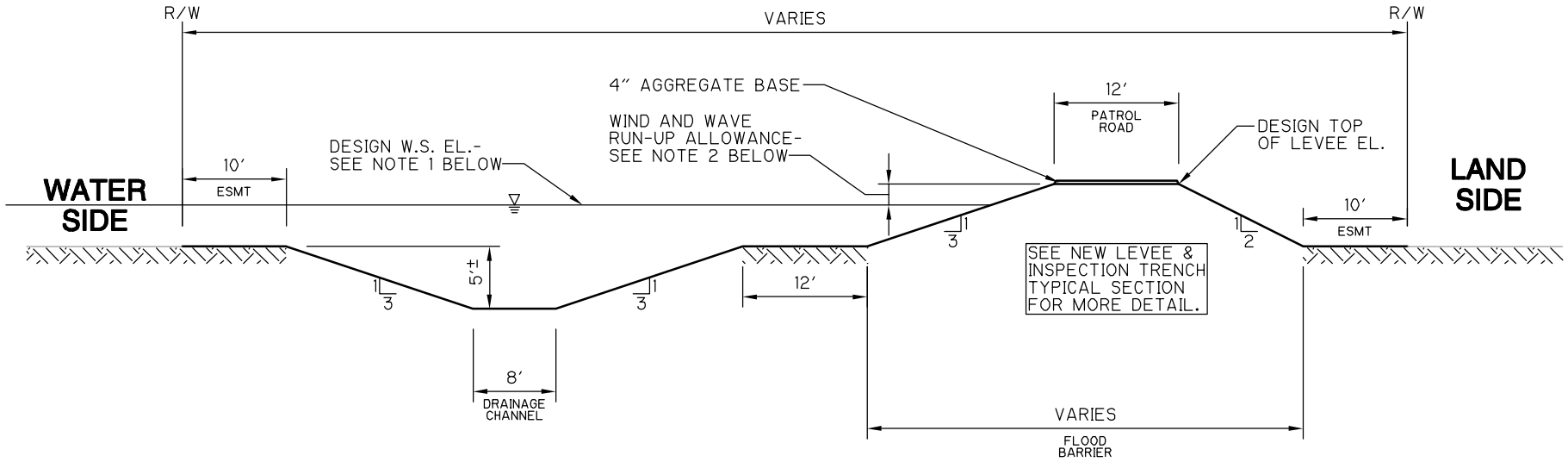
- Cache Creek
- Existing Project Levee
- Lower Cache Creek Flood Barrier
- Road Improvements
- Drainage Canal
- Slope Protection
- Remove Existing Levee
- Stoplog Structure
- Inlet Weir
- Culvert Locations

LOWER CACHE CREEK
FLOOD DAMAGE REDUCTION STUDY EIS/EIR

LOWER CACHE CREEK FLOOD BARRIER PLAN

SACRAMENTO DISTRICT, CORPS OF ENGINEERS
AUGUST 2002

Figure 2-1



LOWER CACHE CREEK
FLOOD BARRIER

NOT TO SCALE

NOTES

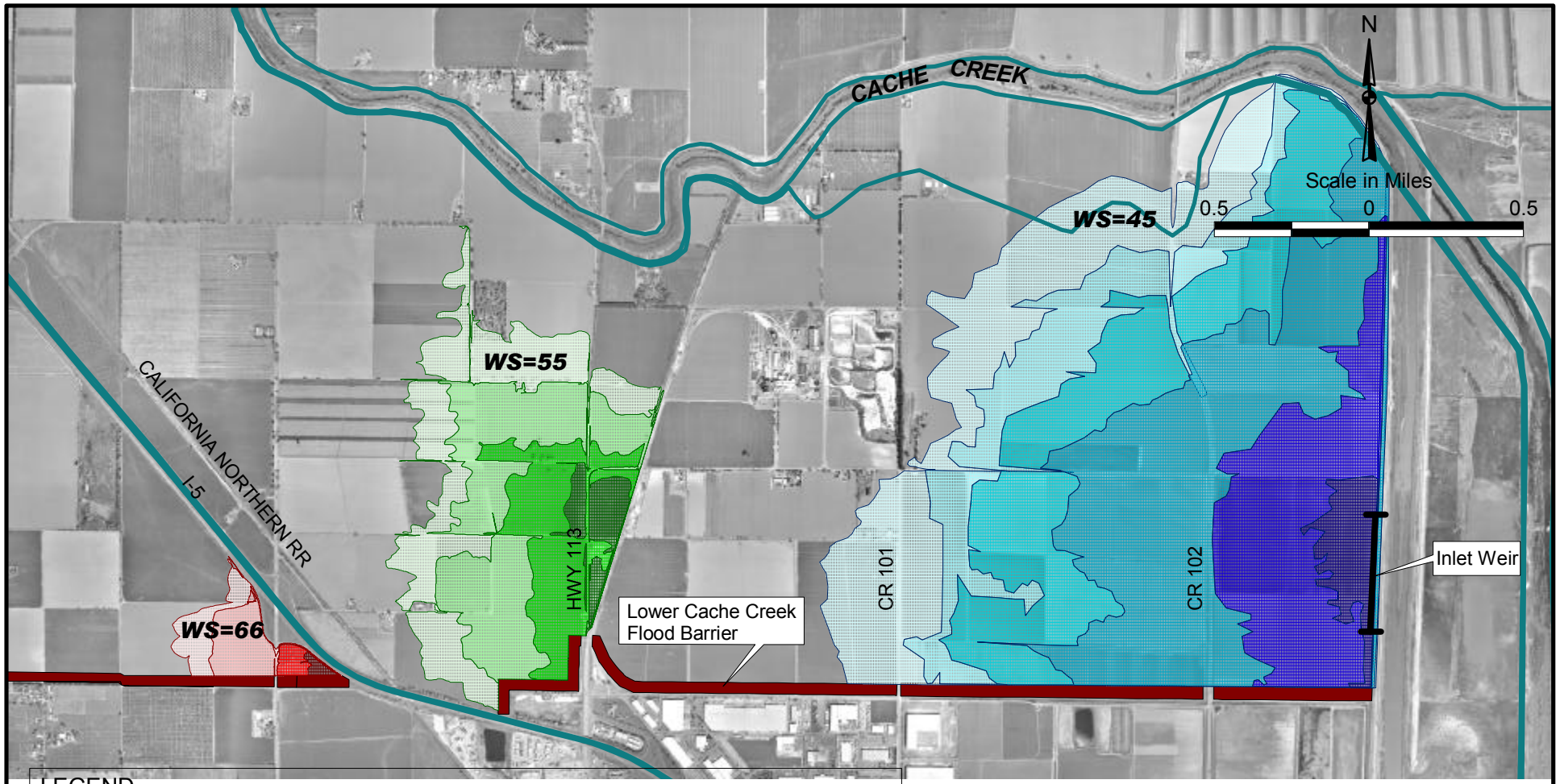
1. REFLECTS A RISK AND UNCERTAINTY APPROACH TO DESIGN.
2. VARIES 1 TO 2.5 FEET.

LOWER CACHE CREEK
FLOOD DAMAGE REDUCTION STUDY EIS/EIR

TYPICAL SECTION
LOWER CACHE CREEK
FLOOD BARRIER

SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SEPTEMBER 2002

FIGURE 2-2



LEGEND

1 in 100 Chance Flood Plain Boundary, taken from the Flood Insurance Rate Map (FIRM) for the City of Woodland, California, Yolo County, dated April 17, 2001, Federal Emergency Management Agency (FEMA)

WS Pond water surface elevation (Feet above mean sea level, NAVD88)

Ponding Depths

I-5	SH113	Northeast Corner
Approx. 6 Feet	Approx. 5 Feet	Approx. 11 Feet
4-6 Feet	3-5 Feet	9-11 Feet
2-4 Feet	1-3 Feet	7-9 Feet
<2 Feet	<1 Feet	5-7 Feet
		3-5 Feet
		< 3 Feet

NOTE: This figure only applies to flows larger than approximately a 1 in 40 chance flow.

LOWER CACHE CREEK
FLOOD DAMAGE REDUCTION STUDY EIS/EIR

LOWER CACHE CREEK FLOOD BARRIER
LONG-TERM FLOODWATER DEPTHS
IN PONDING AREAS

SACRAMENTO DISTRICT, CORPS OF ENGINEERS
OCTOBER 2002

Figure 2-3

The southeast corner, bordered by the LCCFB to the south and the west levee of the settling basin to the east, is of low elevation in the project area and would be prone to flooding and ponding during major flood events. Figure 2-4 indicates flood limits for various Cache Creek flood events in the range of floods that have a 1 in 20 to 1 in 100 chance of occurring in any given year. The drainage of this area would be dependent upon the hydraulic capacity of the pond outlet structures, water levels in the settling basin, and the available pumping capacity of the City's North Canal Pump Station.

Proposed outlet structures necessary to drain the pond consist of a 3,000-foot inlet weir (drains water to the settling basin) installed in the west levee of the settling basin and gated culverts through the west levee of the settling basin and through the flood barrier for low-flow conditions. Figure 2-3 shows the location of the inlet weir. During high ponding conditions, water from the ponding area would flow over the inlet weir into the settling basin, allowing access to CR 101 in about 5 days following a flood event that would have a 1 in 100 chance of occurring in any given year. Maximum ponding extents and depths are shown in Figure 2-3. (Refer to the Feasibility Report.)

The water levels in the settling basin would also influence the drainage. Figure 2-5 displays a representative cross section of the ground elevation, levee heights, and water table elevation for a flood that has a 1 in 200 chance of occurring in any given year. This figure shows that for large storm events, the inlet and outlet weirs to the settling basin may be submerged. However, during these high storm events, the water elevation in the Yolo Bypass would be lower than the settling basin such that backflow would not occur. Floodwaters would continuously drain down gradient from the agriculture land through the settling basin to the Yolo Bypass. At depths below the inlet weir to the settling basin, the drainage through the culvert into the settling basin would occur only under favorable hydraulic head conditions (when the water table elevation in the settling basin is lower than the elevation on the ponding side). This would occur when a sufficient amount of water has drained from the settling basin and Cache Creek is flowing at a rate lower than 400 cfs.

The proposed outlet facility leading to the pump station consists of a reinforced concrete pipe culvert with a slide gate in the middle or at the upstream end of the culvert. The culvert would have a maximum hydraulic capacity of 170 cfs (the same capacity as the pump station). The slide gate would be used to control the flow to the pump station to match the available capacity of the station. If approximately 100 cfs (200 acre-feet per day) of the capacity of the pump station is available, it would take approximately 50 days to drain the pond using only this facility and assuming no additional inflow into the pond (Cache Creek flows are less than 20,000 cfs).

Real estate requirements for the LCCFB Plan would be based on the footprint of the levee, the drainage canal plus 20 feet for maintenance access. Furthermore, flowage easements would be required for an area west of the west levee of the settling basin, due to the increased depth and duration of ponding in this area. Additionally, flowage

easements would be acquired for lands that are not currently within the Cache Creek flood plain, but would be subject to flooding induced by the flood barrier.

Existing homes and structures on the south Cache Creek flood plain could be damaged by flood flows escaping from Cache Creek under both existing conditions and post-project conditions associated with the LCCFB Plan. Pre- and post-project depth duration curves were developed for all groups of structures within the post-project LLCFB flood plain and used to identify homes and structures that may require floodproofing measures or other remedies (refer to Appendix D of the Feasibility Report for depth duration curves at selected locations).

Accomplishments

The LCCFB Plan would remove the city of Woodland and an area of Yolo County south of Woodland from the flood plain. The areas remaining in the flood plain would be protected by the existing levee system that would be maintained to provide protection from floods with a 1 in 10 to 1 in 20 chance of occurring in any given year.

Due to the large flood plain between the creek and the flood barrier, the flood barrier would serve as a reliable flood protection alternative, withstanding floods that have at a minimum a 1 in 100 chance of occurring in any given year.

The proposed LCCFB Plan would improve the existing internal drainage system to protect against local flooding along various flood plain embankments, roadways and against the west levee of the settling basin. East of I-5, the capacity of the system would be increased. West of I-5, capacity is also being increased; however, under existing conditions, where floodwaters would flow into Woodland, the flood barrier would divert these flows easterly via the drainage channel system to the settling basin or the City pump station.

A flood warning system would increase the time to prepare for flood fighting, to evacuate citizens from flood areas, and to close the openings in the flood barrier. The river forecast at the Yolo stream gage would increase warning time for storms centered downstream from the Rumsey stream gage. The acquisition of a storm watch system and a reverse “911” system by the local agencies would save several hours in notifying and evacuating the general public.

Operation and Maintenance

Once the LCCFB is completed, ownership would be transferred to the non-Federal local entity. Operation, maintenance, and rehabilitation of the LCCFB would be in accordance with the operation and maintenance manual provided by the Corps. The Corps has the responsibility to make certain the non-Federal entity inspects, maintains, and rehabilitates the project according to this manual to protect the Federal investment. Maintenance of the levees would include grading and graveling roadways, weed control, rodent control, drainage inspection, maintenance of slope protection, and maintenance of project mitigation features.

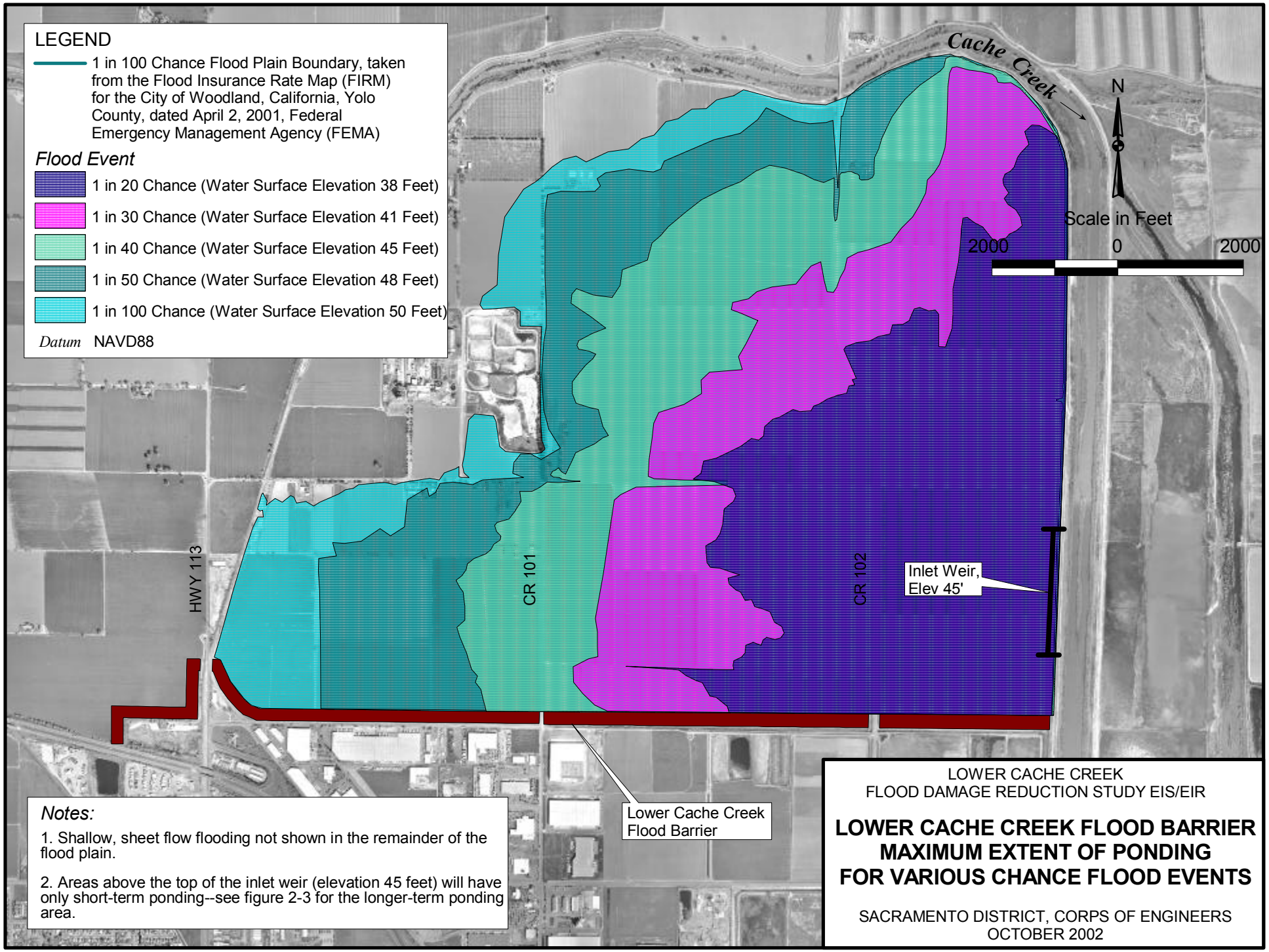
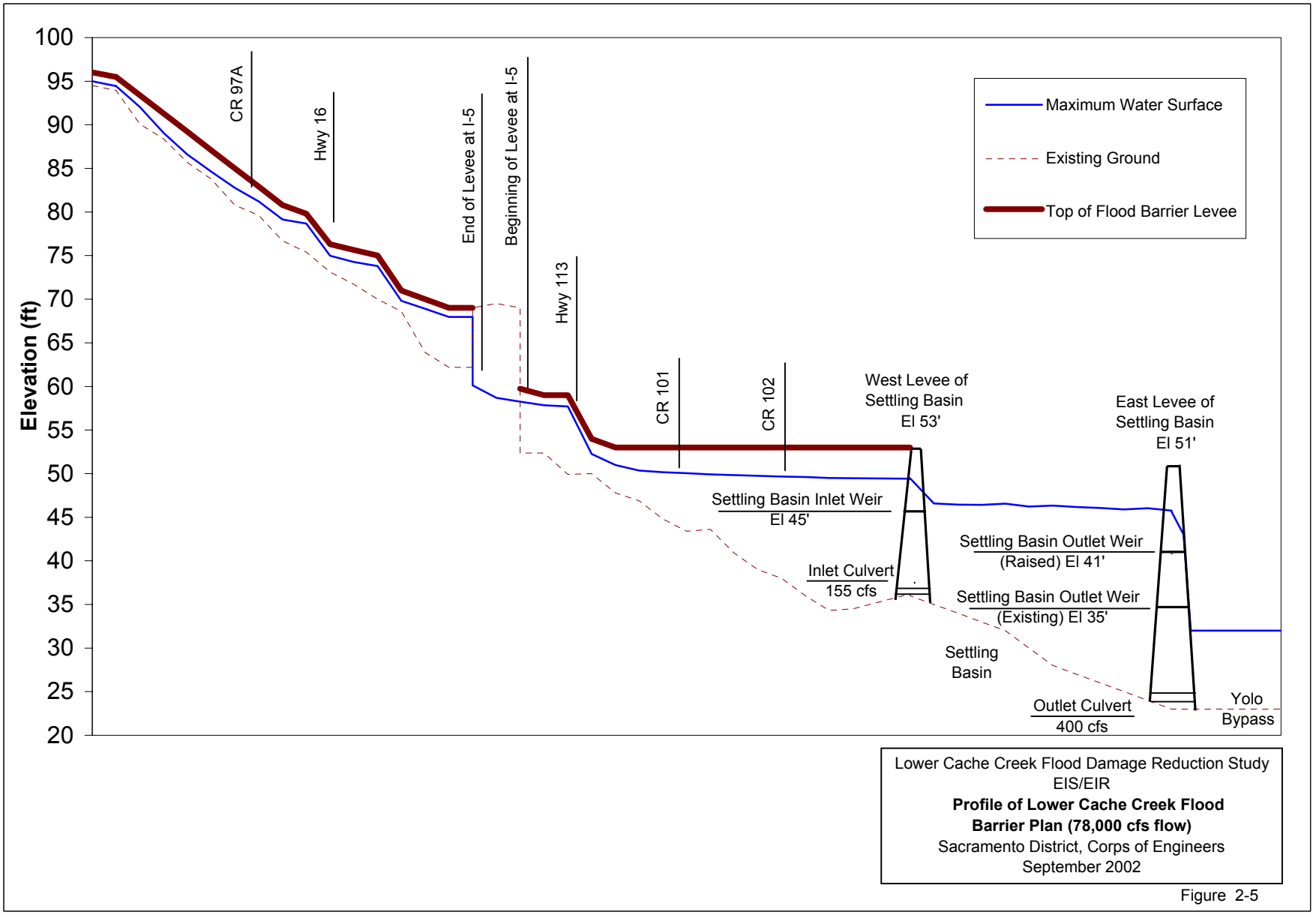

LEGEND
1 in 100 Chance Flood Plain Boundary, taken from the Flood Insurance Rate Map (FIRM) for the City of Woodland, California, Yolo County, dated April 2, 2001, Federal Emergency Management Agency (FEMA)
Flood Event
1 in 20 Chance (Water Surface Elevation 38 Feet)
1 in 30 Chance (Water Surface Elevation 41 Feet)
1 in 40 Chance (Water Surface Elevation 45 Feet)
1 in 50 Chance (Water Surface Elevation 48 Feet)
1 in 100 Chance (Water Surface Elevation 50 Feet)
Datum NAVD88
Cache Creek
N
Scale in Feet
2000
0
2000
HWY 113
CR 101
CR 102
Inlet Weir, Elev 45'
Lower Cache Creek Flood Barrier
Notes:
1. Shallow, sheet flow flooding not shown in the remainder of the flood plain.
2. Areas above the top of the inlet weir (elevation 45 feet) will have only short-term ponding--see figure 2-3 for the longer-term ponding area.
LOWER CACHE CREEK
FLOOD DAMAGE REDUCTION STUDY EIS/EIR
LOWER CACHE CREEK FLOOD BARRIER
MAXIMUM EXTENT OF PONDING
FOR VARIOUS CHANCE FLOOD EVENTS
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
OCTOBER 2002

Figure 2-4



Lower Cache Creek Flood Damage Reduction Study
EIS/EIR
Profile of Lower Cache Creek Flood Barrier Plan (78,000 cfs flow)
Sacramento District, Corps of Engineers
September 2002

Figure 2-5

The LCCFB Plan would require minor changes to the operation and maintenance of the settling basin. DWR is currently operating the settling basin under an operations and maintenance manual provided by the Corps. If and when a new project is authorized, this manual and any other reports and agreements would be updated at that time.

Under the LCCFB Plan, the operation and maintenance of the existing Cache Creek levee system is expected to continue. Although it is not a part of the LCCFB Plan, by State law, operation and maintenance of the existing levee system is the responsibility of DWR.

Construction Details

The flood barrier would be constructed during the dry season over the course of 2 years. The LCCFB would be constructed using standard earth moving equipment and would begin at the east end of the project area at the settling basin and continue westward. Two staging areas would be used during construction to stage equipment and materials, one located at CR 99 and the flood barrier, the other located at the east end of the project area near the settling basin for construction of the weir. During peak construction periods, an additional 90 truck trips and 50 construction worker vehicles per day would be on roads throughout the project area. Haul routes would be on a construction easement along the north side of the proposed flood barrier embankment. For construction west of I-5, borrow material would come from the drainage channel excavation. For construction east of I-5, borrow material would come from the drainage channel excavation, demolition of parts of the training levee and west levee of the settling basin, and directly from the settling basin. Materials that would need to be disposed, such as vegetation, would likely be brought to the Yolo County dump site.

2.4.3 Setback Levee Plans (Three Options)

Two initial plans, the Narrow Setback Levee Plan and the Wide Setback Levee Plan, were evaluated prior to the development of the third plan, the Modified Wide Setback Levee Plan. The physical features, accomplishments, operation and maintenance requirements, and construction details for all three plans are discussed in the following sections. Additionally, the reasons why (significant issues) the Narrow and Wide Setback Levee Plans were not considered further are presented.

Narrow Setback Levee Plan

Features

The major feature of the Narrow Setback Levee Plan would involve the construction of about 19 miles of new setback levees and modifications to the existing levees on Cache Creek. The levee system would extend from the settling basin inlet to high ground near County Road 94B (Figure 2-6). Levee design, construction, and use of portions of the existing levee system would vary between the right (southern) and left

(northern) levees. Downstream from County Road 102, finished levee heights would have a maximum height of approximately 18 feet.

The new setback levees were placed about 500 feet north and south of the creek centerline to avoid channel instability problems. Exceptions to this generalization were made at major structures and significant topographical features such as vertical banks. Also, setbacks were altered in some areas to reduce channel velocities and the need for slope protection, and narrowed in the vicinity of bridges to match existing bridge openings. A toe drain along the waterside levee toe of a newly constructed setback levee would be provided to drain the area between the creek and the levee.

Other major features of this plan include 28,500 feet of slope protection, 10,000 feet of slurry wall, and 4,000 feet of sheet piling. These features were inserted where high velocities were unavoidable, where known erosion problems exist, and where existing structures neighbor the existing levee. Most of the slope protection consisted of stone revetment and gabion structures along the channel banks and a total of 700 linear feet of concrete lining through the bridges. A 40-foot slurry wall was assumed necessary for 15 percent of the total length of levees (10,600 feet). In areas with space constraints, levees would be raised with about 3,600 feet of sheet pile.

The SH 113 and CF 102 bridges would need to be replaced and lengthened and the railroad bridge would be replaced. Additionally, the settling basin training levee would be removed because the training levee was designed for lesser flows than would be conveyed with the new levee system. Also, the increased design flow would cause backwater on the CR 102 bridge, requiring the bridge to be replaced.

Real estate requirements for the Narrow Setback Levee Plan would be based upon the "footprint" of the levee and toe drain, plus 20 feet for maintenance access. A flowage easement would be required on all lands between the levees. In addition, a temporary 40-foot-wide construction easement and a 40-foot-wide drainage easement would be necessary on the waterside of the levee. The temporary construction easement would be acquired for the duration of the construction contracts.

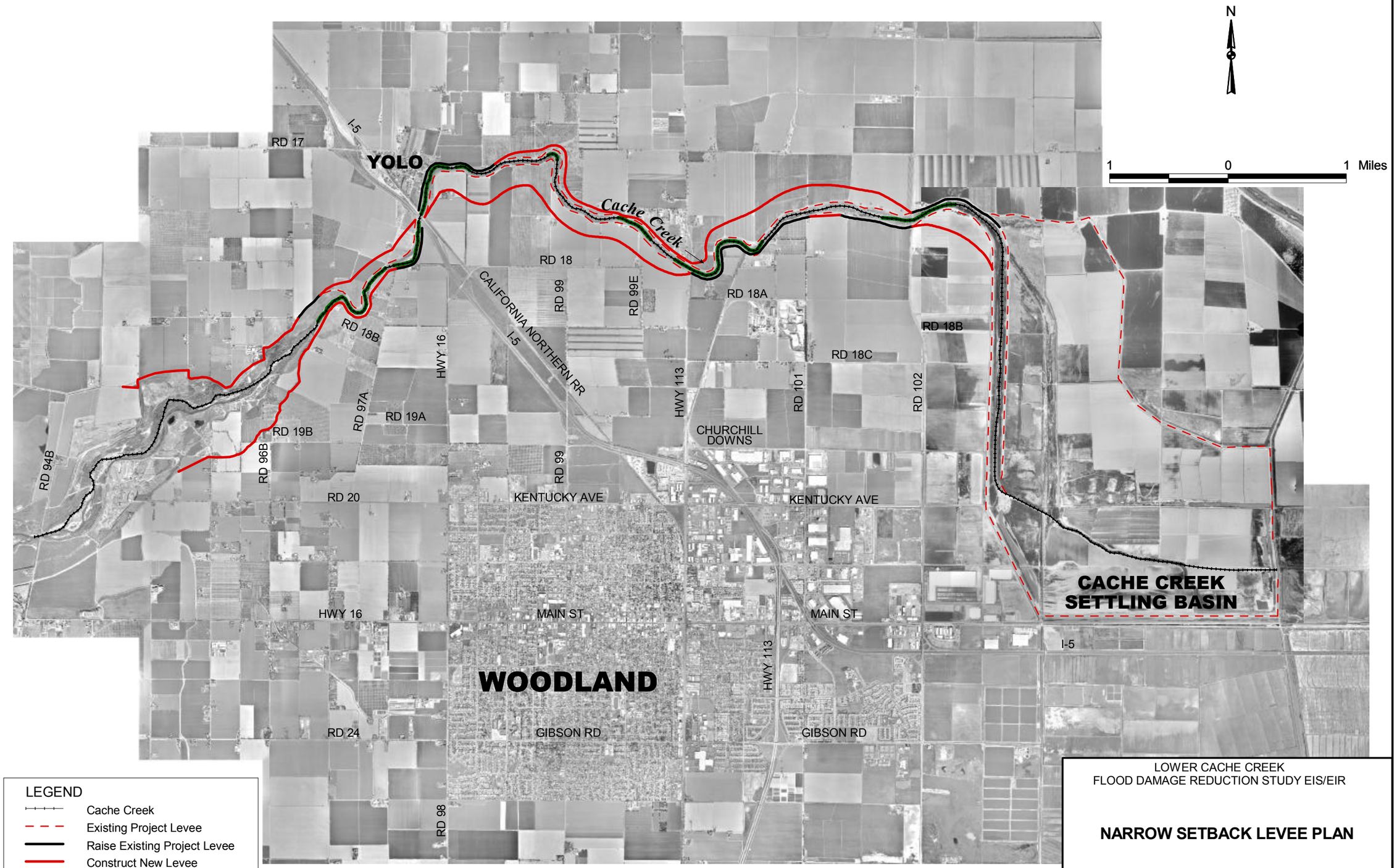
Accomplishments

The main benefit of the Narrow Setback Levee Plan is the reduced frequency of flooding from Cache Creek to lands north and south of the levee system. Flooding of major interstate and State transportation routes would also be reduced.

The Narrow Setback Levee Plan would allow for future restoration of Cache Creek.

Operation and Maintenance

Ownership of the Narrow Setback Levee Project, once completed, would be transferred to the non-Federal sponsor. Operation, maintenance, and rehabilitation of the Narrow Setback Levee Project would be in accordance with the operation and maintenance manual to be provided by the Corps. The Corps would have the



LOWER CACHE CREEK
FLOOD DAMAGE REDUCTION STUDY EIS/EIR

NARROW SETBACK LEVEE PLAN

SACRAMENTO DISTRICT, CORPS OF ENGINEERS
AUGUST 2002

Figure 2-6

responsibility to make certain that the non-Federal sponsor inspects, maintains, and rehabilitates the project according to this manual to provide an operational and a safe project. Maintenance of the existing levees now includes grading and maintenance of patrol roads, weed control, rodent control, and drainage inspection, and would be similar under project conditions.

Construction Details

The Narrow Setback Levee Plan would be constructed during the dry season over the course of 2 to 3 years. The levees would be constructed using standard earth moving equipment and would begin east of CR 102 and continue westward. Due to the elimination of this plan for reasons listed below, a further determination of construction details was not undertaken.

Significant Issues

The Narrow Setback Levee Plan involved minimizing the effects on agricultural lands and residences by having most levee construction performed near or immediately adjacent to the creek. However, this plan would require extensive environmental mitigation due to the large amount of channel armoring necessary for bank erosion protection and excessive direct and indirect effects to the valley elderberry longhorn beetle (VELB) and its habitat due to streambank protection and removal/enlargement of the existing levee system. The magnitude of the mitigation measures required would make this plan extremely difficult to implement. For example, approximately 20 miles of shaded riverine aquatic (SRA) habitat would be needed as mitigation for project effects.

Wide Setback Levee Plan

Features

Many of the features of the Wide Setback Levee Plan are similar to those features of the Narrow Setback Levee Plan. The major features of the Wide Setback Levee Plan are described below. For other features, refer to the section under the heading “Features,” under the description of the Narrow Setback Levee Plan.

The major feature of the Wide Setback Levee Plan would be the construction of about 19 miles of flood control levees, consisting of a combination of new setback levees and modifications to the existing levees on Cache Creek (Figure 2-7). The levees would extend from the settling basin inlet to high ground near CR 94B. Levee design, construction, and use of portions of the existing flood damage reduction system would vary between the right (southern) and left (northern) project flood damage reduction structure. However, maximum levee heights would be approximately 18 feet.

In general, the levees were set back 1,000 to 1,500 feet north and south of the creek centerline except where the levees pinched in at the bridges. The channels would be concrete lined under the bridges, and rock slope protection would be provided both upstream and downstream from these bridges to provide protection. To accommodate the rock slope protection, channel slopes steeper than 2H:1V would be cleared and degraded

to a slope of 2H:1V. In some areas, this would be a combination of both excavation and embankment fill or rock fills. A portion of the right existing levee between Highway 113 and Road 102 would need to be raised.

Real estate requirements for the wide setback levee option were based on the "footprint" of the levee and toe drain, plus 20 feet for maintenance access. A flowage easement would be required between the footprints of the levees. Additionally, a temporary 40-foot-wide construction easement and a 40-foot-wide drainage easement would be necessary on the waterside of the levee. The temporary construction easement would be acquired for the duration of the construction contracts. Many homes and agricultural support structures (approximately 58 structures) would be confined within the wide setback levees and need to be relocated.

Accomplishments

The main benefit of the Wide Setback Levee Plan is the reduced frequency of flooding from Cache Creek to lands north and south of the levee system. Flooding of major interstate and State transportation routes would also be reduced.

The Wide Setback Levee Plan would allow for future restoration of Cache Creek.

Operation and Maintenance

Ownership of the Wide Setback Levee Project, once completed, would be transferred to the non-Federal sponsor. Operation, maintenance, and rehabilitation of the Wide Setback Levee Project would be in accordance with the operation and maintenance manual to be provided by the Corps. The Corps would have the responsibility to make certain that the non-Federal sponsor inspects, maintains, and rehabilitates the project according to this manual to provide an operational and a safe project. Maintenance of the existing levees now includes grading and maintenance of patrol roads, weed control, rodent control, and drainage inspection, and would be similar under project conditions.

Construction Details

The Wide Setback Levee Plan would be constructed during the dry season over the course of 2 to 3 years. The levees would be constructed using standard earth moving equipment and would begin east of CR 102 and continue westward. Due to the elimination of this plan for reasons listed below, a further determination of construction details was not undertaken.

Significant Issues

The Wide Setback Levee Plan involved moving the flood protection levees away from the creek to a distance that would reduce adverse effects on the stream channel. However, the plan would still require extensive environmental mitigation due to the channel armoring near the bridges and the removal of the existing levee system. As compared to the Narrow Setback Levee Plan, the amount of mitigation for SRA habitat would be reduced significantly under this plan, but the direct and indirect effects to the

N

1 0 1 Miles

YOLO

WOODLAND

CACHE CREEK SETTLING BASIN

Cache Creek

I-5

RD 17

RD 18

RD 18A

RD 18B

RD 18C

RD 19A

RD 19B

RD 20

RD 24

RD 94B

RD 96B

RD 97A

RD 98

RD 99

RD 99E

RD 101

RD 102

HWY 16

HWY 113

CALIFORNIA NORTHERN RR

CHURCHILL DOWNS

KENTUCKY AVE

MAIN ST

GIBSON RD

LEGEND

- Cache Creek
- Existing Project Levee
- Raise Existing Project Levee
- Construct New Levee
- Slope Protection

LOWER CACHE CREEK
FLOOD DAMAGE REDUCTION STUDY EIS/EIR

WIDE SETBACK LEVEE PLAN

SACRAMENTO DISTRICT, CORPS OF ENGINEERS
AUGUST 2002

Figure 2-7

VELB due to slope protection and removal of the existing levee system could potentially make this plan difficult to implement. In addition, the Wide Setback Levee Plan would adversely affect a large number of homes and structures.

Modified Wide Setback Levee Plan

Features

Many of the features of the Modified Wide Setback Levee Plan are similar to those features of the Narrow Setback Levee Plan and the Wide Setback Levee Plan. The major features of the Modified Wide Setback Plan are described below. For other features, refer to the section under the heading "Features," under the description of the Narrow Setback Levee Plan.

The plan consists of approximately 19 miles of levees. Levee improvements begin at the west levee of the settling basin and terminate upstream near CR 94B. The maximum levee height would be approximately 18 feet. A portion of the right existing levee between SH 113 and CR 102 would need to be raised 2 feet. Levee design, construction, and use of portions of the existing levee system would vary (Figure 2-8).

In general, the proposed alignment of the Modified Wide Setback Levee Plan is similar to those of the Wide Setback Levee Plan. However, a major difference in levee alignments of this plan occurs on the north and south banks between I-5 and SH 113. The changes in the levee alignments were made in an effort to reduce the environmental mitigation associated with the location of elderberry shrubs and also to reduce effects to homes and farm structures. Modifications to the bridges would consist of rebuilding the bridge approaches and replacing the existing embankment approaches with viaduct approaches. These viaducts would substantially increase bridge openings and flow capacity, reducing the flow velocities, and eliminating the need for bank protection and subsequent environmental mitigation. Concrete linings would still be necessary under bridges and viaducts for erosion and scour protection. CR 97A, CR 18B, CR 17 and CR 18A would need to be realigned.

Although rock slope protection is reduced at the bridges, riprap and a series of gabions would be required on a small portion of the left bank downstream of I-5. Furthermore, hard points (stone fills) would be installed at the outer bend near the vicinity of Yolo. Due to the geomorphology of Cache Creek in these locations, rock slope protection is necessary to ensure lateral channel stability. Toe drains, acting as lateral drainage channels, would also be installed on the waterside of the levees to facilitate adequate drainage. Additionally, approximately 70 percent of the existing levee system would be removed for hydraulic and interior drainage purposes. The other 30 percent is expected to naturally degrade over time, minimizing disturbance to the nearby elderberry shrubs, substantially reducing environmental effects.

Real estate requirements for the Modified Wide Setback Levee Plan would be based upon the "footprint" of the levee and toe drain, in addition to 20 feet for maintenance access. A flowage easement would be required between the footprints of the

levees. In addition, a temporary 40-foot-wide construction easement and a 40-foot-wide drainage easement would be necessary on the waterside of the levee. The temporary construction easement would be acquired for the duration of the construction contracts. Thirty-two homes would need to be relocated based on the alignment of the Modified Wide Setback Levee Plan.

Accomplishments

The main benefit of the Modified Wide Setback Levee Plan is the reduced frequency of flooding from Cache Creek to lands north and south of the levee system. Flooding of major interstate and State transportation routes would also be reduced.

The Modified Wide Setback Levee Plan would allow for future restoration of Cache Creek.

Operation and Maintenance

Ownership of the Modified Wide Setback Levee Project, once completed, would be transferred to the non-Federal sponsor. Operation, maintenance, and rehabilitation of the Modified Wide Setback Levee Project would be in accordance with the operation and maintenance manual to be provided by the Corps. The Corps would have the responsibility to make certain that the non-Federal sponsor inspects, maintains, and rehabilitates the project according to this manual to provide an operational and a safe project. Maintenance of the existing levees now includes grading and maintenance of patrol roads, weed control, rodent control, and drainage inspection, and would be similar under project conditions.

Construction Details

The Modified Wide Setback Levee Plan would be constructed during the dry season over the course of 2 to 3 years. The levees would be constructed using standard earth moving equipment and would begin east of CR 102 and continue westward. Staging areas would be used to stage equipment and materials along the project site. Staging areas of approximately one acre would likely occur in between the levees and near the bridges. At peak construction periods, 100 additional roundtrip truck trips per day and 70 worker vehicle roundtrips would be required. Haul routes would be on construction easements on the waterside of the proposed setback levee alignment. Access to these easements would be along CR 102, CR 101, SH 113 and SH 16, and CR 99. Borrow material would come from land confined between the levees, the removal of the training levee in the settling basin, the removal of portions of the existing Cache Creek levee system, and an area in the northwest corner of the settling basin. Any materials that would need to be disposed, such as removed vegetation, would be hauled to the Yolo County dump site.

2.5 Comparative Effects of the Alternative Plans

Based on the least adverse effects to social, economic, and environmental resources as discussed above, the Modified Wide Setback Levee Plan was selected from among the other Setback Levee Plans. For the remainder of this Draft EIS/EIR, the three

N

1 0 1 Miles

YOLO

I-5

RD 17

Cache Creek

RD 18

RD 18A

RD 18B

RD 18C

RD 99

RD 99E

CALIFORNIA NORTHERN RR

HWY 16

HWY 113

RD 101

RD 102

RD 97A

RD 19A

RD 19B

RD 96B

RD 94B

RD 20

KENTUCKY AVE

CHURCHILL DOWNS

CACHE CREEK SETTLING BASIN

HWY 16

MAIN ST

WOODLAND

RD 24

GIBSON RD

RD 98

LEGEND

- Cache Creek
- Existing Project Levee
- Raise Existing Project Levee
- Construct New Levee
- Slope Protection

LOWER CACHE CREEK
FLOOD DAMAGE REDUCTION STUDY EIS/EIR

MODIFIED WIDE SETBACK LEVEE PLAN

SACRAMENTO DISTRICT, CORPS OF ENGINEERS
AUGUST 2002

Figure 2-8

plans carried forward for further analysis are the No-Action, LCCFB, and the Modified Wide Setback Levee Plans.

For analytical purposes, the environmental effects of the various plans have been classified as direct and indirect effects. Direct effects would result immediately from constructing the project. Indirect effects would result from the effects of the project, but occur later in time. These effects were evaluated by comparing environmental conditions with the project to the likely conditions without the project. A flood that has a 1 in 100 chance of occurring in any given year was used in this comparison. Table 2-2 summarizes the direct environmental effects of the No-Action, LCCFB, and the Modified Wide Setback Levee Plans. Chapter 4 describes these effects in detail.

Mitigation for all direct effects of the second and third alternative plans would be a joint responsibility of the Corps and the non-Federal sponsor on a cost-shared basis. The mitigation measures to avoid, minimize, or compensate for these effects are summarized in Table 2-3 and are discussed in detail in Chapters 4 and 5. If any future maintenance work requires mitigation under the No-Action Plan, the specifics would be decided at that time by DWR. Therefore, the No-Action Plan is not included in Table 2-3.

The environmental analysis was prepared for a range of levee crown widths between 12 and 20 feet for the Modified Wide Setback Levee and the LCCFB. This allows flexibility to increase the width as appropriate for ease and safety of maintenance operations. Crown widths between 12 and 20 feet have the same level of significance in environmental impacts. The increases in width can be accommodated by reductions in the size of the temporary construction easement that parallels the base of the levee, and therefore the only changes would be associated with the increase in levee fill material. Crown widths will be refined for the selected plan.

2.6 Environmental Commitments

Environmental commitments are defined as the required measures, particularly mitigation measures, incorporated into projects as recommended by the Corps. These commitments are related to the mitigation measures and environmental monitoring described in this Draft EIS/EIR.

Commitments related to direct environmental effects would be implemented during (1) preconstruction engineering and design, (2) project construction, or (3) O&M. The Preconstruction, Engineering, and Design Phase begins prior to project authorization and extends until all project-related plans and specifications are completed. This process includes preparation of detailed mitigation plans and ongoing coordination with other agencies.

The acquisition of all lands, easements, rights-of-way, and relocations included in any project mitigation measure it the responsibility of the non-Federal sponsor. During construction, the Corps is responsible for administering project construction contracts and for ensuring that the mitigation measures included in these contracts are carried out. After completion of the project, the non-Federal sponsor is required to maintain the

improvements. The Corps prepares the O&M manual, which the Sacramento District and the non-Federal sponsor are responsible for implementing. The O&M manual includes requirements for annual inspections by qualified specialists to review and evaluate all mitigation features and ensure compliance.

State law requires that the Board pass on O&M responsibilities and their costs to the local beneficiaries of the project. As a result, an as yet undetermined local entity would be responsible for maintaining the completed project. The environmental commitments to mitigate the direct effects of the project alternative plans are listed below.

Table 2-2. Summary of Environmental Effects

Affected Resource	No-Action Plan	Lower Cache Creek Flood Barrier Plan	Modified Wide Setback Levee Plan
Social and Economic Resources	Landowners with Federally insured mortgages and some businesses/facilities within the FEMA 1 in 100 chance flood plain would be required to pay flood insurance.	The potential for growing tree crops in the ponded area would be reduced. One home would need to be relocated. The city of Woodland would be able to continue with planned growth patterns.	The city of Woodland, town of Yolo, and most of the unincorporated community within the County would no longer be required to pay flood insurance. The potential for growing tree crops in the land confined by the levees would be reduced. A total of 32 homes and 182 structures would need to be relocated.
Land Use	Future growth and land use changes would occur as described in City and County General Plans where not limited by the FEMA 1 in 100 chance flood plain. The unincorporated communities north and south of Cache Creek, and the city of Woodland would be subject to flooding during major storm events.	The city of Woodland and county land south of the flood barrier would be removed from the FEMA 1 in 100 chance flood plain. A total of 104 acres would be converted for flood damage reduction purposes.	The city of Woodland, town of Yolo, and unincorporated communities north and south of the levees would be removed from the FEMA 1in 100 chance flood plain. A total of 216 acres would be converted for flood control purposes; potential conversion of 2,135 acres confined by the levees.
Agriculture, Prime and Unique Farmlands	The status of important farmlands would not be expected to change without a flood damage reduction project.	The flood barrier would result in the conversion of 100 acres of prime farmlands and 2 acres of locally important farmland to flood damage reduction uses.	The Modified Wide Setback Levee Plan would result in the conversion of 158 acres of prime farmlands to flood control uses. Potential conversion of an additional 1,254 acres of prime farmland confined by levees.

Table 2-2. Summary of Environmental Effects

Affected Resource	No-Action Plan	Lower Cache Creek Flood Barrier Plan	Modified Wide Setback Levee Plan
Transportation	Potential for flooding of roadways during major storm events remains.	Temporary increases in trips, volumes, roadway safety hazards, and traffic disruption during construction. Flooding of roadways during major storm events. Lengthened response times for emergency vehicles due to flooding.	Temporary increases in trips, volumes, roadway safety hazards, and traffic disruption during construction. Significantly reduces roadway flooding potential.
Noise	Noise levels would be the same as existing conditions.	Temporary increase in noise levels during construction.	Temporary increase in noise levels during construction.
Air Quality	Local emission rates would likely change with projected traffic volume increases.	Temporary increase in combustion, dust, and asphalt paving emissions during construction.	Temporary increase in combustion, dust, and asphalt paving emissions during construction.
Sedimentation and the Settling Basin	No change to sedimentation pattern in settling basin.	The removal of the training levee could alter the distribution of sedimentation in the settling basin. It is expected that this would not be significant.	The removal of the training levee could alter the distribution of sedimentation in the settling basin. It is expected that this would not be significant.
Water Quality	Water quality would remain generally the same as under current conditions.	Pollutants from construction equipment and erosion at the construction site could temporarily degrade the water quality of local runoff during construction.	Pollutants from construction equipment and erosion at the construction site could temporarily degrade the water quality of local runoff during construction.
Vegetation and Wildlife	Vegetation and wildlife resources are likely to be affected by O&M of existing levee system. Future flood fighting and repair activities are also likely to affect vegetation and wildlife resources.	Temporary and permanent loss of row cropped agricultural land and orchards during construction. Vegetation and wildlife resources are likely to be affected by O&M of existing levee system. Potential for continued degradation of Cache Creek system.	Temporary and permanent loss of row cropped agricultural land and orchards during construction. Mitigation provides opportunity for habitat improvements. Vegetation and wildlife resources are likely to be affected by O&M of existing levee system.

Table 2-2. Summary of Environmental Effects

Affected Resource	No-Action Plan	Lower Cache Creek Flood Barrier Plan	Modified Wide Setback Levee Plan
Special-Status Species	Habitat for special-status species is likely to be affected by O&M of existing levee system. Future flood fighting and repair activities are also likely to affect special-status species.	Potential loss or disturbance of Swainson's hawk, giant garter snake, northwestern pond turtle, chinook salmon, and steelhead habitat.	Potential loss or disturbance of the following species or their habitat: giant garter snake, northwestern pond turtle, Swainson's hawk, valley elderberry longhorn beetle, chinook salmon, and steelhead.
Cultural Resources	Archeological sites would continue to be degraded due to various activities such as flooding, farming, and construction.	Cultural resources south of the flood barrier would be protected from flood damage. Increased flooding would occur at sites between CR 101 and the settling basin.	Archeological and historic sites could be affected by levee construction, degradation of the present levee, and accelerated erosion.
Esthetic and Visual Resources	Continued need for flood fighting and repair would degrade visual nature of lower Cache Creek by removing or altering its remaining riparian forest and changing the nature of the creek bank.	The flood barrier would create a linear visual wall within a rural landscape and also a view block to future users. Levee walls are a prominent visual feature of unincorporated Yolo County. Primary view block would be from the industrialized area of Woodland.	Levee would form a view block to local rural residences. Levee walls are a prominent visual feature of unincorporated Yolo County.

Table 2-3. Summary of Mitigation

Affected Resources	Lower Cache Creek Flood Barrier Plan	Level of Significance With Mitigation	Modified Wide Setback Levee Plan	Level of Significance With Mitigation
Social and Economic Resources	Landowners would be compensated for land value effects/takings (flowage easements, raising and/or flood proofing structures, fair market value given for homes/land).	LTS[1]	Landowners would be compensated for land value effects/takings (flowage easements, raising and/or flood proofing structures, fair market value given for homes/land).	LTS
Land Use	Loss of farmland is an effect that cannot be mitigated.	SU[2]	Loss of farmland is an effect that cannot be mitigated.	SU
Agriculture, Prime and Unique Farmlands	The conversion of prime farmlands represents an effect that cannot be mitigated.	SU	The conversion of prime farmlands represents an effect that cannot be mitigated.	SU
Transportation (temporary)	Temporary construction effects would be offset by use of best management practices.	LTS	Temporary construction effects would be offset by use of best management practices.	LTS
Transportation (indirect effect)	Detours would be available to circumvent flooded roadways. However, emergency vehicles would still have lengthened response times.	SU	There are no long-term transportation effects due to the Modified Wide Setback Levee Plan. Therefore, no mitigation required.	No Effect
Noise	Temporary effects of construction noise would be reduced by use of best management practices.	SU	Temporary effects of construction noise would be reduced by use of best management practices.	SU
Air Quality	Air quality effects would be reduced by use of best management practices.	SU	Air quality effects would be reduced by use of best management practices.	SU
Sedimentation and the Settling Basin	Design of LCCFB Plan would incorporate function of the settling basin.	LTS	Design of Modified Wide Setback Levee Plan would incorporate function of the settling basin.	LTS
Water Quality	The proper permitting procedures would be adhered to. In addition, best management practices and monitoring would be implemented to preserve the quality of surface runoff.	LTS	The proper permitting procedures would be adhered to. In addition, best management practices and monitoring would be implemented to preserve the quality of surface runoff.	LTS

[1] LTS = Less than significant
[2] SU = Significant unavoidable

Table 2-3. Summary of Mitigation

Affected Resources	Lower Cache Creek Flood Barrier Plan	Level of Significance With Mitigation	Modified Wide Setback Levee Plan	Level of Significance With Mitigation
Vegetation and Wildlife	Mitigation would occur onsite within the project area where possible and at a mitigation bank if necessary.	LTS	Mitigation would occur onsite within the project area where possible and at a mitigation bank if necessary.	LTS
Special-Status Species	Specific mitigation/avoidance measures are proposed for the giant garter snake, chinook salmon, and steelhead. Mitigation would be finalized during consultation with the USFWS.	LTS	Specific mitigation/avoidance measures are proposed for the giant garter snake, northwestern pond turtle, Swainson's hawk, valley elderberry longhorn beetle, chinook salmon, and steelhead. Mitigation would be finalized during consultation with the USFWS.	LTS
Cultural Resources	Mitigation measures would be developed in consultation with the SHPO and could include flood proofing some structures.	LTS	Mitigation measures could consist of avoidance, data recovery, and for structures, recordation under the Historic American Buildings Survey/Historic American Engineering Recordation criteria.	LTS
Esthetic and Visual Resources	Mitigation measures would include reseeding the new levees.	SU	Mitigation measures would include reseeding the new levees.	SU

Transportation

- The lead agency would develop a traffic management plan and implement precautions such as posted construction zones, reduced speed limits, flagmen, off-street parking, and construction quality control monitors to ensure public safety on the roadways. Traffic would be rerouted when necessary to avoid construction zones.

- Contractors would avoid public roads as much as feasible when hauling materials to the construction site. Any damage to roadway surfaces from the operation of heavy equipment would be repaired.

Noise

- During project construction, noise-generating equipment would be limited to work during daytime hours only.

- Additionally, all mobile equipment would be fitted with mufflers consistent with the best noise reduction technology.

Air Quality

- The lead agency would provide a dust suppression plan that would likely include the following measures:

    - All construction areas, unpaved access roads, and staging areas would be watered as needed when soil is dry.

    - All trucks hauling soil or other loose material would be covered or have at least 2 feet of freeboard. Construction vehicles would use paved roads to access the construction site wherever possible.

    - Vehicle speeds would be limited to 15 mph on unpaved roads and construction areas, or as required to control dust.

    - Streets would be cleaned daily if visible soil material is carried onto adjacent public streets.

    - Exposed stockpiles of soil and other excavated materials would be enclosed, covered, and watered twice daily as needed.

    - Vegetation would be replanted in disturbed areas as quickly as possible following the completion of construction.

- All standard practices and procedures set by the Yolo-Solano Air Quality Management District, the Air Resources Board, and the guidelines provided by the U.S. EPA to minimize emissions would be used during construction.

- According to the results of the conformity review process, a conformity determination is not needed.

Water Quality

- The lead agency would prepare a stormwater pollution prevention plan. A portion of this plan would specifically address erosion and sediment control, including the following measures:

    - Regular watering of construction surfaces with water trucks to prevent wind erosion of dust into water resources.

- Construction crews would install erosion controls such as hay bales, water bars, covers, sediment fences, and sensitive-area access restrictions where necessary and appropriate before initiating extensive clearing and grading to prevent materials from eroding in or near water resources.

- The refueling of equipment is designated staging areas.

- The regular monitoring and maintenance of equipment for fuel leaks.

- Reseeding soil areas with native grass to prevent soil erosion from surface water runoff.

- The lead agency would prepare a Hazardous Substance Control and Emergency Response Plan.

- The lead agency would comply with all Section 404 requirements.

Vegetation and Wildlife

- Limiting construction crews to the right-of-way and confinement of disturbance to as small an area as possible;

- Requiring construction crews to maintain a 15-m.p.h. speed limit on all unpaved roads to reduce the chance of wildlife being mortally wounded if struck by construction equipment;

- Avoidance of effects to Cache Creek's water quality by taking appropriate measures to prevent construction materials (fuels, oils, and lubricants) from spilling or otherwise entering the creek;

- Avoidance of effects to woody vegetation at all construction sites, staging areas, borrow sites, and haul routes by fencing them with orange construction fencing;

- Minimization of effects to trees along the construction area by having all trimming performed by a qualified arborist to ensure tree survival after the project;

- Conducting of nest surveys prior to the removal of any trees or scrub shrub to ensure migratory birds would not be lost during construction, pursuant to the Migratory Bird Treaty Act; and

- Revegetation of borrow, staging, turn-arounds, and any other disturbed areas with native grasses and forbs.

- Development of a mitigation and remediation plan for the project by the lead agency.

Special-Status Species

The conservation measures for the giant garter snake include those taken from the "Programmatic Formal Consultation for U.S. Army Corps of Engineers 404 Permitted Projects with Relatively Small Effects on the Giant Garter Snake within Butte, Colusa, Glenn, Fresno, Merced, Sacramento, San Joaquin, Solano, Stanislaus, and Yolo Counties, California," (November 13, 1997). Measures include:

- Seasonal restrictions (construction from May 1 to October 1 only) to avoid overwintering giant garter snakes;
- Ensuring that dewatered habitat remains dry for at least 15 consecutive days after April 15 and prior to excavation or filling;
- An environmental awareness program for construction workers;
- Avoidance of giant garter snake identified during completion of pre-construction surveys 24 hours prior to commencement of construction by a qualified biologist, who would remain available thereafter to provide additional services should a snake be encountered during construction;
- Halting of all construction activities within the area should a giant garter snake be encountered during construction until the snake has had time to move away from the area;
- Confinement of construction activities to the minimal area necessary to facilitate construction;
- Flagging and avoidance of areas that would not be affected by construction and are designated Environmentally Sensitive to the giant garter snake;
- Restoration of all riprap areas to upland habitat by placing at least an 18- to 24-inch layer of soil over the rock and reseeding the area with native grasses and forbs; and
- Compensation of lost habitat according to ratios agreed upon by the Corps and the USFWS.

Conservation measures for chinook salmon and steelhead are based on the recommendations outlined in the "Guidelines for Salmonid Passage at Stream Crossings," (September, 2001). In addition to guidance specific to culverts, the following general conservation measures would be observed (the final determination of specific conservation measures would be determined during consultation with NMFS):

- Minimization of erosion and sediment delivery through the use of erosion control devices such as hay bales, water bars, covers, and sediment fences where necessary and appropriate;

- Restriction of access to sensitive-areas to minimize streamside habitat effects;
- Installation of culverts in a de-watered site with a sediment control and flow routing plan;
- Use of pumps with fish screens to dewater the site; and
- Restoration of the affected area to pre-project conditions including reseeding using locally native riparian and other vegetation.

Conservation measures for Swainson's hawks would include:

- Replacement of non-native trees at a 1:1 ratio and native trees at a 5:1 ratio.
- Avoidance of hawks identified during pre-construction surveys conducted according to Swainson's Hawk Technical Advisory Committee guidelines (2000); and
- Prohibition of construction activities within one-half mile of a nesting hawk until young fledge.

The following conservation measures for the valley elderberry longhorn beetle include those taken from the "Conservation Guidelines for the Valley Elderberry Longhorn Beetle," (July 9, 1999). Measures include:

- All areas to be avoided during construction activities would be fenced at 100-feet from the dripline of each elderberry plant;
- Signs would be erected along the edge of the avoidance area designating the area as environmentally sensitive for the valley elderberry longhorn beetle;
- An environmental awareness program for construction workers; and
- Compensation of lost habitat according to ratios agreed upon by the Corps and the USFWS.

These conservation measures for the giant garter snake would provide sufficient avoidance, minimization, and mitigation measures for the northwestern pond turtle.

Cultural Resources

- If previously unidentified cultural materials and/or features are discovered during construction, all work in the immediate area would cease and a cultural resources specialist would be immediately contacted for identification and evaluation.

- If materials and/or features are determined to be significant and cannot be avoided, a site-specific mitigation plan would be prepared in consultation with interested parties and the SHPO.

- If human remains are encountered, a cultural resources specialist and county coroner would be contacted in compliance with State law.

LOWER CACHE CREEK, YOLO COUNTY, CA
CITY OF WOODLAND AND VICINITY

DRAFT ENVIRONMENTAL IMPACT STATEMENT/
ENVIRONMENTAL IMPACT REPORT
FOR POTENTIAL
FLOOD DAMAGE REDUCTION PROJECT

Chapter 3

CHAPTER 3
AFFECTED ENVIRONMENT

Levee break near County Road 102 in 1983.

CHAPTER 3.0

AFFECTED ENVIRONMENT

3.1 Introduction

This chapter describes the existing conditions (and future without project conditions where different) in the study area. These conditions are current to 2002, where possible; otherwise, the latest available data have been used. The information in this chapter serves as the comparison for project-induced effects (described in Chapter 4). Resources not affected by the project are described first (resources eliminated from detailed analysis), followed by the resources that may be affected by the project (affected environment). Resources eliminated from detailed analysis include climate; topography; geology; soils; recreation; hazardous, toxic, and radiological waste, public health vectors and vector control, and fisheries. The affected environment section discusses social and economic resources, land use, agriculture, prime and unique farmlands, transportation, noise, air quality, water quality, sedimentation and the settling basin, vegetation and wildlife, special-status species, cultural resources, and esthetic and visual resources.

3.2 Resources Eliminated from Detailed Analysis

Effects on several environmental resources were evaluated during the initial scoping process and found to be minor and insignificant. These resources are described below along with reasons for eliminating them from detailed analysis.

3.2.1 Climate

The Cache Creek basin experiences the same Mediterranean climate as the Sacramento Valley, characterized by hot, dry summers and mild, rainy winters. Summer temperatures usually are in the 90's and occasionally exceed 100 °F. Winter lows occasionally dip below freezing, but rarely drop below 20 °F. Annual rainfall averages are 17 inches near the town of Yolo and 32 inches for the entire basin; snowfall is very rare.

Prevailing winds are from the southwest and are caused by coastal wind passing from San Pablo Bay to Suisun Bay through the Carquinez Strait. Winds channeled through the Carquinez Strait bring southerly winds from the ocean in the summer and rainstorms in the winter. Prevailing winds are moderate in strength and vary from dry, overland wind from the north to moist, clean sea breezes from the south.

3.2.2 Topography

Topographic features of the Cache Creek basin vary from the steep hills of the eastern slopes of the Coast Range Mountains to the nearly flat valley floor. Elevations range from 6,000 feet at the north end of the basin to nearly sea level near the town of

Yolo. Stream channel gradients in the upper basin are steep; gradients in the lower basin are very small. Flood control and land reclamation levees provide some topographic relief in the relatively flat project area, ranging from 91 feet msl within the gravel mining reach to 35 feet msl (NAVD88) at the settling basin. Construction of the LCCFB and the Modified Wide Setback Levee plans would be consistent with existing topographic relief and would therefore not have a significant effect.

3.2.3 Geology and Soils

The study area is in both the Coast Range and the Great Valley geomorphic areas. The lower basin consists of continental deposits of silt-clay, sand, and gravel. The overlying alluvium deposits are similar and generally not as coarse as the continental deposits. This material forms significant aquifers that underlie the valley portion of the basin downstream from Rumsey. The size and extent of the aquifers are not known.

Lower Cache Creek flows on alluvial fan and flood plain deposits ranging from clay and silt to coarse sand and gravel (Wahler Associates, 1982). Borehole data show clay deposits to be common at depths in excess of 20 to 25 feet from the ground surface, whereas more recently deposited silt and sand characterize sediments above the 20-foot to 25-foot depth (Corps, 1958; Wahler Associates, 1982). Table 3-1 contains a list of existing soils types within the project area. Although construction of the LCCFB or the Modified Wide Setback Levee would disturb soils, there would be no loss of soils or soil types in the area and thus no significant effects on soils.

Table 3-1. Lower Cache Creek Project Area Soil Types

Soil Map Symbol	Soil Name	Prime and Statewide Importance Farmland Designation (where irrigated)
BrA	Brentwood silty clay loam, 0 to 2% slopes	Prime Farmland
Ca	Capay silty clay	Prime Farmland
Lg	Laugenour very fine sandy loam	Prime Farmland
Lm	Loamy alluvial land	(none)
Ma	Made land	(none)
Mb	Maria silt loam	Prime Farmland
Md	Maria silt loam, deep	Prime Farmland
Mo	Merritt silty clay loam, deep, drained	Prime Farmland
Ra	Reiff very fine sandy loam	Prime Farmland
Sn	Soboba gravelly sandy loam	(none)
Sp	Sycamore silt loam, drained	Prime Farmland
St	Sycamore silty clay loam, drained	Prime Farmland
Tc	Tyndall very fine sandy loam, drained	Prime Farmland
Ya	Yolo silt loam	Prime Farmland
Yb	Yolo silty clay loam	Prime Farmland
Wb	Willows clay	Statewide Importance

Source: Soil Survey of Yolo County, California (June, 1972)

Several faults are located in the vicinity of the project area. The Dunnigan Hills Fault is less than 5 miles northwest of the project area and is considered active due to recent activity during the Holocene epoch (the last 10,000 years) (Toppozada et al., 2000). Other faults in the region include the Zamora Fault and the Capay Fault, both of which are considered to be inactive (Jennings et al., 1994).

Lower Cache Creek has experienced a small amount of land subsidence due to ground water withdrawal. A maximum of 2.25 feet of cumulative land subsidence is estimated in the city of Woodland from 1942 to 1987.

3.2.4 Recreation

Yolo County has 11 parks and recreational facilities and about 1,256 acres that are accessible to the public. Cache Creek Canyon Regional Park, the largest park in Yolo County, is about 40 miles west of Woodland on SH 16. The park consists of three developed areas: upper, middle, and lower sites, plus acres of undeveloped land across the creek, for a total of 760 acres. This park also provides access to nearly 50,000 acres of U.S. Bureau of Land Management wilderness property. Cache Creek Canyon Regional Park offers picnicking, nature study, swimming, fishing, hiking and horseback trails, innertubing, and camping. Private outfitters offer whitewater rafting. Facilities at the middle site include 3 group and 45 individual campsites, along with picnic and parking areas. Yolo County operates one developed community park in Esparto off SH 16. Other parks in Yolo County are designated for open space or boat launching and bank fishing on the Sacramento River.

Parks in Woodland are operated and maintained by the City. The City also considers Woodland Joint Unified School District property available to assist in meeting the demand for parks and athletic facilities. It has been the City's policy to locate park facilities adjacent to public school sites whenever possible to use the school's open space. The City coordinates the park and recreational needs of the community with the Woodland Joint Unified School District. The school district works with the City to provide for joint use of the athletic facilities. The City operates 31 recreation facilities, comprising about 309 acres. Categories of city parks are listed below.

Neighborhood Parks: Neighborhood parks should fulfill recreational needs by providing open space, playing fields, play courts, picnic facilities, and playground apparatus. Neighborhood parks are about 10 to 15 acres. The city of Woodland has 15 neighborhood parks totaling 66 acres.

Special User Parks: Special user parks are playing fields, swimming pools, and special activities. Special user parks range from 1 to 16 acres. The city of Woodland has 15 special user parks totaling 78.5 acres.

Community Parks: Community parks are places where members of the entire community can congregate. The facilities include the typical neighborhood park facilities plus covered picnic areas, restrooms, and lighted softball fields and tennis courts.

Community parks should be 30 to 50 acres. The city of Woodland has no community parks.

Regional Parks: Regional parks are developed to serve more than one community. They should provide as many diverse recreational facilities as possible. They should also make use of the unique natural resources in the area. Regional parks should be, at a minimum, 50 acres or more. The city of Woodland has one 160-acre regional park on the site of the former city landfill, southeast of the city at the southeast corner of CR 25 and CR 102. This area is partially developed for recreational uses, but is not fully developed for regional park use.

The only recreational facility in the project area is Woodland Sports Park (Dubach Field). Dubach Field is an athletic field north of I-5 near the intersection of SH 113. This park is used for adult softball leagues. Of the 11 parks within the city of Woodland, 7 lie within the flood plain. The majority of the 7 parks are picnic and barbeque areas. Two fields, Camarena Field and Clark Field, have baseball diamonds. The city parks have little use during the winter months, but numerous city and county residents, including children and adults, use the parks during the remainder of the year.

Public access to Cache Creek in the project area is limited. Access is restricted as a result of private lands bordering the creek to the north and south, and locked gates at the entrances to the levees.

The levees constructed for either the LCCFB or the Modified Wide Setback Levee Plans would not be used for recreational purposes. No significant adverse recreational effects would occur as a result of either plan. Both plans would provide flood protection to recreational resources.

3.2.5 Hazardous, Toxic, and Radiological Waste (HTRW)

This section describes (1) the methods used to identify hazardous, toxic, and radiological wastes associated with the Lower Cache Creek Potential Flood Damage Reduction Project and (2) known HTRW sites within the project area.

Regulatory Framework

The policy of the Corps regarding HTRW sites is presented in Engineering Regulation 1165-2-132, developed in response to the Federal Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended. This policy for cost-shared projects stipulates that the non-Federal sponsor must ensure cleanup of a Corps' civil works project. When HTRW sites are identified, response actions must be acceptable to USEPA and applicable State regulatory agencies. Corps' policy also requires that each civil works project must include a phased and documented review to provide early identification of known and potential HTRW sites that may be affected by a proposed Federal project.

Methods and Results

In March 2000, a Phase I Environmental Site Assessment (ESA) was performed by the Environmental Design Section of the Corps Sacramento District. The site visit portion of the Phase I ESA encompassed Cache Creek, the existing levees, the settling basin, plus a 100-foot construction zone on the landside of the project. The records investigation included a 1-mile corridor on the landside of Cache Creek. The area investigated began at CR 94B above the town of Yolo and ended at the settling basin near the Yolo Bypass. In all, approximately 12 miles of Cache Creek and levees on both banks were evaluated.

The site visit had the objective of locating and identifying recognizable environmental concerns including asbestos, construction and demolition debris, drums, landfill or solid waste disposal sites, pits, waste disposal ponds or lagoons, wastewater, fill dirt, depressions, mounds, PCB-containing transformers, structures used for the storage of chemicals, and tanks. None of these items were observed within the project area during the site visit with the exception of pesticide (chemical) mixing trailers at one location. Although no spills were observed at the mixing location, the potential for spills remains. There were no soil, surface-water, or ground-water samples collected as part of the site visit at this location or any other location within the project area.

As part of the records review for HTRW sites within the project area, Environmental Data Resources, Inc. (EDR) conducted a search of 38 public databases. This search resulted in the identification of 12 potential HTRW sites. However, the sites had been investigated prior to this inquiry and had been subject to removal actions, as necessary. Thus they no longer pose environmental hazards. The status of the sites was confirmed through subsequent contacts with local and State regulatory agencies.

Local and State agencies contacted regarding information on HTRW sites within the project area included the Yolo County Agricultural Department, the Yolo County Department of Environmental Health Services, the California Department of Toxic Substances Control, and the State Water Resources Control Board. These agencies did not have records of HTRW incidences or sites beyond those identified by the EDR records search.

Gravel is mined within the western portion of the study area adjacent to Cache Creek. Because the gravel mining does not involve chemical extraction, there are no mining-related HTRW concerns beyond common fuels and lubricants used to operate and maintain the mining equipment.

Surface water and sediment flowing from upgradient sources contain elevated concentrations of boron and mercury. Elevated boron is a result of naturally occurring mineral spring sources, whereas mercury presence results from mercury mining and natural minerals. During periods of lower streamflow in Cache Creek, boron precipitates along the banks of the creek. Mercury remains in creek bottom sediments. Both elements are an HTRW concern for reuse of streambank soil and creek bottom sediments. The

potential effects of boron and mercury on water quality are discussed further in Section 4.9.

Groundwater in the project area is typically shallow and in contact with surface water for most of the year. Based on available data, ground water is not affected by manmade chemicals, but there are localized areas of elevated boron concentrations due to naturally occurring soil minerals.

Other Wastes

Although not included within the Resource Conservation and Recovery Act (RCRA) definition of hazardous waste, agricultural chemicals and wastes (excluding some pesticides) do pose a danger if released into the surrounding environment. The area north of Cache Creek includes two agricultural chemical facilities: (1) Cache Creek Chemical, and (2) Agriform. They are both located near the junction of SH 113 and CR 18C.

3.2.6 Public Health Vectors and Vector Control

A vector is any organism that can serve as a transmission vehicle for a disease-causing agent. Insects such as mosquitoes, flies, fleas, and ticks are the most prominent vectors in the United States, along with animals such as rats and mice. Vector diseases are most often caused by a virus, protozoan, bacteria, or worm. Table 3-2 lists vector-borne diseases documented in the Sacramento-Yolo Mosquito and Vector Control District (SYMVCD), their causes, their transmission vectors, and their potential locations. All of these vector-borne diseases occur on a very limited basis within the SYMVCD.

Table 3-2. SYMVCD Vector-borne Diseases

Vector Disease	Disease-causing Agent	Transmission Vector	Potential Locations
Encephalitis	Virus	Encephalitis (*Culex tarsalis*) and wetlands (*Ochlerotatus melanimon*) mosquitoes	SYMVCD (most cases prior to 1960)
Malaria	Protozoan (*Plasmodioum*)	Western malaria (*Anopheles freeborni*), woodland malaria (*Anopheles punctipennis*), and coastal malaria (*Anopheles hermsi*) mosquitoes	Cases are acquired outside the U.S. through travel to infected areas
Canine Heartworm	Worm	Western treehole (*Ae. sierrensis*), western malaria, and *Ae. vexans* mosquitoes	SYMVCD, cases reported annually
Lyme Disease	Bacteria (*Borrelia burgdorferi*)	Western black-legged tick	One suspected case in Orangevale, CA (1992)
Plague	Bacteria (*Yersinia pestis*)	Infected fleas of wild rodents	Western United States
Weils Disease (*leptospirosis*)	Bacteria (*Leptospira interrogans*)	Infected animal urine/blood	United States
Bacterial Food Infection (*salmonellosis*)	Bacteria (*Salmonella*)	Infected animals	United States

Source: Sacramento-Yolo Mosquito and Vector Control District, 2002.

The SYMVCD takes the following actions to monitor and control vectors and vector diseases:

- Conducts surveys to track mosquitoes, ticks, and valley black gnats;
- Conducts surveys for western equine and St. Louis encephalitis, two vector diseases;
- Stocks mosquitofish in potential mosquito breeding habitat; and
- Applies environmentally compatible chemicals to suppress mosquito breeding.

The current SYMVCD vector control measures would ensure that there would be no additional effect due to the construction of a flood control project associated with Cache Creek.

3.2.7 Fisheries

The variable streamflow, shallow depths, and agricultural runoff in Cache Creek influence the number and type of fish found in the study area. A stream habitat survey of lower Cache Creek was conducted in July 1997 and overseen by Dr. Peter Moyle of UC Davis. Seventy-seven percent of the fish netted within the creek were red shiners. Other

members of the minnow family found within the creek include Sacramento squawfish, Sacramento blackfish, carp, speckled dace, and hitch. Warmwater sport fish such as catfish and large and smallmouth bass are also present. Historically, fish populations in Cache Creek included anadromous species such as steelhead trout, chinook salmon, and the Pacific lamprey. Fish collecting surveys (for mercury) conducted by Darell Slotton and Shaun Ayers of UC Davis in the fall of 2000 provided evidence of several salmon and a possible redd within lower Cache Creek. Due to flood control actions, including the settling basin and agricultural withdrawals, fish migration between the Sacramento River and Cache Creek is limited; however, not precluded. Lower Cache Creek has been designated as critical habitat for the Central Valley Steelhead and Essential Fish Habitat for the Central Valley fall-run chinook salmon.

Due to the already degraded nature of Cache Creek, there would be no additional effects to fisheries within the creek. Nevertheless, NMFS has declared Cache Creek to be special-status species' critical habitat and essential fish habitat. These details are discussed in Section 3.3.10 (Special-Status Species).

3.3 Affected Environment

This section describes existing conditions for resources that may be affected by the project.

3.3.1 Social and Economic Resources

Yolo County

The project area is located in Yolo County. The area is primarily rural and sparsely populated. The largest urban center in the county is Davis. According to the State Department of Finance (2000), Yolo County had a population in 2000 of 162,900 (California State Department of Finance, 2000).

In 1991, per capita personal income for Yolo County was $19,320. This was below the State average of $20,689, although not below the State poverty level (California State Department of Finance, 2000). The population of Yolo County is made up of 65 percent Caucasian, 22 percent Hispanic, 10 percent Asian/Pacific Islander, 2 percent black, and 1 percent Native American according to 1999 data (California Demographic Research Unit Report, 2001). Within the project area there are no designated affordable housing units.

Agriculture is an important source of employment and tax revenue for Yolo County. Agriculture employs two types of workers: migrant workers, who are bussed in for seasonal work, and permanent workers, who live in the area and work year-round. Together, these workers farm close to 540,000 acres of land within Yolo County (1997 Census of Agriculture). Currently, agricultural production in Yolo County is in transition from the production of field crops such as sugar beets and tomatoes to more economically stable production of tree and vine crops. A number of factors have led to this change. Internationally produced products such as sugar and canned tomatoes are available at a lower price than domestically produced products. Proper management of field crop

production includes the production of wheat and corn for crop rotation; wheat and corn are also subject to fluctuations in world market prices and generally do not return a profit. Production of field crops has driven domestic prices down to a level that makes it very difficult for Yolo County farmers to obtain a reasonable price for produce. Tree and vine crops such as nuts and fruit provide a more stable income for valley growers and can be harvested yearly. However, tree and vine crops take time to become established before they become productive.

Public services in the study area are provided by the counties and their cities. Services include schools, libraries, roads, utilities, and emergency services. Within the project area, there are no major utility corridors. The majority of the residents in the unincorporated area have septic systems and wells that eliminate the need for water and sewer mains originating from Woodland. Utilities such as electric, and communications run primarily along the major roads through the project area (CR 102, 101, SH 113 and 16, and CR 99) before branching out to serve more remote customers. Closer to Woodland city limits there are gas, water and sewer pipes as well as electric and communications that serve local businesses and residents.

The populations of the counties in the study area are expected to continue to grow at a rate higher than that of the State, primarily due to the influx of people who work in Sacramento and the Bay Area. Since the counties are attempting to preserve agricultural land, future development is planned adjacent to existing urban areas. County plans include additional housing, schools, water systems, and other public facilities. This future growth would occur with or without a Federally sponsored flood damage reduction project.

City of Woodland

The city of Woodland is the largest incorporated community within the study area. On average, the city is experiencing a 1.7 percent growth rate based on the General Plan buildout population as explained by Steve Harris (pers. comm., 2002). The 1980 population, 30,235, increased by 10,019 during the 1980's. During the 1990's, the population increased by over 6,000, for a 2000 census of 46,300 (Department of Finance, 2000). The January 1, 2001, population of the city of Woodland was estimated to be 50,614 persons. This represents an increase of 10,360 persons over the last decade.

Originating as an agricultural support community, Woodland remains surrounded by agricultural lands. As part of its current development planning, Woodland has directed separation of its residential development from existing and planned industrial development. Land use designations from the General Plan show most industrial development planned for the northeastern parts of the city, which are also within the FEMA 1 in 100 chance flood plain. Residential areas lie primarily to the west of downtown, with current developments to the south.

There were an estimated 17,438 housing units of all types in Woodland as of January 1, 2001: 10,986 single-family homes, 5,476 multiple family homes, and 854 mobile homes (California Demographic Research Unit Report, 2001). (Housing type

breakdown is based on the percentages of housing types published in the 1996 Woodland General Plan). Within the FEMA 1 in 100 chance flood plain are 3,500 homes including 3,200 single-family homes and 300 multiple-family homes. There are also an additional 500 structures (industry, retail, and restaurants) that lie within the FEMA 1 in 100 chance flood plain.

The police department and fire department within the city of Woodland are both located on Court Street just east of College Street. Woodland Memorial Hospital, the only hospital in Woodland, is located on California Street near Gibson Road. There are approximately 40 public facilities that lie within the FEMA 1 in 100 chance flood plain (Figure 3-1). Included in this count are health facilities, schools (5 of the 18 located within Woodland), a library, the wastewater treatment plant, and a firehouse.

Town of Yolo

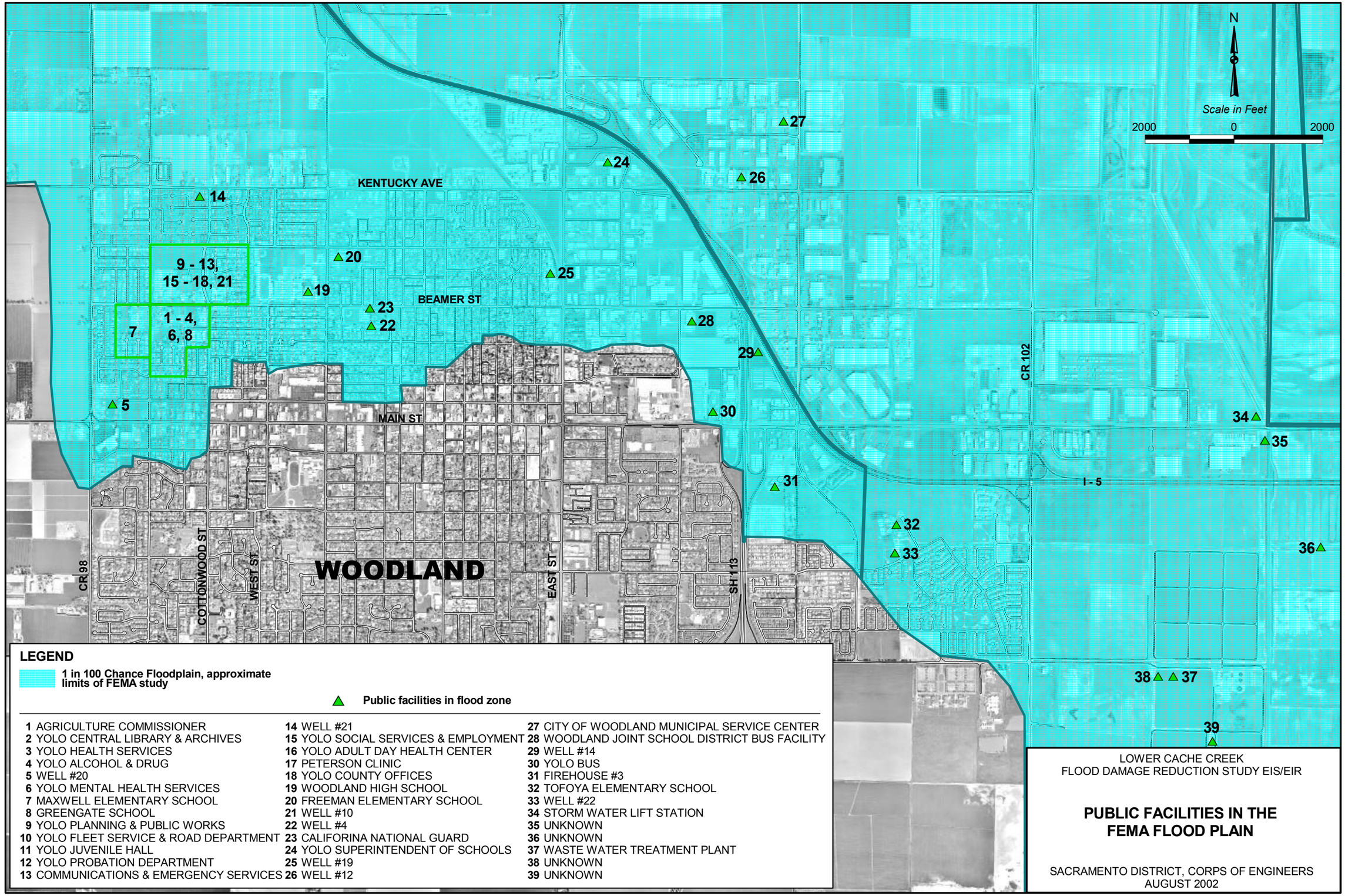
The population of the town of Yolo as of 1997 was 457 (Allen, pers. comm., 2002). There were an estimated 161 housing units in the town of Yolo according to 1997 data. There is one school within the town of Yolo. The town of Yolo has no hospitals.

3.3.2 Land Use

Agriculture comprises a majority of Yolo County. According to the 1997 Census of Agriculture, close to 540,000 acres of land were in farms. Land use specific to the project area follows this trend; agriculture is the predominant land use, comprising about 66 percent of the total project area. Other land uses include urban and industrial, residential, and flood damage reduction (Figure 3-2). Leading crops include wheat and grains, fruits and nuts, and tomatoes.

Land use in the southern part of the study area includes the city of Woodland and related residential, commercial, and industrial buildings and appropriate streets and roadways. Industrial land use is heavily concentrated to the east and northwest of the city of Woodland. Land use to the north of Cache Creek includes the unincorporated town of Yolo and a mixture of agricultural croplands, orchards, and individual residences. There is minimal development along Cache Creek.

Prior to designation of the city of Woodland within the FEMA 1 in 100 chance flood plain, it was predicted that the eastern area of Woodland would continue to develop for industrial use and the area to the south for industrial and residential use. Growth would provide increased economic opportunities and generate a substantial need for new housing, additional water supply, increased sewage capacity, new schools, and other public infrastructure and services.



LEGEND

1 in 100 Chance Floodplain, approximate limits of FEMA study

▲ Public facilities in flood zone

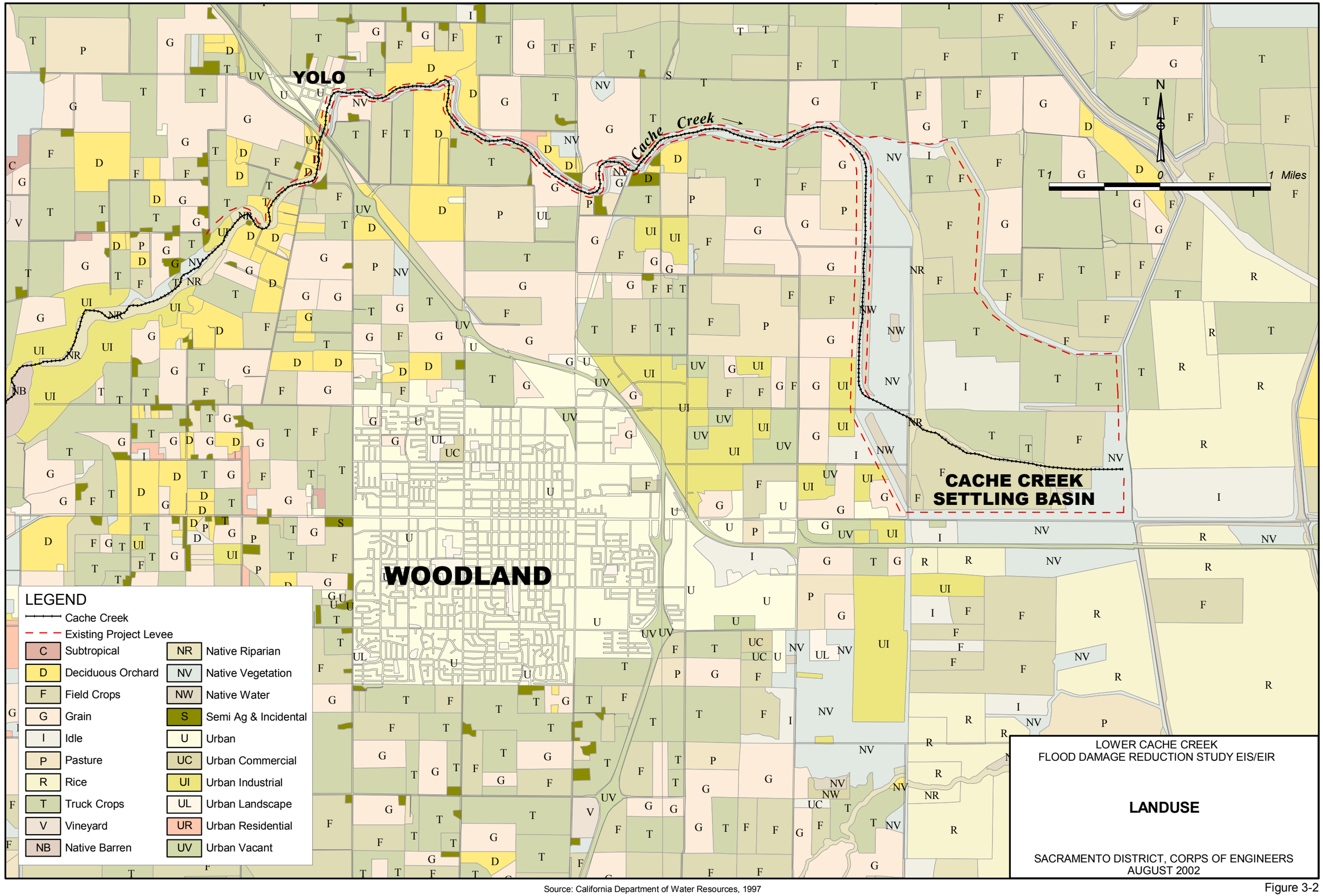
1 AGRICULTURE COMMISSIONER	**14** WELL #21	**27** CITY OF WOODLAND MUNICIPAL SERVICE CENTER
2 YOLO CENTRAL LIBRARY & ARCHIVES	**15** YOLO SOCIAL SERVICES & EMPLOYMENT	**28** WOODLAND JOINT SCHOOL DISTRICT BUS FACILITY
3 YOLO HEALTH SERVICES	**16** YOLO ADULT DAY HEALTH CENTER	**29** WELL #14
4 YOLO ALCOHOL & DRUG	**17** PETERSON CLINIC	**30** YOLO BUS
5 WELL #20	**18** YOLO COUNTY OFFICES	**31** FIREHOUSE #3
6 YOLO MENTAL HEALTH SERVICES	**19** WOODLAND HIGH SCHOOL	**32** TOFOYA ELEMENTARY SCHOOL
7 MAXWELL ELEMENTARY SCHOOL	**20** FREEMAN ELEMENTARY SCHOOL	**33** WELL #22
8 GREENGATE SCHOOL	**21** WELL #10	**34** STORM WATER LIFT STATION
9 YOLO PLANNING & PUBLIC WORKS	**22** WELL #4	**35** UNKNOWN
10 YOLO FLEET SERVICE & ROAD DEPARTMENT	**23** CALIFORINA NATIONAL GUARD	**36** UNKNOWN
11 YOLO JUVENILE HALL	**24** YOLO SUPERINTENDENT OF SCHOOLS	**37** WASTE WATER TREATMENT PLANT
12 YOLO PROBATION DEPARTMENT	**25** WELL #19	**38** UNKNOWN
13 COMMUNICATIONS & EMERGENCY SERVICES	**26** WELL #12	**39** UNKNOWN

LOWER CACHE CREEK
FLOOD DAMAGE REDUCTION STUDY EIS/EIR

PUBLIC FACILITIES IN THE FEMA FLOOD PLAIN

SACRAMENTO DISTRICT, CORPS OF ENGINEERS
AUGUST 2002

FIGURE 3-1



Source: California Department of Water Resources, 1997

Figure 3-2

Since 1965, Woodland has become more urbanized as more than 150 new manufacturing and distribution centers have moved into the area. Currently, over 3,000 acres in Woodland are used for industrial purposes. The city of Woodland General Plan identifies an Urban Limit Line that encompasses all land to be considered for urban development within the timeframe of the General Plan (by 2020). The Citywide Growth and Development Implementation Program of the General Plan includes the following policy, "1.A.12 The City shall establish a permanent urban limit line around Woodland to permanently circumscribe urban development and preserve surrounding agricultural lands. The western and northern boundaries are the Urban Limit Line boundaries…" Figures 3-3 and 3-4 show zoning for the city of Woodland and parts of Yolo county including the town of Yolo.

In order to attain "high-quality, orderly growth to achieve a balance in residential, commercial, and industrial development"(City of Woodland, 1996), the City of Woodland outlines the following land use goals in its General Plan:

- Goal 1.A: To grow in an orderly pattern consistent with economic, social and environmental needs, providing for continued small-town character and preservation of surrounding agricultural lands.

- Goal 1.B: To provide adequate land in a range of residential densities to accommodate the housing needs of all income groups expected to reside in Woodland.

- Goal 1.C: To provide for new residential development in planned neighborhoods to be developed at an orderly pace and style and designed to promote walking, bicycling, and transit use, including the use of a modified grid system.

- Goal 1.D: To conserve and enhance the best qualities of existing residential neighborhoods as the city grows.

- Goal 1.E: To designate adequate commercial land for and promote development of commercial uses compatible with surrounding land uses to meet the present and future needs of Woodland residents and visitors and to maintain Woodland's economic vitality.

- Goal 1.F: To develop and maintain an economically-viable and physically-attractive Downtown.

- Goal 1.G: To revitalize and maintain the East Street Corridor as an economically-viable and physically-attractive mixed-use corridor.

- Goal 1.H: To designate adequate land for and promote development of industrial uses to meet the present and future needs of Woodland residents for jobs and to maintain Woodland's economic viability.

- Goal 1.I: To promote the productivity of agricultural lands surrounding Woodland and the continued viability of Yolo County agriculture.

- Goal 1.J: To maintain land as Urban Reserve for consideration for future development.

- Goal 1.K: To maintain and enhance the quality of Woodland's major corridors, city entrances, landscape, and streetscape.

The Yolo County also outlines goals for land use policy. The following are included in Yolo County's General Plan:

- Wise land use based on both physical and social characteristics of the County.

- Protect prime and other agricultural land from urban development.

- Provide for industrial growth in the County to provide employment, services, and tax base while minimizing hazards and nuisances and while conserving resources and agricultural lands.

- Establish natural and wildlife areas (preserves).

- Create urban spaces, green belts, and scenic highways.

- Make land use compatible with culture and rural setting.

- Discourage urban sprawl.

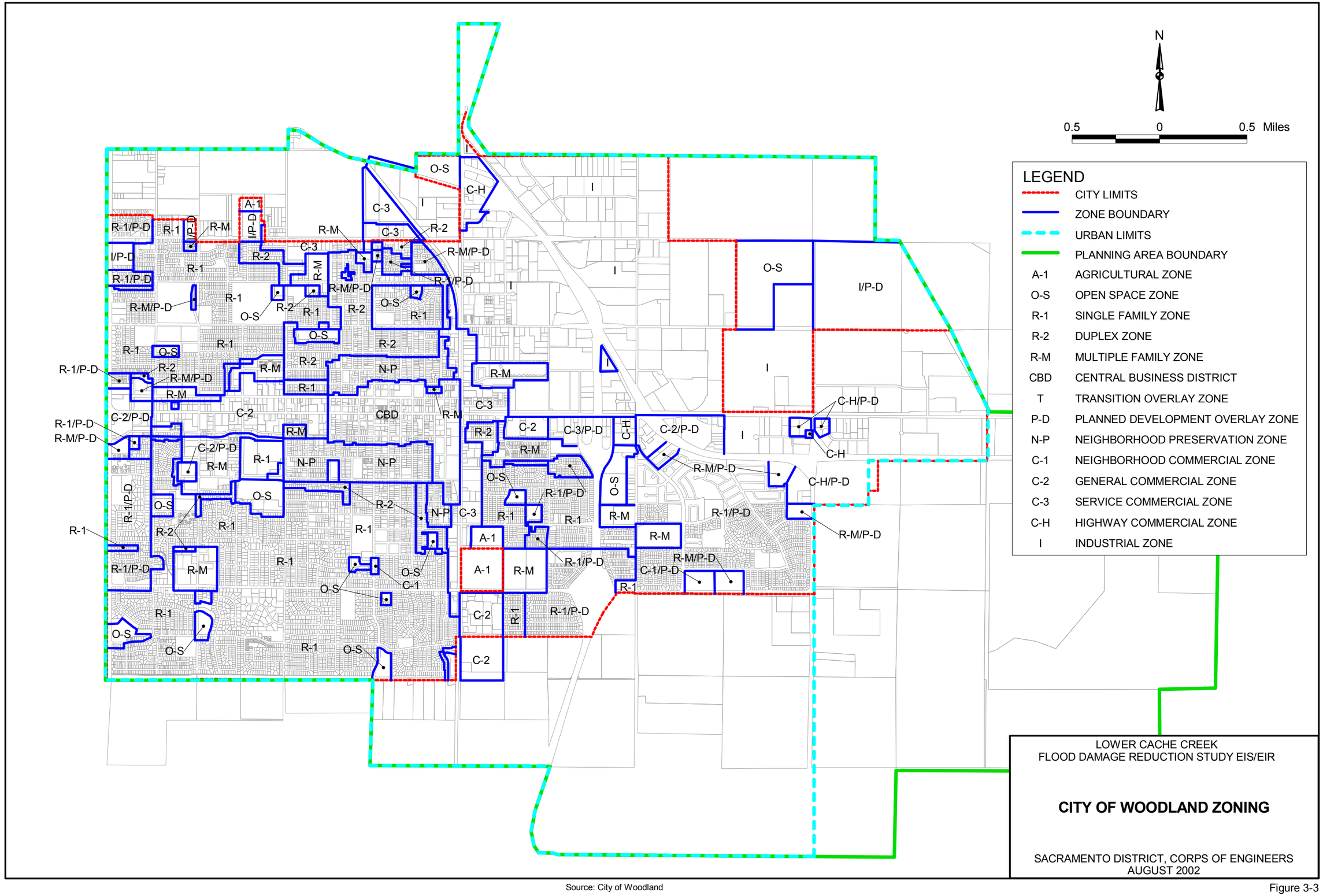
- Continue to improve existing urban uses and place new urban uses in existing planned urban uses.

- Protect property values.

- Assure that the costs of new development are borne by the beneficiaries of such development.

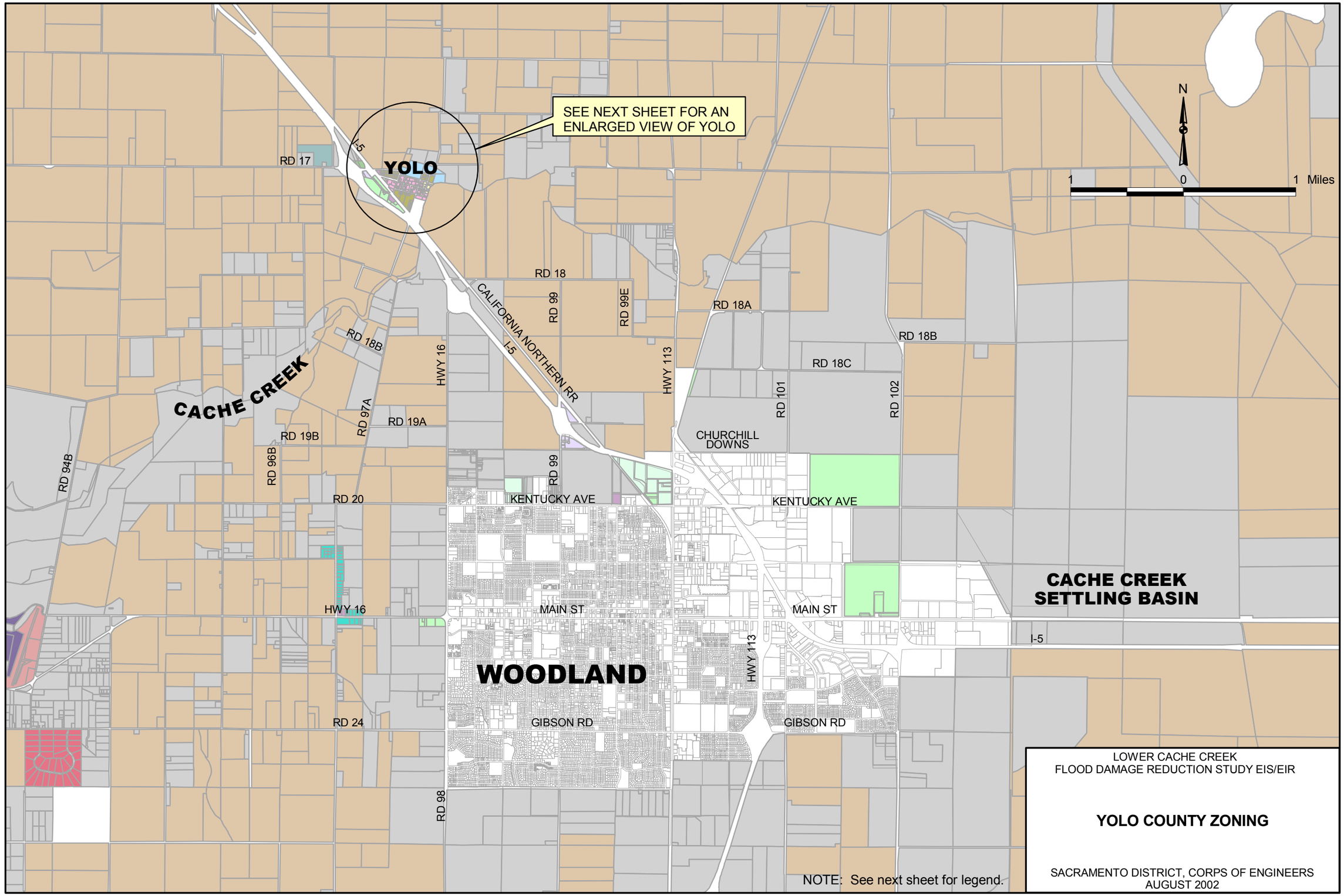
3.3.3 Agriculture, Prime and Unique Farmland

In 1980, the California Department of Conservation (CDC) joined the Natural Resources Conservation Service (NRCS) (formerly the Soil Conservation Service) in mapping the Nation's important farmlands. The designation of prime farmland was a result of this project. A continual conversion of agricultural lands made necessary the Farmland Protection Policy Act, passed in 1981 and amended in 1994. The act called for awareness of the effects that Federal programs had on the Nation's farmlands. To address this issue, the U.S. Department of Agriculture (USDA) developed the following as major requirements (Corps, 1998):



Source: City of Woodland

Figure 3-3



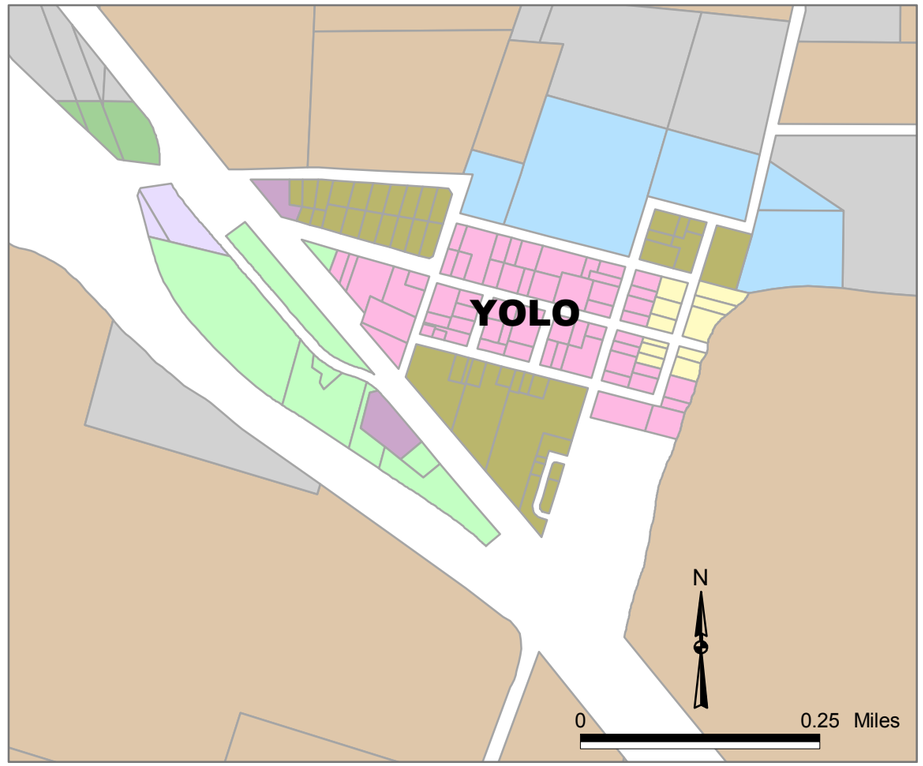
LOWER CACHE CREEK
FLOOD DAMAGE REDUCTION STUDY EIS/EIR

YOLO COUNTY ZONING

SACRAMENTO DISTRICT, CORPS OF ENGINEERS
AUGUST 2002

Source: Yolo County Planning and Public Works Department

Figure 3-4, SHEET 1 of 2



LEGEND

A-1	Agricultural General (Ag. Gen.)
A-E	Agricultural Exclusive
A-P	Agricultural Preserve
A1/CH	Ag. Gen/Highway Service Commercial
AV	Airport
C1	Neighborhood Commercial
C2	Community Commercial
CH	Highway Service Commercial
M1	Light Industrial
M2	Heavy Industrial
PD-45	Planned Development 45
R1-PD	Residential, One Family-Planned Development
R2	Residential, One Family or Duplex
R2-B28	Residential, One Family or Duplex: 28,000 sf minimum parcel
R3	Residential, Multi-Family
RS	Residential, Suburban
RS-B130	Residential, Suburban; 130,000 sf minimum parcel

LOWER CACHE CREEK
FLOOD DAMAGE REDUCTION STUDY EIS/EIR

YOLO COUNTY ZONING

SACRAMENTO DISTRICT, CORPS OF ENGINEERS
AUGUST 2002

Source: Yolo County Planning and Public Works Department

Figure 3-4, SHEET 2 of 2

(1) Federal agencies must use the USDA's criteria to identify and take into account the adverse effects of their programs on the preservation of farmland.

(2) Federal agencies must consider alternative actions, as appropriate, to reduce such adverse effects and ensure that their programs, to the extent practicable, are compatible with State, local, and private programs.

The act also gives authority to local governments to designate farmland of local significance and exempts land already tagged for urban development. The following terms are defined by the NRCS, as they pertain to California (Corps, 1998):

"Prime Farmland" is land with the best combination of physical and chemical characteristics for the production of crops. It has the soil quality, growing season, and moisture regime needed to produce sustained high yields of crops when treated and managed, including water management, according to current farming methods. Prime farmland must have been used for the production of irrigated crops within the last three years. It does not include publicly owned lands for which there is an adopted policy preventing agricultural use.

"Farmland of Statewide Importance" is land other than prime farmland with a good combination of physical and chemical characteristics for the production of crops. Like prime farmland, it must have been used for the production of irrigated crops within the last 3 years. It also does not include publicly owned lands for which there is an adopted policy preventing agricultural use.

"Unique Farmland" is land that does not meet the criteria for the preceding categories, but is currently used for the production of specific high-economic-value crops. This land has the special combination of soil quality, location, growing season, and moisture supply needed to produce sustained high quality and high yields of a specific crop when treated and managed according to current farming methods. It does not include publicly owned lands for which there is an adopted policy preventing agricultural use.

According to 1998 data, 63 percent of agricultural land located within Yolo County is designated as Prime, Unique, or Locally or Statewide Important Farmland (California Department of Conservation, 2002). These lands are generally located in the eastern half of the county. Within the project area, there is prime farmland and farmland of statewide importance (Figure 3-5). These farmlands can be found entirely surrounding the city of Woodland extending west to the Woodland Municipal Airfield and east, north, and south to the county line. In order to continue to preserve this valuable agricultural land, Yolo County has incorporated into its General Plan an Urban Area Boundary and Community Area Plan for the County's cities, outside of which only agricultural development would be allowed.

Projects that are subject to the requirements of the Farmland Protection Policy Act include any projects that may irreversibly convert (directly or indirectly) farmland to nonagricultural use, and are completed by a Federal agency or completed with the assistance of a Federal agency. If a project falls under this Act, a Farmland Conversion

Impact Rating Form supplied by the NRCS must be completed. Information supplied by both the NRCS and the sponsoring federal agency results in a numeric score from which the alternative would be assessed. Higher point totals require additional alternatives to be evaluated.

3.3.4 Transportation

The following section describes the existing roadway functions, traffic volumes, airports, rail service, transit, and bicycle routes that may be affected by the proposed project. Figure 3-6 shows transportation routes through the project area.

Highways and Roadways

State Highways – One interstate and two State highways provide transportation through the project area. I-5 provides north-south circulation through the eastern portion of the project area. SH 113 also provides north-south circulation, but through the middle of the project area. SH 16 provides north-south circulation through the western portion of the project area. With the exception of I-5, a four-lane highway, all other roads in the project area are two lanes.

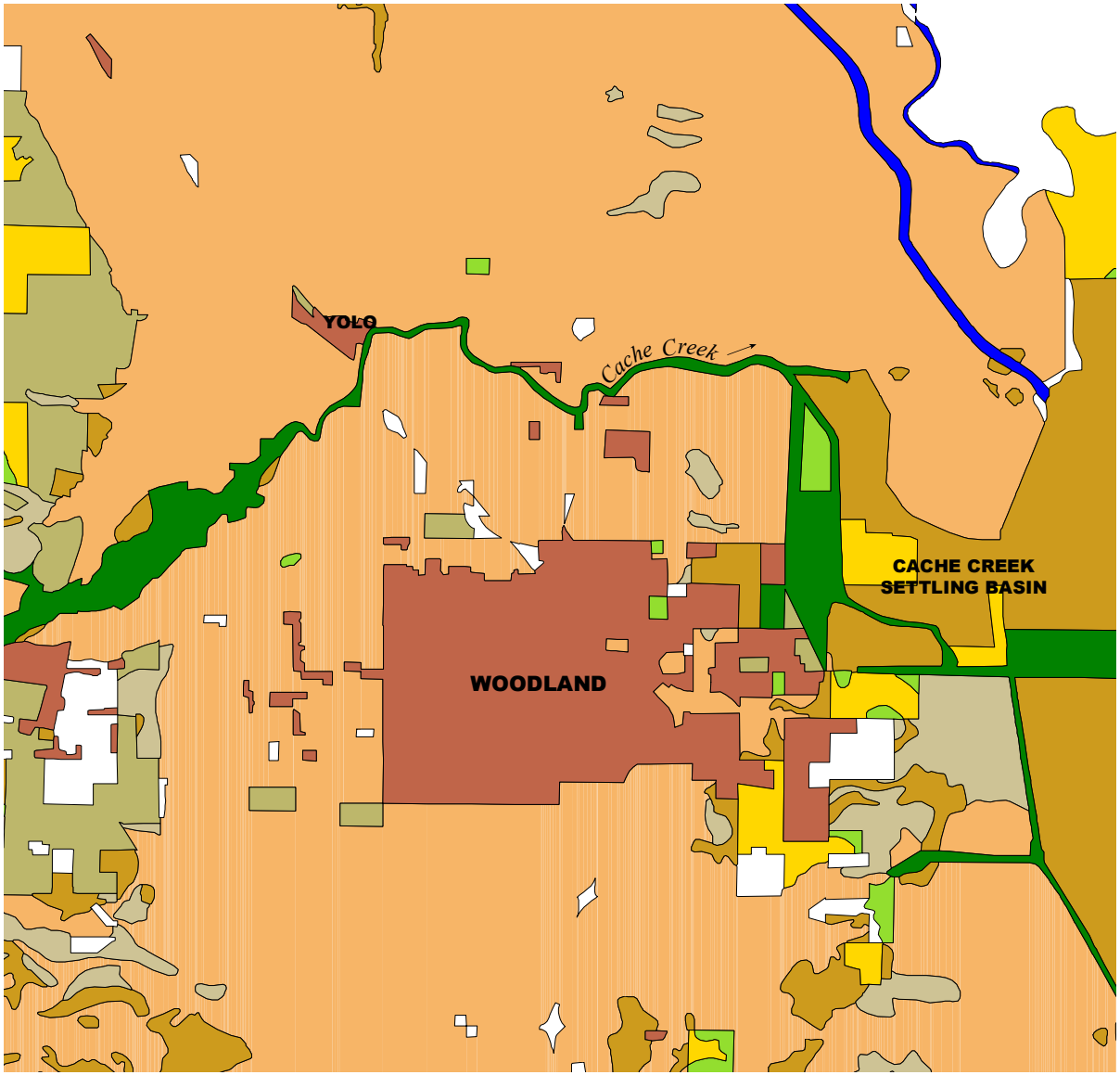
County Roadways – The majority of the roadways in the project area are county roads. The most heavily traveled county road in the project area is CR 102 which runs north-south. CR 102 is one of two county roads that cross Cache Creek in the project area; the second is CR 99W. CR99W runs parallel to I-5 and serves mostly local traffic to and from the town of Yolo. Other county roads in the project area include (north-south circulation) CR 101, 99, 97A, and 96B and (east-west circulation) CR 18C, 18A, 18, 19A, 19B, and 20.

City Roadways – Although south of the project area, city roadways may be used as haul routes. Kentucky Avenue runs east-west in the northern portion of the city of Woodland. A two-lane road, Kentucky Avenue is designated as a truck route by the City of Woodland's General Plan.

Traffic Types and Volumes

All roadways within the project area are traveled on by automobiles, trucks, buses, motorcycles, emergency vehicles, and with the exception of I-5, agricultural equipment. A brief discussion of bicycle traffic is also described below.

The Caltrans Traffic Operations Program reports average daily traffic volumes (ADT) on interstates and State highways. Additional traffic volumes were obtained from Yolo County. Annual average daily traffic for State highway sections through Yolo County and the intersections of county roads in the study area are provided on Tables 3-3 through 3-6.



N

SCALE IN MILES

5 0 5

LEGEND

Yolo1998

- Urban and Built up Land
- Grazing Land
- Farmland of Local Importance
- Prime Farmland
- Farmland of Statewide Importance
- Unique Farmland
- Water
- Farmland of Local Potential
- Cache Creek
- Other Land

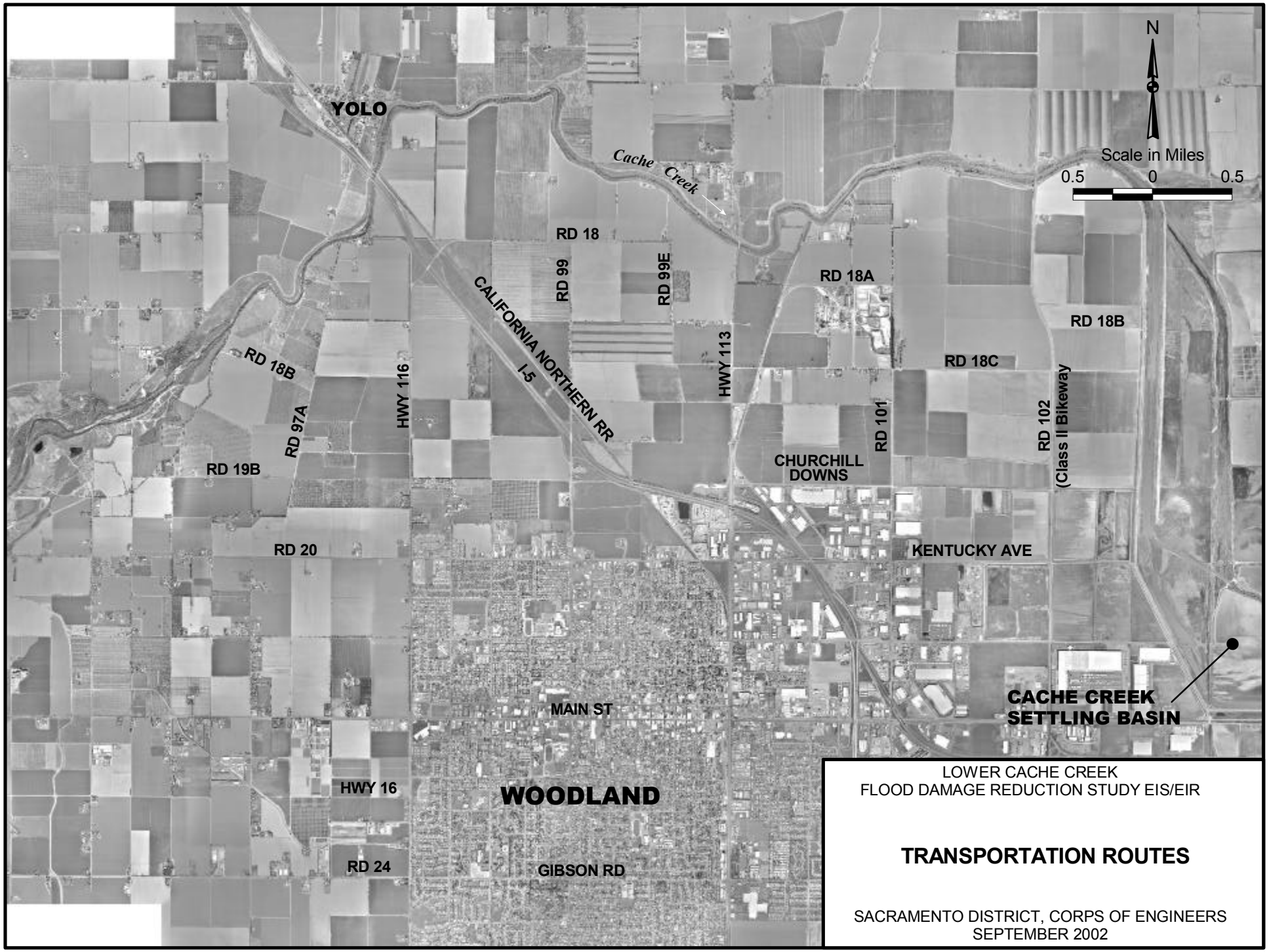
LOWER CACHE CREEK
FLOOD DAMAGE REDUCTION STUDY EIS/EIR

FARMLAND OF IMPORTANCE WITHIN PROJECT AREA

SACRAMENTO DISTRICT, CORPS OF ENGINEERS
OCTOBER 2002

Source: California Department of Conservation, 1998

Figure 3-5



LOWER CACHE CREEK
FLOOD DAMAGE REDUCTION STUDY EIS/EIR

TRANSPORTATION ROUTES

SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SEPTEMBER 2002

Figure 3-6

Traffic volumes are also described by level of service (LOS) categories depicting the overall amount of traffic congestion on roadways. Yolo County is currently in the process of gathering data and calculating LOS for area roadways. This information will be included in the final EIS/EIR.

Table 3-3. Annual Average Daily Traffic (AADT) for I-5 Through Study Area

I-5 AADT (Annual ADT)		South			North		
Post Mile	**Description**	**Peak Hr**	**Peak Mo**	**AADT**	**Peak Hr**	**Peak Mo**	**AADT**
0	Yolo County Elkhorn Road	3950	52000	47500	3700	45500	41000
5.53	CR 102	3700	45500	41000	3050	39500	38000
6.51	Woodland, East Main Street	3050	39500	38000	2900	38000	34000
7.09	Woodland, Jct. Rte. 113 S.	2900	38000	34000	2950	36000	32000
8.26	Woodland, Jct. Rte. 113 N.[1]	2950	36000	32000	2900	37000	31000
9.41	CR 99/West Street[1]	2900	37000	31000	2300	28000	23500
10.81	Jct. Rte. 16, County Road 18[1]	2300	28000	23500	2150	24300	21000
12.34	Yolo Interchange, County Road 17	2150	24300	21000	2150	22800	19500
17.62	Zamora Interchange, County Road 13	2150	22800	19500	1900	22500	18500
22.61	Jct. Rte. 505 South	1900	22500	18500	2900	35500	33500
23.79	CR 8	2900	35500	33500	2650	30000	28000
25.57	CR 6	2650	30000	28000	2700	30500	27000
28.92	Yolo County-Colusa County	2700	30500	27000	2550	30500	25500

[1] Located in project area.
Source: Caltrans Traffic and Vehicle Data Systems Unit, November 2001

Table 3-4. Annual Average Daily Traffic (AADT) For SH 113 Through Study Area

SH 113 AADT		South			North		
Post Mile	Description	Peak Hr	Peak Mo	AADT	Peak Hr	Peak Mo	AADT
9.23	Woodland, Gibson Road	1550	18300	17000	1200	12800	12000
10.15	Woodland, East Main Street	1200	12800	12000	580	6000	5400
10.72	Woodland, Jct. Rte. 5	580	6000	5400			
11.44	Jct. Rte. 5[1]				610	7000	6600
12.33	CR P18C[1]	610	7000	6600	320	3950	3500
14.09	CR P100	320	3950	3500	270	3300	2900
18.66	CR P13	270	3300	2900	240	2800	2500
21.2	CR 102	240	2800	2500	700	8700	7800

[1] Located in project area.
Source: Caltrans Traffic and Vehicle Data Systems Unit, November 2001

Table 3-5. Annual Average Daily Traffic (AADT) For SH 16 Through Study Area

SH 16 AADT		South			North		
Post Mile	Description	Peak Hr	Peak Mo	AADT	Peak Hr	Peak Mo	AADT
36.71	CR 94b	510	6400	5600	730	8200	7400
39.56	CR 97	730	8200	7400	810	10200	8600
40.57	West Main St/CR 98	810	10200	8600	600	7300	6500
41.3	West Woodland Avenue	600	7300	6500	470	5900	5100
41.57	Kentucky Ave/CR 20[1]	470	5900	5100	320	4300	3750
43.42	Jct. Rte. 5[1]	320	4300	3750			

[1] Located in project area.
Source: Caltrans Traffic and Vehicle Data Systems Unit, November 2001

Table 3-6. Annual Average Daily Traffic for Intersections Within Project Area

Intersections	ADT
CR 102 and Churchill Downs	7,226
CR 101 and Road 18C	675
CR 99 and Kentucky Avenue	9,583
CR 101 and Kentucky Avenue	4,356

Source: Yolo County, November 2001

Airports

Two municipal airports and a number of private airports are located in Yolo County. Yolo County Airport is about 11 miles west of Woodland, and the University

Airport at Davis is about 11 miles southwest of Woodland. Commercial flight services are provided by Sacramento International Airport about 20 miles east of Woodland.

Transit

The Yolo County Transportation District operates Yolobus, the public transportation for Yolo County. Yolobus serves Woodland, Davis, West Sacramento, Madison, Esparto, Capay, Dunnigan, Yolo, Southport, Knights Landing, and Winters. Bus route 215 and 217 traverse the project area.

Bikeways

Bicycle and pedestrian travel within the study area is limited because of the rural character of the area. Currently, CR 102 is the only designated bikeway in the project area. The bikeway begins at the Woodland city/Yolo County line and continues north through the project area. Roadway width, specifically shoulder width, limits bicycle traffic on most roadways. Yolo County has planned additional bikeways for the future within the project area, for example on CR 99, however project start dates and funding sources have yet to be identified.

Railroads

Two railroads traverse the study area. The California Northern Railroad (CNRR) runs alongside I-5 between Cache Creek and the city of Woodland/Yolo County line. The Southern Pacific Railroad runs north-south through the project area on the east side of SH 113. Both railroads are branches of larger lines; locally, they serve the community's industries.

The CNRR traverses the project area on a railroad embankment. There are no elevated sections of the tracks except for the railroad bridge across Cache Creek just east of I-5. At the intersection of the tracks and Churchill Downs, warning gates are in place to alert vehicles and pedestrians of an oncoming train. The train does not carry passengers; it is solely a freight train serving local demand. The train schedules depend on necessity and do not run on a consistent basis.

3.3.5 Noise

Noise levels and effects are interpreted in relationship to noise-level objectives for each county. Sound is technically described in terms of loudness (amplitude) and frequency (pitch). The standard unit of sound amplitude measurement is the decibel (dB). Since the human ear is not equally sensitive to sound at all frequencies, a special frequency-dependent rating scale has been devised to relate noise to human sensitivity. The A-weighted decibel scale (dBA) provides this compensation by discriminating against frequencies in a manner approximating the sensitivity of the human ear.

Several rating scales have been developed to analyze the adverse effect of community noise. Development of these scales has considered that the potential effect of

noise on people largely depends on the total acoustical energy content of the noise, as well as the time of day when the noise occurs.

L_{eq}, the equivalent energy noise level, is the average acoustic energy content of noise during the time that it lasts. Thus, the L_{eq} of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during the exposure, no matter what time of the day or night they occur.

L_{dn}, the day-night average noise level, is the 24-hour average L_{eq}, with a 10-dBA "penalty" added to noise during the hours of 10 p.m. to 7 a.m. to account for the greater noise sensitivity of people at night.

Other noise measures give information on the range of instantaneous noise levels experienced over time. Examples include:

L_{max} is the maximum instantaneous noise level experienced during a given period of time.

L_{min} is the minimum instantaneous noise level experienced during a given period of time.

L_n values indicate noise levels that were exceeded "n" percent of the time. For instance, L_{50} is the noise level that was exceeded 50 percent of the time during a measurement period.

For each increase or decrease of 10 decibels, the sound would be perceived by an observer to be a doubling or halving of the sound. For example, an increase from 60 to 70 decibels would sound twice as loud. A change of 3 decibels is barely perceptible, whereas a 5-decibel change is readily perceptible.

The existing Woodland General Plan Noise Element is based on recommendations by the California State Office of Noise Control as contained in the Model Community Noise Control Ordinance and the Guidelines for the Preparation and Content of Noise Elements of the General Plan. The Noise Element contains exterior noise-level performance standards for locally regulated noise sources. These noise sources are typically referred to as stationary noise sources or nontransportation-related noise sources. Table 3-7 indicates noise compatibility with various land use types. Noise guidelines vary depending on proximity to different land uses. For instance, an acceptable decibel range in an industrial area may not be acceptable in a residential neighborhood.

The City of Woodland General Plan (1996) identifies noise sensitive land uses as residential, hospitals, motels, nursing homes, theaters, music halls, churches, offices, schools, libraries, museums, playgrounds, and parks. Within the project area, residences are the predominant sensitive noise receptors. Noise sensitive periods are generally from 10 p.m. to 7 a.m.; the Ldn add a 'penalty' for noise during this time period since people have a greater sensitivity to sound in the evening.

Table 3-7. Noise/Land Use Compatibility Guidelines for Community Noise Exposure (dBA, Ldn, or CNEL)[1]

Land Use Category	Community Noise Exposure Ldn or CNEL, dB						
	55	60	65	70	75	80	
Residential, Theaters, Auditoriums, Music Halls, Churches							
Transient Lodging – Motels, Hotels							
Schools, Libraries, Museums, Hospitals, Nursing Homes							
Playgrounds, Neighborhood Parks							
Office Buildings, Retail Commercial							
Industrial, Utilities, Manufacturing							
Golf Courses, Outdoor Spectator Sports							

[1]dBA: A weighted decibel scale; Ldn: day-night average noise level; CNEL: community noise equivalent level

COMPLETELY COMPATIBLE – Noise exposure is such that indoor and outdoor environments are pleasant.

TENTATIVELY COMPATIBLE – Noise exposure is great enough to be of concern, but common construction practices would make the indoor living environment acceptable and the outdoor environment reasonably pleasant for recreation. Protective measures should be included as needed to satisfy the policies of the noise section of the General Plan.

NORMALLY INCOMPATIBLE – Noise exposure is so severe that unusual and costly building construction is necessary to ensure some tranquility inside one's home, and barriers must be erected between the site and prominent noise sources to make the outdoor environment tolerable.
Source: Woodland General Plan 1996.

Major noise sources in the project area are roadway traffic on State and county roadways, particularly I-5; California Northern and Southern Pacific Railroads operations, which generally operate between 7 a.m. and 7 p.m.; planes from the Yolo County Airport, the University Airport at Davis, and Sacramento Metropolitan Airport; agricultural activities; and fixed-noise sources. Fixed-noise sources are a result of many industrial processes, including Adams Grain Dryer, Pacific International Rice Mill, and Woodland Biomass.

Existing background noise levels vary within the project area depending on the proximity to noise sources. I-5 and county roads can produce average noise levels of

approximately 70 decibels at 100 feet. Agricultural fields, while in production, produce noise levels of approximately 78 decibels at 100 feet. Railroads can create noise levels of 75 decibels at 100 feet.

3.3.6 Air Quality

The air quality of a given area is determined by 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, terrain, and isolation.

Woodland is located within the Sacramento Valley Air Basin, a broad, flat valley bounded by the coastal ranges to the west, the Cascade Range to the north, and the Sierra Nevada to the east. Air entering the Sacramento Valley basin typically comes from the San Francisco Bay/Delta region near the Carquinez Strait. The strong winds over the Delta bring pollutants from the San Francisco Bay area. These pollutants can also be mixed with metropolitan Sacramento-area pollutants while being dispersed northward toward Yolo County.

The frequency of air stagnation is highest in the autumn and early winter when large high-pressure cells lie over the valley. The lack of surface wind during these periods and the reduced vertical air flow caused by less surface heating reduces the influx of outside air and allows air pollutants to become concentrated in a stable volume of air. The surface concentrations of pollutants are highest when these conditions are combined with smoke from agricultural burning or when temperature inversions trap cool air, fog, and pollutants near the ground.

The primary air quality problems in Woodland are ozone and suspended particulates (PM_{10}). In the Sacramento Valley Air Basin, ozone is a seasonal problem roughly from May through October and is characterized by stagnant morning air or light winds with the Delta sea breeze arriving in the afternoon out of the southwest. Usually this evening breeze transports the airborne pollutants to the north out of the Sacramento Valley. During about half the days from July to September, however, a phenomenon called the 'Schultz Eddy' prevents this from occurring. Instead of allowing for the prevailing wind patterns to move north carrying the pollutants out of the valley, the Schultz Eddy causes the wind pattern to circle back south toward the Yolo-Solano AQMD. This exacerbates the pollution levels in the district and increases the likelihood of violating Federal or State standards. This eddy will normally dissipate about noon if the Delta sea breeze arrives.

Federal and State standards have been established for ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, suspended particulates (PM_{10}) and lead. California has also set standards for pollutants not covered by national standards (sulfates, hydrogen sulfide, vinyl chloride and visibility-reducing particulates).

The Yolo-Solano Air Quality Management District (YSAQMD) monitors and regulates air quality in the Woodland area and regulates air pollution emissions of

commercial and industrial operations. During the 5-year period between 1989 and 1993, exceedances of the State and Federal standards were recorded in Yolo County for the State/Federal ozone standards and State PM_{10} standards. Both pollutants are regional problems affecting the entire Sacramento Valley Air Basin. Under the Federal Clean Air Act (CAA), Yolo County is designated as "severe" nonattainment for the Federal ozone standard, and attainment or unclassified for other pollutants. Under the California CAA, the county is a "serious" nonattainment area for the State ozone standard, and is also considered nonattainment for the State PM_{10} standard. Table 3-8 shows YSAQMD thresholds and EPA conformity thresholds for criteria pollutants.

The conformity provisions of the Federal CAA were put in place to ensure that Federal agencies would contribute to the efforts of attaining the national ambient air quality standards. The EPA has issued two conformity guidelines: transportation conformity rules which apply to transportation plans and projects, and general conformity rules which apply to all other Federal actions. Conformity determination is only required for the alternative that is ultimately approved and funded. A project that produces emissions that exceed standards would be required to be mitigated. A project would be exempt from the conformity rule if the project-related emissions are less than the *de minimis* thresholds established by the conformity rule.

While emission-control requirements on motor vehicles and industrial operations have substantially reduced air pollution from these sources, increased development and the associated increase in emissions from automobiles threatens to offset these gains.

Woodland contains a multitude of air pollution sources. Motor vehicle exhausts and pesticides are major contributors to the regional ozone problem. Industrial combustion, combustion of natural gas in homes and businesses for space and water heating, and evaporation of paints and solvents are other sources of urban air pollutants. Agricultural lands that surround Woodland generate pollutants from vehicle exhaust, tilling, burning, unpaved road travel, and evaporation of pesticides.

The Yolo-Solano AQMD has permit authority over stationary sources of air pollutants. Major permitted sources in the Woodland area include Adams Schwab & Adams, Contadina, Fosroc, Leer West, Pacific International Rice Mill Inc., and the Woodland Biomass Power Ltd.

Sensitive air receptors are people that are more susceptible to the effects of air pollution than are the general public. Examples of sensitive air receptors include health care facilities, rehabilitation centers, convalescent centers, residences, schools, playgrounds, child-care centers, and athletic facilities. Within the project area, residences are the primary sensitive receptor.

During the summer months, odors can be detected while traveling through the project area, specifically in the Woodland area while traveling on I-5 (odors originate in the industrial area).

Table 3-8. Pollutant Thresholds

YSAQMD Thresholds	
Pollutant	**Threshold**
NO_x	82 lbs/day
ROG	82 lbs/day
PM_{10}	82 lbs/day
CO	550 lbs/day
EPA Thresholds	
Pollutant	**Threshold**
NO_x	25 tons/year
ROG	25 tons/year

3.3.7 Sedimentation and the Settling Basin

The existing settling basin was constructed to minimize the adverse affect on the hydraulic capacity of the Yolo Bypass caused by excess sediment deposition by allowing sediment carried by Cache Creek to settle out before entering the Yolo Bypass. The settling basin is bounded by levees on all sides and covers 3,600 acres. Flows from Cache Creek enter the northwest corner of the settling basin and exit via two structures in the southeast corner of the basin: (1) a 1,700-foot concrete weir and (2) a grated 400 cfs double-box culvert low flow outlet. A training levee adjacent to the west levee ties into the end of the left levee of Cache Creek. The training levee was designed to direct the flow to the southern portion of the settling basin, maintaining the flow velocity and preventing sediment deposition and clogging near the inlet of the basin.

The levee heights and locations have been modified several times to control sediment deposition and increase sediment storage capacity. In 1991, modifications to the settling basin included 50-year storage capacity with an average of 340 acre-feet of sediment accumulation per year. This corresponds to an average trapping efficiency of 55 percent, assuming existing levee project conditions and a Cache Creek channel conveyance of 30,000 cfs. Future modifications include a plan that would raise the 1,740-foot concrete weir in the east levee of the settling basin 6 feet in 2017 or when the basin fills with sediment such that the trap efficiency decreases to less than 30 percent. Modifications also include a plan to remove the training levee in increments to encourage a broader distribution of sediment deposition in the upper portion of the settling basin.

Sediment data has been collected on Cache Creek at a U.S. Geological Survey (USGS) gage near the town of Yolo from 1943 to 1971 (Corps, 1987). Results indicate that 93 percent of the total sediment load at the Yolo gage is suspended sediment, approximately 86 percent of which consists of silts and clays with an average diameter less than 0.064 mm. The annual suspended sediment load into the settling basin between 1904 and 1963 was approximately 675 acre-feet (DWR, 1968). The annual deposition rate in the settling basin from 1934 to 1968 was calculated to be 340 acre-feet, yielding a 50 percent trap efficiency. The 1991 modifications were intended to add an additional 50-

year storage capacity with an average trapping efficiency of 55 percent (assuming existing levee project conditions and a Cache Creek channel storage capacity of 30,000 cfs). A Central Valley Regional Water Quality Control Board (RWQCB) study (1996 to 1998) indicated that the settling basin trapped approximately 50 percent of the mercury and sediments for flows exceeding 730 cfs. However, for flows less than 150 cfs, exports were three to four times higher than the imports entering the basin. Limited testing has been done in the settling basin, but sediments are suspected to consist of relatively high mercury concentrations.

3.3.8 Water Quality

The Cache Creek watershed drains a large area with a wide variety of land uses. These land uses have the potential to contribute to water quality problems such as fecal coliform from septic systems and cattle; boron, mercury and other minerals from geothermal springs and abandoned mines; fertilizers, pesticides, and herbicides from agriculture activities; and sediment from erosion. Although Cache Creek is not used as a municipal drinking water supply, water quality problems do affect wildlife, recreational, and agricultural uses along the creek.

As part of the Cache Creek Resources Management Plan and the Cache Creek Improvement Program, monitoring has been undertaken to establish baseline information on water quality within the creek. Monitoring stations are located at CR 85 (Capay bridge), upstream of Gordon Slough, CR 94B (Stevens bridge), and CR 97B.

Results show that the creek is high in turbidity (sediment) and fecal coliform. Although these results are not unexpected for a highly erosive stream with upstream cattle grazing, they do pose a threat to the overall water quality of Cache Creek. Monitoring results show that fertilizers, pesticides, and herbicides are not contaminating the creek.

There is a local concern about high levels of boron in Cache Creek. Boron is a result of geothermal releases found in the upper reaches of the basin. Concentrations of boron vary depending on the volume of flow in Cache Creek. During low flows in late spring, boron precipitates out on the rocks along the creek. In the fall, when flows increase, boron is diluted and carried into the Yolo Bypass and then to the Sacramento-San Joaquin River Delta. Concentrations of boron are regularly monitored at Capay and Moore dams by the Yolo County Flood Control and Water Conservation District to ensure suitability of the water for agricultural use. Although there are no Federal or State thresholds for boron, the district would not use Cache Creek water until it is nearly free of and boron, which, at high concentrations, can kill English walnut trees and degrade downstream water quality.

Groundwater quality is generally very good except for localized areas containing high boron levels such as along Cache Creek, where boron concentrations in the groundwater are high, ranging from 2 to 4 ppm, in comparison to background levels of 0.6 to 1.0 ppm in other parts of the county. Other localized areas of ground-water contamination are due to (1) nitrates near Dunnigan, east of Woodland, and west of the

University of California at Davis and (2) pesticides near Mace Boulevard north of Putah Creek. Mercury is detected in the groundwater, but is typically at background concentrations.

With regards to human health, the long-term effects of boron exposure remain undetermined. However, on a short-term basis, boron is discharged from the body within a few days of exposure.

The Central Valley RWQCB currently designates Cache Creek as an Impaired Water Body due to high levels of mercury in fish populations. Studies have indicated that Cache Creek is a major source of mercury to the Sacramento-San Joaquin Delta estuary. This has caused concern because this wetland area is a highly favorable environment for methylation. The methylation of mercury is common in anaerobic environments. Methyl-mercury is more bio-available than metallic mercury and can be found in toxic concentrations in species at the top of food chains. Mercury is present throughout the basin, originating from geothermal springs, agricultural runoff, atmospheric deposition, and erosion of naturally mercury-enriched soils. However, the majority of mercury comes from mercury-laden mine and retort wastes. There are three inactive mercury-mining districts in the upper watershed, including Sulfur Bank Mercury Mine at Clear Lake, which is a Superfund site, and the Sulfur Creek and Knoxville mining districts. Elevated mercury concentrations have been observed in invertebrates and fish species sampled from Cache Creek.

The RWQCB is concerned about activity in the Cache Creek watershed that could result in disturbance of mercury-contaminated sediments. This could mobilize the mercury and make it available for biological intake. The streambed between Clear Lake and Rumsey drops about 27 feet per mile (USGS, 1958-92). This steep gradient upstream and broad flat plain in the project area downstream ensures continuous erosion and deposition of mercury-laden sediment. During high flows, much of this mercury-laden sediment is carried farther downstream. The RWQCB identified three patterns of mercury loading during the hydrologic cycles between February 1996 and February 1998 (Foe and Croyle, 1998). The lowest mercury and sediment transport occurred during the summer irrigation period from April to October; during the winter non-runoff periods, mercury export rates from Cache Creek were about 10 to 20 times higher. The highest export rates were measured after large winter storms. Although large storms were relatively infrequent (4 to 10 times a year), these storms appeared to result in the largest portion of mercury exported from the basin.

The Central Valley RWQCB listed Cache Creek on the EPA list of priority water bodies that do not meet beneficial uses. The RWQCB is currently developing the Total Maximum Daily Load (TMDL) limits related to the Cache Creek mercury management strategy, which is to be completed in the summer of 2003 (SWRCB, 2001). The main components of the TMDL are to determine an appropriate target for mercury, identify the sources, determine the load reduction necessary to meet the appropriate target, and to assign the load reduction to various sources with a margin of safety.

The greatest potential source of mercury exposure to humans is through game fish. Health advisories for Clear Lake and the Bay-Delta region concerning the consumption of fish have been adopted. These same advisories should be adhered to within the Cache Creek watershed.

3.3.9 Vegetation and Wildlife

Cache Creek flows roughly east-southeast from Clear Lake for approximately 75 miles out of the Coast Range and into the Sacramento Valley, one of only a few large creeks of the Coast Range that follow this path. Maps and historical descriptions of Cache Creek indicate that the creek was much shallower prior to human disturbance. The riparian corridor was extensive on both sides of the creek, and overbank floodflows frequently replenished the vegetation with nutrients. Native vegetation in the study area was composed of riparian forest, riparian scrub/shrub, valley grassland, oak woodland, and freshwater marsh. The lush riparian forest and wetland systems supported a diversity of wild game and fish. Yolo County derives its name from the Native American word "Yoloy," meaning a place abounding in tules. The first western settlers brought livestock to the Cache Creek region; later, in the mid-1800's, agriculture became a part of the region.

Currently, 35 miles of Cache Creek's upper reach is protected from human encroachment as the Bureau of Land Management's Cache Creek Natural Area. This is a primitive area (no motorized vehicles and no developed campgrounds or facilities) that is managed to protect wildlife and rare plants. This pristine area supports oak woodland, grassland, and chaparral, sustaining the second largest wintering population of bald eagles in California and one of the few free-roaming herds of Tule Elk. Today, the lower reach of Cache Creek flows mostly through private agricultural lands, typically supporting a narrow strip of riparian vegetation.

Riparian vegetation along Cache Creek now consists largely of willow, elderberry, cottonwood, blackberry, and the nonnative tamarisk and giant reed. Between CR 96B and CR 97B and the settling basin, the creek is confined by levees. Within the levees, wild rose, tamarisk, giant reed, sandbar willow, elderberry, wild grape, and cottonwoods can be found. Lower Cache Creek is dry part of the year as a result of a diversion dam constructed near Capay in 1912 and related irrigation diversions. Some riparian vegetation continues to grow on the banks and terraces of the low-flow channel despite limited water availability. Generally, the vegetation grows in narrow strips between 37 and 75 feet wide along both sides of the low-flow channel. The riparian canopy consists mainly of willow, Fremont, black cottonwoods, valley oak, and interior live oak trees. Many of the trees are covered with blackberry and grape vines. Much of the ground cover is made up of California blackberry; western ragweed; sweet anise; curly dock; cocklebur; and several species of thistles, grasses, and forbs. The range of the riparian vegetation is constrained by nearby agricultural activity. Crops cultivated near the creek include rice, wheat, tomatoes, melons, and fruit and nut orchards. The 3,600 acres within the settling basin are also farmed.

Vegetation in the inactive gravel pits is sparse with small patches of dense shrubs. Spring-flowering annual forbs and annual grasses cover much of the area. Emergent wetland communities of cattails, bulrushes, and willows populate some depressions, canals, and drainage ditches. Jurisdictional wetlands may occur within the project area. To date studies have not been conducted to determine their extent. A wetlands delineation would be completed in the PED phase prior to construction to ensure the project complies with all wetlands regulations. There are no other sensitive natural communities within the project area.

A number of wildlife species are associated with the types of habitat available for food, cover, and nesting along Cache Creek. Typically, riparian forest, valley oak woodland, and freshwater marsh are highly productive wildlife areas. Avian species found in these areas include house finch, scrub jay, acorn woodpecker, egret, owl, red-tailed hawk, and Swainson's hawk. Mammalian species found here include deer, coyote, opossum, gray fox, raccoon, western gray squirrel, and muskrat. Migratory waterfowl and raptors use the study area during the winter. Grassland and riparian scrub areas are used by species that feed on seed and vegetation such as the California ground squirrel, California vole, California quail, and American goldfinch. Vertebrate predators in the area include the gopher snake, red-tailed hawk, striped skunk, and fox. Reptilian species include garter and gopher snakes and western fence lizards. Agricultural fields provide foraging and resting areas for Swainson's hawk, red-tailed hawk, Brewer's blackbird, and black-tailed hare. Agricultural fields also provide habitat for western fence lizards, gopher snakes, California ground squirrel, California quail, coyote, skunk, and fox. These species often nest in nearby riparian areas and feed on agricultural field and annual grassland. The creek itself serves as habitat for northwestern pond turtles and giant garter snakes, as well as an assortment of fish.

Lower Cache Creek is within the Pacific Flyway. The Pacific Flyway is used by 10 to 12 million ducks, of which 300,000 winter in the Yolo Bypass and the settling basin. During migration and wintering periods, dabbling ducks such as pintail, teal, and shoveler can be found. Raptors that use the area include golden eagle, northern harrier, red-tailed hawk, short-eared and barn owls, and turkey vulture. Passerine species include the Brewer's blackbird, Lewis's woodpecker, acorn woodpecker, scrub jay, red-shafted flicker, common crow, yellow-billed magpie, tree swallows, rough-winged swallows, and cliff swallows. Over 200 species of birds are known to be seasonal visitors or residents of the riparian community.

Yolo County has developed 41 conservation policies within its 1983 General Plan. Of note is conservation policy #28 which advocates establishing a tree planting program and a tree preservation ordinance. Yolo County has also begun the development of a habitat conservation plan (HCP) to mitigate for future development within the County. This document is still in draft form and as yet has not been adopted. The City of Woodland has stated within its General Plan (1996) that it would participate in the County HCP. The City has also developed 28 other policies to advocate the preservation of wildlife, vegetation and open space. Within these policies the City aims to conserve open space, improve the City's tree cover, encourage the development of open space areas, avoid significant biological resources, ecologically fragile areas and special-status

species, and ensure that landmark and major groves of native trees are protected just to specify a few policies.

3.3.10 Special-Status Species

The Federal Endangered Species Act of 1973 (ESA) (50 CFR 17) provides legal protection and requires definition of critical habitat and development of recovery plans for plant and animal species in danger of extinction. The State provides parallel legal protection in the California Endangered Species Act of 1977 (CESA). The status of an animal or plant is listed as endangered, threatened, or in the case of plants, rare by the ESA and CESA.

Lists of species of special concern based on factors such as limited distribution; declining population size; diminishing habitat acreage or value; or unusual scientific, recreational, or educational value are also maintained by Federal and State agencies. Legal protection for species of special concern is limited as compared to listed species, but these species may be added to official lists in the future if their decline is not halted.

A record of species listed or proposed for listing under ESA for the study area was received from the USFWS in August 2001 and from the National Marine Fisheries Service in December 2001. (An updated list was received from the USFWS as part of its draft Coordination Act Report (CAR) in March 2002.) Table 3-9 (at the end of Chapter 3) includes a compilation of these lists and a literature review of other environmental documents prepared for sites in the study area. This table gives details of potential and documented occurrences of special-status species in the study area, as well as information on habitat requirements and distribution.

The species list provided by the USFWS was used as the basis for determining potentially affected species. Species from the USFWS list, their locations, and their habitat were identified through searches of the California Department of Fish and Game (DFG) natural diversity database (CNDDB), draft Yolo County HCP, Woodland General Plan (1996), and other literature available on the project area. If a species and/or its habitat were located within the project area, this information was compared to the alignment and potential construction zone of the LCCFB and Modified Wide Setback Levee plans. This comparison allowed for the determination of those species potentially affected by the development of this project. These species and their life history requirements are discussed below.

Potentially Affected Species

Giant Garter Snake (*Thamnophis gigas*) – The giant garter snake (GGS) is a State-listed (June 27, 1971) and Federally listed (October 20, 1993) threatened species. It historically ranged throughout the Central Valley, but is currently extirpated from Fresno County southward. During the winter (the snake's dormant season) and at night, it typically inhabits upland areas, small mammal burrows, and other soil crevices. Daytime and active season (early spring through mid-fall) habitats include aquatic sites; emergent vegetation; and grassy banks along agricultural wetlands, irrigation and drainage canals,

sloughs, ponds, small lakes, and low gradient streams. The GGS feeds on fish, amphibians, and amphibian larvae.

Giant garter snakes bare live young between mid-July and September. These young then disperse immediately after birth, thereby eliminating any need by the GGS for nesting sites.

The snake rapidly retreats to water if disturbed.

The decline of the GGS is attributable to habitat loss through flood control and agricultural activities. Critical habitat for the GGS has been proposed (September 9, 2000); however, none occurs within the project area. Sycamore Environmental biologist Dr. John Little and CDM biologist John Downs undertook a field survey for GGS habitat on September 14, 2001. During an October 15, 2001, survey for *Cordylanthus palmatus,* additional observations were made on GGS habitat. The northern boundary of the study area includes an 11-mile reach of lower Cache Creek. The southern boundary is located 0.5 mile north of Kentucky Avenue and extends for 5.7 miles. The land between these two boundaries consists mostly of agriculture.

The survey logged five areas of potential GGS habitat: (1) bed and bank of Cache Creek and the levees adjacent to the creek; (2) agricultural ditch between CR 101 and CR 102; (3) agricultural ditch between CR 102 and the Cache Creek west levee; (4) narrow channel east of CR 102 on the south side of the farm road (levee); and (5) agricultural ditch at the base of the north-south segment of the Cache Creek west levee.

Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*) – The Valley elderberry longhorn beetle (VELB), Federally listed (August 8, 1980) as threatened, is entirely dependent on the elderberry (*Sambucus spp.*) as its host plant. The VELB is a wood borer that emerges from late March through June to feed, reproduce, and deposit its eggs within crevices in the bark of the elderberry shrub. Once the larva hatch, they bore into the wood where they spend 1 to 2 years feeding on the shrub's pith before exiting the plant as adults. The adults are active from March to June, mating and feeding on the elderberry leaves and flowers.

The VELB is endemic to Central Valley riparian forests along rivers and streams. These areas are typically the first settled and are often converted entirely for human uses such as agriculture. Some estimates place the extent of destruction at 89 percent for Central Valley riparian forest habitat.

Critical habitat (August 8, 1980) for the VELB does not exist within the project area.

CDM biologist John Downs completed a survey for presence of the VELB. The entire project site was surveyed for the presence of elderberry shrubs. No shrubs were found near the flood barrier project area. In the setback levee project areas where shrubs are expected to be taken, stem sizes, numbers, and beetle presence were estimated at the road crossings. Estimates were made by making a quick count of stems in clumps

occurring less than 100 feet from the project area. Elderberry shrubs were found on both banks of Cache Creek.

Palmate-bracted Bird's Beak (*Cordylanthus palmatus*) – The palmate-bracted bird's beak is a State-listed (May, 1984) and Federally listed (July 1, 1986) endangered annual plant that occurs along the edges of channels and drainages on seasonally flooded, saline-alkali soils below 500 feet. Individuals can also be found in alkali scalds (barren areas with a surface crust of salts) and grassy areas. Currently, seven metapopulations exist in California. Four can be found in the Sacramento Valley, one in the Livermore Valley, and two in the San Joaquin Valley.

The palmate-bracted bird's beak is a hemiparasitic plant. It manufactures its own food, but depends on saltgrass (*Distichlis spicata*) (believed to be its host plant) for water and nutrients. It flowers from May until October, depending upon bees for pollination. It is a highly prolific seed producer, therefore forming a lasting seedbank. However, annual plant numbers vary depending on environmental conditions.

Current population declines result from detrimental land use practices such as agriculture, livestock grazing, and urbanization. Sycamore Environmental biologist Dr. John Little and CDM biologist John Downs undertook a field survey for *Cordylanthus palmatus* habitat on October 15, 2001. During a September 14, 2001, survey for *Thamnophis gigas,* additional observations were made on *C. palmatus* habitat. The northern boundary of the study area includes an 11-mile reach of lower Cache Creek. The southern boundary is 0.5 mile north of Kentucky Avenue and extends for 5.7 miles. The land between these two boundaries consists mostly of agriculture. The survey focused on areas mapped as Pescadero silty clay soils. Disturbed alkaline areas within abandoned rice fields south of the flood barrier and east of CR 102 provide some of the best potential habitat in or adjacent to the study area. However, these alkaline habitats are located outside the project boundary and therefore would not be affected by construction.

Central Valley Chinook Salmon (*Oncorhynchus tshawytscha*) – The various runs of the Central Valley chinook salmon were determined by the USFWS and NMFS to be candidate (fall/late fall), endangered (winter), and threatened (spring) species. The chinook salmon is an anadromous and semelparous (spawns only once and then dies) fish that spends up to 2 years as a juvenile in freshwater before returning to the ocean. It then spends up to 6 years in the marine environment before returning to its home stream to spawn and then die.

There are different seasonal runs or modes in the migration of chinook salmon from the ocean to freshwater. The fall/late fall-run chinook salmon was historically found within Cache Creek between July and April. The winter-run chinook salmon was historically found within Cache Creek between December and July. The spring-run chinook salmon would be found within Cache Creek between April and October. Although NMFS considers Cache Creek to be essential fish habitat for the Central Valley fall-run chinook salmon, currently Cache Creek no longer flows directly into the Sacramento River, making it highly unlikely that salmon winter and spawn within the creek at present.

NMFS has determined that Cache Creek serves as essential fish habitat for the Central Valley fall-run chinook salmon.

Steelhead Trout – California Central Valley (CCV) ESU (*Oncorhynchus mykiss*) - The steelhead is currently Federally listed as threatened (March 19, 1998) in the Central Valley region. Steelhead trout are an anadromous form of rainbow trout. The fish spends one to four growing seasons in the ocean before returning to spawn for the first time. Steelhead seek out small streams and tributaries where cool, well oxygenated water and gravelly stream channels occur in order to lay their eggs. Cover in the form of deep pools, overhanging and submerged vegetation, undercut banks, and submerged debris is also important for the protection of spawning and hatching steelhead. The CCV ESU generally spends up to its first 3 years of life in freshwater before migrating to the ocean between March and June. Unlike other anadromous pacific salmonids, steelhead may survive spawning and return to the ocean to spawn again a later year.

Critical habitat was designated for the CCV ESU (February 16, 2000) to include all river reaches accessible to listed steelhead in the Sacramento and San Joaquin Rivers and their tributaries (NMFS, 1998). This critical habitat included lower Cache Creek; however, an April 30, 2002 court ruling vacated this critical habitat for the CCV ESU.

Swainson's Hawk (*Buteo swainsoni*) – The Swainson's hawk was listed by the State of California as threatened on May 17, 1983. Currently, the species migrates north into California from March through May; breeds from late March to late August in the Central Valley, Klamath Basin, Northeastern Plateau, Lassen County, and Mojave Desert; and then returns to Central America by the end of October. The hawk uses scattered, large trees in juniper-sage flats, riparian areas, and oak savannah to raise one brood per year with its monogamous mate. Adjacent grasslands, grain fields, and pastures provide foraging areas for mice, gophers, ground squirrels, rabbits, large arthropods, amphibians, reptiles, birds, and rarely fish.

The Swainson's hawk is considered an uncommon to locally common breeding resident and migrant. A total California population of 375 pairs and 110 breeding pairs was estimated by Bloom (1980). The California Department of Fish and Game (DFG) estimates up to 1,000 pairs occur within the State (Woodbridge, 2001). These numbers signify a decline across the State of up to 90 percent of their historical population (Bloom, 1980). Declines in Swainson's hawk populations are ascribed, in part, to the loss of nesting habitat.

There are numerous documented occurrences of Swainson's hawks within the project area from I-5 eastward and throughout the settling basin. These hawks can be habituated to human activity such as crop cultivation if the activity is consistent. Disturbances, particularly during the breeding season, may include construction actions (a change in current activity routine) and personnel near nesting sites. These disturbances during prenesting, egg-laying, and incubation could result in nest abandonment.

Bank Swallow (*Riparia riparia*) – The bank swallow is a State-listed (June 11, 1989) threatened species that migrates into California from South America in

March through May. The species spends the summer breeding in northern and central California before heading back south for the winter. The swallow is found primarily in riparian and other lowland habitats. It digs nesting holes into vertical banks, bluffs, and cliffs with fine-textured or sandy soils. Foraging habitat includes open riparian areas, brushland, grassland, wetland, water, and cropland.

The bank swallow is considered a locally common to uncommon breeding resident and migrant. The California population totals approximately 100 breeding colonies. The Sacramento River, between Redding and the Yolo Bypass, contained approximately 50 percent of the breeding population as of 1987 (Garrison, 2001).

There are documented occurrences of bank swallows within the project area, including observations of birds in flight by project biologists during site visits. A relatively large breeding population has recently been found along Cache Creek north of the gravel mining areas (T. and J. Heindel, personal communication with Garrison, 2001). Breeding bank swallow populations seem to be fairly tolerant of moderate levels of human activity. Bank swallow susceptibility is primarily tied to habitat losses of their nesting banks from flood damage reduction measures.

Northwestern Pond Turtle (*Clemmys marmorata marmorata*) - The northwestern pond turtle is a California species of special concern. It is common to uncommon throughout California, west of the Sierra-Cascade crest. It inhabits aquatic areas with plentiful hiding and basking sites. A permanent water source is necessary to avoid desiccation, especially for hatchlings. Underwater bottom mud or upland habitat is used for hibernation in colder areas. Upland habitat is used for aestivation and reproduction. The turtle seeks aquatic plant material, beetles, aquatic invertebrates, fishes, and frogs for a food source.

Mating for northwestern pond turtles begins in late April and extends through early May. Oviposition typically occurs during May and June on upland habitats that average 2,300 feet from the turtle's aquatic habitat. The hatchlings, it is assumed, spend the winter within the nest and emerge the following spring. Loss of upland nesting habitat through human disturbance is a potential source for the turtles' decline. There are documented occurrences of the turtle within Cache Creek and various stock ponds of the project area.

3.3.11 Cultural Resources

Cultural resources include buildings, structures, objects, sites, districts, and archeological resources associated with historic or prehistoric human activity. The cultural value of these resources may be of national, state, or local significance and may be listed in, or eligible for listing in, the National Register of Historic Places (NRHP) on the Federal level, or in the California Register of Historic Places as outlined in CEQA. CEQA has similar criteria for the evaluation of the significance of cultural resources to the California Register of Historic Places. If properties are eligible under the NRHP, they are also eligible under the California Register.

For a cultural resource to be determined eligible for listing in the National Register, it must meet certain criteria. The resource has to be at least 50 years old or exhibit exceptional importance and meet one or more of the following criteria as defined in 36 CFR 60.4. It must be (1) associated with events that have made a significant contribution to the broad patterns of our history; or (2) associated with the lives of persons significant in our past; or (3) embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or (4) has yielded, or may be likely to yield, information important in prehistory or history.

Cultural Context

Prehistory

The earliest known human occupation in or near the study area is from Borax Lake near Clear Lake where radiocarbon dates place the site in the 10,000- to 12,000-year-old range. Artifacts consist of fluted projectile points and chipped stone "cresents," both of which are typical of sites of similar antiquity elsewhere. This was an era when large game hunting was emphasized. Archeological evidence for continuous habitation of the study area is missing until the period of around 2000 B.C. Radiocarbon dates from a prehistoric site in Capay Valley show that both large and small game were being hunted and undoubtedly many vegetable food sources were being used by that period. Populations in the region, as elsewhere in California, continued to increase with the result that technological specialization in economic and ceremonial systems became characteristic. In the latest archeologically distinct period of 500 A.D.-1770 A.D., the bow and arrow became predominant. Acorns had become a staple food source, and all manner of plants, animals, and fish were used for food, basket materials, decorative items, shelter, ceremonial and musical implements, clothing, and other items. There are numerous recorded archeological sites along Cache Creek and the Sacramento River that have provided evidence of a substantial population already in place prior to arrival of non-Native Americans.

Ethnography

"Ethnography" refers to the recent history of the Native Americans of the region from the late 1700's to the early 1900's. The Penutian-speaking Patwin Indians occupied a large area west of the Sacramento River north from the town of Princeton south to the city of Benicia. They were composed of three main groups: the River, Hill, and Southern Patwin. This minor geographic division of the peoples barely represents the extent to which these people were much more geographically and linguistically diverse. They were organized along socio/political lines in small units called tribelets. They existed in the study area until their virtual eradication by the ever-increasing influx of Euro-Americans who took up the land for farms, ranches, and towns. Epidemics of malaria and smallpox in the 1830's also contributed to the rapid decimation of the Patwin.

Before such events, Patwin lived along waterways in permanent villages that varied in size from 50 to 1,000 inhabitants. The larger villages were along the Sacramento River. There is little evidence of occupation away from the streams in the study area although temporary campsites certainly must have been established. A wide variety of food and other resources were available and used, including fish, deer, elk, birds, berries, seeds, and particularly acorns. Trade networks were extensive and included items not present in the study area, such as obsidian from Clear Lake, shell beads from the coast, and salt from farther north. The village of Churup, a Patwin name, was recorded near the town of Yolo. The village of Chila was located near Cache Creek at its lower terminus.

History

Euro-American occupation in the Sacramento Valley is represented first by Spanish interests, then Mexican dominion, and finally by American claim of the region. English fur trappers were present, but English rule of the territory was not. Explorers and trappers entered the Sacramento Valley at least by 1808. Captain Luis Arguello's expedition of 1821 was probably the first near the study area. Alexander McLeod of the Hudson's Bay Company led a hunting and trapping party, and encountered Cache Creek, which they named as such because of the caches of pelts and furs they hid in the banks of the creek. French Camp, on the north bank of the creek about 1 mile downstream from Yolo was one such site (Walters, 1995).

William Gordon, the first major settler in the study area, came to Yolo County in 1842 and claimed the Mexican land grant of Rancho Guesesosi along Cache Creek as his own. His first house, built on the north side of Cache Creek, is long gone. Gordon had to reestablish his claim on the land after 1846 when Alta California became part of the United States. He was issued a patent for the 8,894.49 acres. The rancho boundaries are defined by County Road (CR) 19 on the north, CR 94B on the east, State Highway 16 on the south, and CR 89 on the west. He farmed the property until 1866 (Walters, 1995). Gordon represents the first wave of settlers who acquired large parcels of land for ranching and farming. Agriculture was and still remains the primary industry of Yolo County.

Adjacent to and downstream of Rancho Guesesosi, on both sides of Cache Creek, lay Rancho Rio Jesus Maria, which was taken up by Thomas Hardy in 1843. His ranch covered 6 leagues or 26,000 acres. He died in 1849, and his ranch was bought by James Madison Harbin, James M. Estill, George W. Tyler, and John G. Parrish. They were eventually issued a patent for the land in 1858. Harbin ended up with much of the property and sold off parcels until none remained in his ownership. He and his family lived on the land for about 7 years (Walters, 1995). Rio Jesus Maria was the original name of Cache Creek. On the 1858 surveyor's plat for the ranch, there are four residences, including three upstream of Yolo and one downstream. Later maps show structures in these locations; however, they would have to be field inspected to determine if they represent earlier or later occupations.

The town of Yolo and the city of Woodland are both within the study area. Yolo grew out of a community established on the property of Thomas Cochran, who built a modest inn there in 1849. Later, James A. Hutton acquired some of the property. The Yolo Post Office was officially open in 1853. In 1857, the town of Cacheville, as it was then called, became the Yolo County seat of government. Yolo boasted a newspaper, church, and cemetery, among the other properties and residences. The county seat was moved to Washington (now Broderick) in 1860.

Settlement in Woodland began when John Morris, from Kentucky, moved to the current site of First and Clover Streets in 1849. The area was informally called Yolo City until the wife of Frank S. Freeman named it Woodland as the petition for establishment of a post office was forwarded to Washington, then the county seat (Larkey and Walters, 1987). In 1862, Freeman successfully lobbied to have the county seat moved to Woodland where it has remained since that time (Larkey and Walters, 1987).

Although growth in Yolo County, including the communities of Yolo and Woodland, continued steadily in the mid- and late 1800's, the coming of the railroad to Woodland in 1869 accelerated that development. Growers profited because there was now a ready source to transport produce, particularly grain, to market. By the 1880's, vineyards, orchards, and other crops began to be more important and were planted, sometimes in place of grain (Larkey and Walters, 1987). Farmers such as Camillus Nelson, R. H. Beamer, Harvey Gable, W. B. Gibson, and others prospered and built grand homes in Woodland or in the outlying areas. Some of these are still standing and are within the study area.

No account of the history of Cache Creek can ignore the effect of the gravel mining operations that have been carried out for the last 100 years. This activity has been a significant force in Yolo County economics and has markedly changed the regime of the stream in the upper part of the study area. Some cultural properties are no longer in existence because of the gravel extraction along the creek. Downstream from the gravel mining, Cache Creek has remained in its current course for the last 100 years.

Cultural Resources Investigations

A records and literature search was conducted at the Northwest Information Center at Sonoma State University in March 2001. The quality of earlier site records on file at the Information Center is poor, and with few exceptions, the field data have not been verified. Both the National Park Service's National Register of Historic Places (NRHP) and the California State Department of Parks and Recreation internet sites were checked for historic properties and historical landmarks. Additional information was obtained from archeologist Eric Wohlgemuth (pers comm 2001), who provided unrecorded information on potential prehistoric archeological mounds along or near Cache Creek in the town of Yolo. Historical sources were examined at the Woodland County Library. Assessor's records, maps, and other documents housed at the Yolo County Archives Library were examined with the assistance of several of the library's archivists. Early U.S.G.S. quadrangle maps were reviewed. Local historians contributed information on the Wells Fargo stage station and bank. Published histories of Yolo

County, Woodland, and Knights Landing were read for information on the history of Woodland, Yolo, and other properties in the study area.

Only one archeological survey has been completed in the study area. "An Archaeological Reconnaissance of Cache Creek between Capay and Yolo in Yolo County, California," written in 1978 by Archaeological Consulting and Research Services, Inc., indicates that no sites were located in the study area identified on the Woodland topographic map. Two previously recorded prehistoric archeological sites were probably destroyed sometime before 1978. Site CA-YOL-1 was recorded in 1945 as a 2-acre village site in a cultivated field between Cache Creek and West Adams Canal. CA-YOL-34, recorded as being located on the south bank of Cache Creek in 1959, was probably destroyed by gravel pit operations.

Two prehistoric sites, CA-YOL-38 and -39, were recorded in the late 1940's. They were located just west of the southwestern terminus of the study area in a parcel known as the Adams Grant. CA-YOL-39 is north of Cache Creek, and CA-YOL-38 is south of the creek. CA-YOL-100 is on the north side of the creek, west of State Highway 113. Its current condition is unknown.

Archeological site CA-YOL-187 was recently discovered during swimming pool construction near the town of Yolo. The site appeared to have been located on a low mound. A known prehistoric archeological site is also across Cache Creek from Yolo. Either of these, or even both, sites may be the ethnographic village of Churup.

In 1982, a building inventory was completed of the potentially historic buildings in the city of Woodland (Wirth A.I.A. & Associates/Architects, Inc. 1982). A county-wide survey was completed in 1986. The 1982 inventory identified 32 properties that Wirth recommended for inclusion in the National Register. Two buildings are State Historical Monuments, and five buildings are listed in the National Register. One additional house had been nominated for the National Register. The buildings are listed in Table 3-10.

The National Register Internet site listed three individual historic properties in the city of Woodland, and one historic district. The three individual properties are the R.H. Beamer house at 19 3rd Street, the William B. Gibson house at 512 Gibson Road, and the Hotel Woodland at 426 Main Street. The historic district is the entire Downtown Woodland Historic District, which is on Main Street between Elm and Third Streets. Presumably, the Downtown Woodland Historic District nomination was based on the results of this historic building inventory. There is a discrepancy between the results of the Wirth building inventory and the National Register Internet site.

The Camillus Nelson house on CR 18C, north of Woodland, is listed on the NRHP. This two-story brick residence was built in 1872 and has intact outbuildings.

The Wells Fargo express stop and bank, adjacent to modern farm buildings and a residence, is located near the town of Yolo on the south side of the creek. It was reported as having been built by W. G. Hunt in the 1860's opposite Yolo because high waters in

Cache Creek made crossing to town dangerous and/or impossible (Larkey, pers. comm. 2002). It has not been evaluated for its eligibility to the NRHP and it is not listed as a California Historic Landmark. It is listed in the Yolo County Historic Inventory.

Table 3-10. Historic Building Inventory Results

Current State Historical Monuments	Address
#851 – Woodland Opera House	2nd Street and Dead Cat Alley
#864 – Gable Mansion	659 1st Street
Current National Register Entrants	
Gibson Mansion	Gibson Road
I.O.O.F. Building	3rd and Main Streets
Porter Building	College and Main Streets
Woodland Opera House	2nd Street and Dead Cat alley
Woodland Public Library	1st and Court Streets
Pending National Register Entrants	
R.H. Beamer house	3rd Street

The Spreckels Sugar processing plant is located on CR 18C. Completed in 1937, the plant was designed in the Moderne architectural style. The John E. Taylor residence at CR 99 south of CR 18, Nelson's Grove at CR 99E south of CR 18, and Robinson olive trees lining CR 18A (Best Ranch Road) are all on the Yolo County Historic Inventory. They are located between Woodland and Cache Creek to the north. The Robinson olive trees are 140 years old, and Nelson's Grove is the only extant area of the original oak woodland remaining. Nelson's Grove is both a natural and a cultural resource. None have been evaluated for the NRHP.

Cache Creek Bridge, built in 1921 as part of CR 99, spans Cache Creek between the railroad bridge downstream and I-5 immediately upstream. Neither bridge has been recently evaluated for the NRHP, although the Cache Creek Bridge received a preliminary rating in the 1986 statewide evaluation for significance. Other early railroad lines such as the Oroville Branch, and railroad spurs are shown on earlier maps. Some routes are overlain by modern railroad lines; others were abandoned and no longer exist. None have been evaluated under the NRHP criteria.

Because virtually none of the study area has been systematically examined for historic or prehistoric resources due to real estate constraints, and because many of the structures have not been evaluated for the NRHP, a draft Programmatic Agreement is included (Appendix C) that stipulates the steps that would be taken to be in compliance with Section 106 of the NHPA and 36 CFR 800. The Area of Potential Effect, while broadly drawn at the present, would be refined depending on the selected plan.

3.3.12 Esthetic and Visual Resources

An area's visual character is determined by the variety of its visual features, the quality of those features, and the scope and scale of the scene. The visual components of a particular area consist of such features as landforms, vegetation, manmade structures,

and land-use patterns. The quality of these features depends on the relationship between them and their scale in the overall scene.

The study area is in the valley region, which has its own unique esthetic qualities. This includes the linear and checkerboard pattern of fields, crops, and orchards contrasted by the curvilinear meandering form of the creek and its associated riparian vegetation. The rural/agricultural nature of orchards, croplands, and the occasional farm structure contrasts greatly with the adjacent developed areas of Woodland and Yolo. New warehouses in Woodland are introducing an urbanized scene to the agronomic setting. Orchards, croplands, and the urban areas of Woodland and Yolo characterize the valley portion of the study area. The riparian vegetation adjacent to the levees is visible from the town of Yolo and from I-5. The north Coast Range Mountains and the Sierra Nevada Mountains are visible, but not dominant landscape features, when weather or air quality conditions allow.

There are no State-designated visual resources within the project area. Within the study area, SH 16 is eligible for a scenic highway designation (from Capay to its intersection with SH20); however, this project would have no bearing on its continued candidacy. Nighttime views within the project area are typical of those within an agricultural setting. Sources of light include the city of Woodland, traffic on I-5, and rural residences.

Table 3-9. Special-Status Species with Potential to Occur in the Project Area

Species	Status Fed/St/1	Habit Requirements	Distribution	Occurrence in Project Area
Mammals				
Pacific western big-eared bat (Townsend's big-eared bat), *Corynorhinus (=Plecotus) townsendii townsendii*	SC	Requires caves, mines, tunnels, buildings, or other human-made structures for roosting. May use separate sites for night, day, hibernation, or maternity roosts. It is most abundant in mesic habitats.	Now considered uncommon, but found throughout California in all but subalpine and alpine habitats. May be found at any season throughout its range.	Potential habitat exists within the study and project areas.
greater western mastiff-bat, *Eumops perotis californicus*	SC	Open semi-arid to arid habitats with crevices in cliff faces, high buildings, trees, or tunnels for roosting	Uncommon in southeastern San Joaquin Valley and Coast Ranges from Monterey County south through southern California, and from the coast eastward to the Colorado desert	Study area is north of this species described range.
small-footed myotis bat, *Myotis ciliolabrum*	SC	Roosts in caves, buildings, crevices, mines, occasionally under bridges and under bark; occurs primarily in relatively arid wooded and brushy uplands near water	Common in arid uplands in California, coastal areas from Contra Costa County south to Mexico, and on the west and east sides of the Sierra Nevada	Study area is outside the species range.
long-eared myotis bat, *Myotis evotis*	SC	Roosts in buildings, crevices, spaces under bark, and snags. Prefers coniferous woodlands and forests but occurs in other habitats as well	Widespread in California but uncommon in most of its range; avoids the Central Valley and desert regions. Occurs along the entire coast and in the Sierra Nevada, Cascades, and Great Basin from the Oregon border south to the Coast Ranges	Study area is outside the species range.
fringed myotis bat, *Myotis thysanodes*	SC	Roosts in buildings, crevices, spaces under bark, and snags. Prefers coniferous woodlands and forests but occurs in nearly all brush woodland and forest habitats	Widespread in California except for the Central Valley and Colorado and Mojave Deserts	Study area is outside the species range.

Table 3-9. Special-Status Species with Potential to Occur in the Project Area (cont.)

Species	Status Fed/St/1	Habit Requirements	Distribution	Occurrence in Project Area
Mammals (cont.)				
long-legged myotis bat, *Myotis volans*	SC	Roosts in caves, rock crevices, buildings, under tree bark, snags, and mines. Most common in woodlands and forests above 4,000 feet, but also occurs in a variety of other habitats	Common in the Cascades, Sierra Nevada, and Coast Ranges; absent only from the Central Valley and desert regions	Study area is outside the species range.
Yuma myotis bat, *Myotis yumanensis*	SC	Roosts in caves, buildings, mines, crevices, swallows' nests, and under bridges. Prefers open forests and woodlands with sources of water over which to feed	Common and widespread in California; uncommon in the desert region	Likely to occur in study area
San Joaquin pocket mouse, *Perognathus inomatus*	SC	Open, sandy areas with grasses and forbs found on shrubby ridge tops and hillsides	Found between 1,100 and 2,000 feet in the Central Valley	Potential habitat within the study area.
Birds				
mountain plover, *Charadrius montanus*	PT	Alkaline flats, plowed ground, grazed pasture, and dry short grass prairie (foraging); bare flat ground with sparse vegetation (nesting)	Found in the Central Valley south of Sacramento County, southern coastal plains and southern coastal interior valleys.	Documented occurrence north of Cache Creek on Rds 102 & 16, and 101 & 17.
Bald Eagle, *Haliaeetus leucocephalus*	T	Perches high in large, stoutly limbed trees, on snags or broken-topped trees, or on rocks within 1 mile of rivers, streams, and lakes. Roosts communally in winter in dense, sheltered, remote conifer stands.	Breeding range in the northern two-thirds of California, in the Central Coast Range, and on Santa Catalina Island	Breeds within the study area. Foraging habitat does not exist within the project area.

Table 3-9. Special-Status Species with Potential to Occur in the Project Area (cont.)

Species	Status Fed/St/1	Habit Requirements	Distribution	Occurrence in Project Area
Birds (cont.)				
Northern spotted owl, *Strix occidentalis caurina*	T	Older forests for foraging, roosting and nesting.	Uncommon permanent resident in the coastal ranges of California from San Luis Obispo to San Diego Co., from Marin Co. north, and in the Sierra Nevada from Plumas Co. through Kern Co. Isolated populations occur in the Santa Cruz and Santa Lucia Mountains.	No suitable habitat within the study area.
Tricolored Blackbird, *Agelaius tricolor*	SC	Marshes, brambles, and non-woody riparian habitats (breeding); marshes, agricultural wetlands, and feedlots (foraging)	Widespread but uncommon throughout most of the Central Valley and coastal areas from Marin County south to San Diego County	Possible transient in the annual grassland and agricultural habitats of the site; breeding habitat is absent. Documented occurrence on Cache Creek west of Woodland
grasshopper sparrow, *Ammodramus savannarum*	SC	Frequents dense, dry or well-drained grassland, especially native grassland with a mix of grasses and forbs for foraging and nesting. Uses scattered shrubs for singing perches.	An uncommon and local, summer resident and breeder in foothills and lowlands west of the Cascade-Sierra Nevada crest from Mendocino and Trinity cos. south to San Diego Co.	Documented occurrence within Yolo County outside the study area.
short-eared owl, *Asio flammeus*	SC	Dense vegetation for roosting and resting cover such as tall grasses, brush, ditches, and wetlands. Open, treeless areas containing elevated sites for perching are also needed	Widespread winter migrant that is found primarily in the Central Valley and the western Sierra Nevada foothills	Documented occurrence within Yolo County outside the study area.

Table 3-9. Special-Status Species with Potential to Occur in the Project Area (cont.)

Species	Status Fed/St/1	Habit Requirements	Distribution	Occurrence in Project Area
Birds (cont.)				
Western Burrowing Owl, *Athene cunicularia hypugea*	SC	Drier open rolling hills, grassland, desert floor and open bare ground with gullies and arroyos	Widely distributed throughout the lowland of the State; formerly fairly common in the Central Valley	Possible in the annual grassland habitats of the site
American bittern, *Botaurus lentiginosus*	SC	Feeds in tall, fresh or saline, emergent wetlands; less often in adjacent shallow water of lakes, backwaters of rivers, or estuaries; and occasionally along adjacent shores.	Distributed widely in winter west of the Sierra Nevada. In the Central Valley, fairly common October to April, uncommon to rare rest of year; although breeds there. Elsewhere in lowlands, a rare transient and local winter resident.	Unlikely, only very marginal habitat is present in the study area
Aleutian Canada Goose*, Branta Canadensis leucopareia*	D	Harvested corn fields and flood-irrigated fields (foraging); large marshes, flooded fields, and stock ponds (roosting)	Winters in Butte sink and then migrates to Los Banos, Modesto, and the Delta	Unlikely, only very marginal habitat is present in the study area
Ferruginous Hawk, *Buteo regalis*	SC	Open grasslands in valleys and lower foothills	Southwest Canada and western U.S.; winters in southwest U.S. and northern Mexico; very localized	Possible transient in the annual grassland habitats during winter
Swainson's hawk, *Buteo swainsoni*	CA	Mature riparian forest, lone trees or groves of oaks, and mature roadside trees (nesting); native grasslands or lightly grazed pastures, alfalfa and other hay crops, and certain grain and row croplands (foraging)	Central Valley (Sacramento, San Joaquin, and Yolo counties) and Great Basin regions; winters in Mexico and Colombia	Documented occurrences within the study and project area.

Table 3-9. Special-Status Species with Potential to Occur in the Project Area (cont.)

Species	Status Fed/St/1	Habit Requirements	Distribution	Occurrence in Project Area
Birds (cont.)				
Lawrence's goldfinch, *Carduelis lawrencei*	SC	Requires open woodland or shrubland, a nearby source of water, and forb and shrub seeds. Habitats include valley foothill hardwood, valley foothill hardwood-conifer, and, in southern California, desert riparian, palm oasis, pinyon-juniper, and lower montaine. Nearby herbacious habitats often used for foraging.	Rather common along western edge of southern deserts, fairly common but erratic from year to year in Santa Clara Co. (Kaiser 1976) and on coastal slope from Monterey Co. south, and uncommon in foothills surrounding Central Valley.	Documented occurrence in the study area. No documented occurrences within the project area.
Vaux's swift, *Chaetura vauxi*	SC	Roosts in hollow trees and snags, and occasionally in chimneys and buildings. Nests in redwood, Douglas-fir, and occasionally other coniferous forests	Summer resident of northern California. Breeds commonly in the Coast Ranges from Sonoma Co. north, and locally south to Santa Cruz Co.; in the Sierra Nevada; and possibly in the Cascade Range	No suitable habitat within the study area.
black tern, *Childonias niger*	SC	Often nests in dense wetland vegetation; needs fresh water while breeding, but also frequents salt water in migration; forages above wet meadows and fresh emergent wetlands	Currently fairly common migrant and breeder on wetlands of the northeastern plateau area and in spring and summer at the Salton Sea	Unlikely, only very marginal habitat is present in the study area
lark sparrow, *Chondestes grammacus*	SC	Frequents sparse valley foothill hardwood, valley foothill hardwood-conifer, open mixed chaparral and similar brushy habitats, and grasslands with scattered trees or shrubs.	A common to fairly common resident in lowlands and foothills throughout much of California.	Potential habitat exists within the study and project areas.
Northern Harrier *Circus cyaneus*	SC	Annual grassland up to lodgepole pine and alpine meadow habitats. Meadows, grasslands, open rangelands, desert sinks, fresh and saltwater emergent wetlands.	Permanent resident of the northeastern plateau and coastal areas; less common resident of the Central Valley.	Documented occurrence east of Woodland within the project area.

Table 3-9. Special-Status Species with Potential to Occur in the Project Area (cont.)

Species	Status Fed/St/1	Habit Requirements	Distribution	Occurrence in Project Area
Birds (cont.)				
Western yellow-billed cuckoo, *Coccyzus americanus occidentalis*	CA	Nests in walnut and almond orchards, however its natural nesting habitat is in cottonwood-tree willow riparian forest	Sacramento Valley portion of the Sacramento River, the Feather River in Sutter County, the south fork of the Kern River in Kern County, and along the Santa Ana, Amargosa, and lower Colorado rivers	Documented occurrence at Willow Slough. No documented occurrence within the project area.
olive-sided flycatcher, C*ontopus cooperi*	SC	Requires large, tall trees, usually conifers, for nesting and roosting sites; also lofty perches, typically the dead tips or uppermost branches of the tallest trees in vicinity, for singing posts and hunting perches.	Uncommon to common, summer resident in a wide variety of forest and woodland habitats below 2800 m (9000 ft) throughout California exclusive of the deserts, the Central Valley, and other lowland valleys and basins.	Outside of the species described range.
hermit warbler, *Dendroica occidentalis*	SC	Breeds in mature ponderosa pine, montane hardwood-conifer, mixed conifer, Douglas-fir, redwood, red fir, and Jeffrey pine habitats. In migration and winter, also occurs in valley foothill hardwood habitat and in stands of planted pines.	Breeds in major mountain ranges from San Gabriel and San Bernardino Mts. northward, excluding coastal ranges south of Santa Cruz Co. Uncommon to fairly common in lowlands in spring, rare to uncommon in fall.	Potential migrant within the study area.
snowy egret, *Egretta thula*	MB	Shores of coastal estuaries, fresh and saline emergent wetlands, ponds, slow-moving rivers, irrigation ditches, and wet fields	Widespread in California. In northern California, common March to November in coastal lowlands. Locally common in the Central Valley all year.	Potential habitat exists within the study and project areas.
white-tailed (=black shouldered) kite, *Elanus leucurus*	SC	Rarely found away from agricultural areas. Substantial groves of dense, broad-leafed deciduous trees used for nesting and roosting. Forages in undisturbed, open grasslands, meadows, farmlands and emergent wetlands.	Common to uncommon, yearlong resident in coastal and valley lowlands.	Potential habitat exists within the study and project areas.

Table 3-9. Special-Status Species with Potential to Occur in the Project Area (cont.)

Species	Status Fed/St/1	Habit Requirements	Distribution	Occurrence in Project Area
Birds (cont.)				
little willow flycatcher, *Empidonax traillii brewsteri*	***	Wet meadows and montane riparian habitats from 600 to 2,440 m.	Tulare County north, along the western side of the Sierra Nevada and Cascades, extending to the coast in northern California.	Does not occur within the project area.
American peregrine falcon, *Falco peregrinus anatum*	D	Nesting and wintering habitats are varied, including wetlands, woodlands, other forested habitats, cities, agricultural areas and coastal habitats	Most of California, except in deserts, during migrations and in winter	Potential habitat exists within the study and project areas.
common loon, *Gavia immer*	SC	Estuarine and subtidal marine habitats	Common along entire coast. Uncommon on large, deep lakes in valleys and foothills	Suitable habitat is absent from project site
greater sandhill crane, *Grus canadensis tabida*	CA	Wet meadows that are often interspersed with emergent marsh. It frequents annual and perennial grassland habitats, moist croplands with rice or corn stubble, and open, emergent wetlands.	Nest in Lassen, Modoc, Plumas, Shasta, Sierra, and Siskiyou counties. It winters primarily in the Sacramento and San Joaquin valleys from Tehama Co. south to Kings Co.	Rare transient.
loggerhead shrike, *Lanius ludovicianus*	SC	Open habitats, with shrubs, trees, posts, fences, utiliy lines, or other perches. Highest density occurs in open-canopied valley foothill woodland, valley foothill hardwood-conifer, valley foothill riparian, pinyon-juniper, juniper, desert riparian, and Joshua tree habitats.	A common resident and winter visitor in lowlands and foothills throughout California.	Potential habitat exists within the study and project areas. Documented occurrence east of Woodland.
least bittern, western, *Lxobrychus exilis hesperis*	SC	Uses dense, emergent vegetation for cover and nesting, and feeds in such vegetation, as well as in small openings. Often feeds along the edge of emergent vegetation, on the open-water side.	In southern California, common summer resident. Rare to uncommon April to September in large, fresh emergent wetlands of cattails and tules in Central Valley, where it nests; and on northeast plateau, where it probably nests.	Rare documented occurrence within Yolo County.

Table 3-9. Special-Status Species with Potential to Occur in the Project Area (cont.)

Species	Status Fed/St/1	Habit Requirements	Distribution	Occurrence in Project Area
Birds (cont.)				
Lewis' woodpecker, *Melanerpes lewis*	SC	Open oak savannahs, broken deciduous, and coniferous habitats with brushy understory, and scattered snags and live trees for nesting and perching.	Eastern slopes of the Coast Ranges south to San Luis Obispo Co. Also winters in the Central Valley, Modoc Plateau, and the Transverse and other Ranges in southern California. Breeds locally along eastern slopes of the Coast Ranges, and in the Sierra Nevada, Warner Mts., Klamath Mts., and in the Cascade Range.	Documented occurrence in the Capay Valley.
long-billed curlew, *Numenisus americanus*	SC	High salt marsh, pastures, salt ponds for roosting during high tide periods. Nests on elevated interior grasslands and wet meadows, usually adjacent to lakes or marshes	Uncommon to fairly common breeder in northeastern California in Siskiyou, Modoc, and Lassen counties. Uncommon to locally very common in winter along most of the California coast, and in the Central and Imperial valleys	Suitable habitat is absent from project site
White-faced Ibis, *Plegadis chihi*	SC	Freshwater marshes with tules, cattails, and rushes; may nest in trees and forage in flooded agricultural fields	Nests in Yolo and Colusa Counties and other isolated areas in the Central Valley; wintering concentrations in Colusa, Merced, and Yolo Counties	Documented occurrence at the Woodland Sugar Ponds.
bank swallow, *Riparia riparia*	CA	Sandy, vertical bluffs or riverbanks (nesting)	Mostly on the banks of Central Valley streams, including several colonies on the Sacramento River. Scattered populations in parts of Inyo and Mono counties and northern, north coastal, and central coastal regions	Documented occurrence at Sacramento River Fremont Weir. Sitings along Cache Creek downstream of I-505 and Rd 89.
rufous hummingbird, *Selasphorus rufus*	SC	Riparian areas, open woodlands, chaparral, mountain meadows, and other habitats rich in nectar-producing flowers, including gardens and orchards.	A common migrant and uncommon summer resident of California. Spring migration mostly is through the lowlands and foothills.	Potential habitat exists within the study and project areas.

Table 3-9. Special-Status Species with Potential to Occur in the Project Area (cont.)

Species	Status Fed/St/1	Habit Requirements	Distribution	Occurrence in Project Area
Birds (cont.)				
red-breasted sapsucker, *Sphyrapicus rubber*	SC	Most numerous in riparian, deciduous hardwood, or in mixture of hardwood and conifer habitats. Frequents sparse to moderate canopy with suitable snags for nest and roost excavation, especially in vicinity of aspens, wet meadows, clearings, lakes, and other open habitats.	Occurs from Oregon border south in Coast Ranges and along coast to Marin Co., and along both the eastern and western slopes of the Cascade Range and Sierra Nevada south to Kern Co. In southern California, an uncommon summer resident locally in the higher mountains. A fairly common winter resident throughout much of lowland, cismontane California.	Potential habitat exists within the study and project areas.
Bewick's wren, *Thryomanes bewickii*	SC	Chaparral. Natural cavity or rock crevice for nesting. Dense shrubs, thickets, slash piles used for cover and foraging.	Common resident throughout the state except in subalpine conifer habitat in the Sierra Nevada and drier portions of the southeastern deserts.	Potential habitat exists within the study area.
California Thrasher, *Toxostoma redivivum*	SC	Moderate to dense chaparral habitats and, less commonly, extensive thickets in young or open valley foothill riparian habitat.	Occurs from Mexican border north to Shasta, Trinity, and southern Humboldt cos., and into the Shasta Valley of Siskiyou Co.	Documented occurrences within the Capay Valley and at Rd 89 at Cache Creek.
Reptiles				
giant garter snake, *Thamnophis gigas*	T	Permanent freshwater, especially sloughs and marshes overgrown with tules of willows	Central Valley including Butte, Colusa, Yolo, Sacramento, Solano, San Joaquin, Stanislaus, Merced, and Fresno Counties	Marginal habitat exists within the project area.
northwestern pond turtle, *Clemmys marmorata marmorata*	SC	Associated with permanent or nearly permanent water bodies with abundant cover and basking sites	Parts of Washington, Oregon, Nevada, and California; below 5,000 feet	Observed in the stock pond and stream habitats of the site
Amphibians				
California red-legged frog, *Rana aurora draytonii*	T	Quiet, permanent water in woods, forest clearings, riparian areas, and grasslands	Coast Transverse, Sierra Nevada, and Cascade Ranges	Project area is outside of current species range. Study area is within the historic range.

Table 3-9. Special-Status Species with Potential to Occur in the Project Area (cont.)

Species	Status Fed/St/1	Habit Requirements	Distribution	Occurrence in Project Area
Amphibians (cont.)				
California tiger salamander, *Ambystoma californiense*	C	Grasslands with long-lasting rain pools and dry-season refuge sites. Also occurs in grassy understory of valley-foothill hardwood habitats, and uncommonly along stream courses in valley-foothill riparian habitats.	Sonoma and Santa Barbara counties, on each side of the Central Valley from southern Colusa County south to northern Kern County and in the coast ranges from Suisun Bay south to the Temblor Range	Marginal habitat exists within the project area.
foothill yellow-legged frog, *Rana boylii*	SC	Rocky streams in valley-foothill hardwood, valley-foothill hardwood-conifer, valley-foothill riparian, ponderosa pine, mixed conifer, coastal scrub, mixed chaparral, and wet meadow habitat types	Most of northern California west of the Cascade crest, along the western flank of the Sierra south to Kern Co., and Coast Ranges from northern California to Ventura County	Project area is outside of current species range. Study area is within the historic range.
western spadefoot toad, *Spea hammondii*	SC	Prefers grassland, scrub and chaparral with temporary pools but could occur in oak woodlands	Central Valley, bordering foothills, and coastal ranges; southwestern United States	Marginal habitat exists within the project area.
Fish				
winter-run Chinook salmon, *Oncorhynchus tshawytscha*	E	Ocean and coastal rivers and streams	Sacramento River and tributaries; SF Bay/Delta estuary and the open ocean	Highly unlikely. Only during high water flows of the Sacramento River.
critical habitat, winter-run chinook salmon, *Oncorhynchus tshawytscha*	E	Freshwater rivers and streams	Sacramento River, tributaries, distributaries, and related riparian zones from Keswick Dam downstream to and including SF Bay	Does not occur within the study area.
delta smelt, *Hypomesus transpacificus*	T	Estuarine areas with salinities below 2 grams per liter; spawns in freshwater	Delta estuary from Suisun Bay upstream to the Delta cross channel on the Sacramento River and south along the San Joaquin and Middle River to the south end of Bacon Island	Not likely, found well downstream of the project area

Table 3-9. Special-Status Species with Potential to Occur in the Project Area (cont.)

Species	Status Fed/St/1	Habit Requirements	Distribution	Occurrence in Project Area
Fish (cont.)				
critical habitat, delta smelt, *Hypomesus transpacificus*	T	areas of all water and all submerged lands below ordinary high water and the entire water column bounded	Suisun Bay (including the contiguous Grizzly and Honker Bays); the length of Goodyear, Suisun, Cutoff, First Mallard (Spring Branch), and Montezuma sloughs; and the existing contiguous waters contained within the Delta, as defined in section 12220 of the California Water Code	Does not occur within the study area.
Central Valley steelhead, *Onchorynchus mykiss*	T	Ocean and freshwater rivers and streams	Sacramento River and tributaries; SF Bay/Delta estuary and the open ocean	Observed in study area, spawns upstream in wet years
Sacramento splittail, *Pogonichthys macrolepidotus*	T	Sloughs and backwaters for the SF Bay Delta and adjacent Sacramento River	The SF Bay Delta and adjacent Sacramento River	Does not occur within the study area.
Central Valley spring-run chinook salmon, *Oncorhynchus tshawytscha*	T	Ocean and freshwater rivers and streams	Sacramento River and tributaries downstream to and including SF Bay to Golden Gate Bridge	Highly unlikely. Only during high water flows of the Sacramento River.
Critical Habitat, Central Valley spring-run chinook, *Oncorhynchus tshawytscha*	T	Accessible river reaches, adjacent riparian zones, and estuarine areas.	River reaches accessible to listed chinook salmon in the Sacramento River and its tributaries in California. Adjacent riparian zones, as well as river reaches and estuarine areas of the Sacramento-San Joaquin Delta, all waters from Chipps Island westward to Carquinez Bridge, including Honker Bay, Grizzly Bay, Suisun Bay, and Carquinez Strait, all waters of San Pablo Bay westward of the Carquinez Bridge, and all waters of San Francisco Bay (north of the San Francisco/Oakland Bay Bridge) from San Pablo Bay to the Golden Gate Bridge	Does not occur within the study area.

Table 3-9. Special-Status Species with Potential to Occur in the Project Area (cont.)

Species	Status Fed/St/1	Habit Requirements	Distribution	Occurrence in Project Area
Fish (cont.)				
Central Valley Fall/late fall-run chinook salmon, *Oncorhynchus tshawytscha*	C	Ocean and freshwater rivers and streams	Sacramento and San Joaquin Rivers and tributaries downstream to and including SF Bay to Golden Gate Bridge and the Pacific Ocean	Historical occurrence in Cache Creek to Capay Dam after high water in the Sacramento River
Essential Fish Habitat, Central Valley Fall/late fall-run chinook salmon, *Oncorhynchus tshawytscha*				Cache Creek has been designated as Essential Fish Habitat.
Green sturgeon, *Acipenser medirostris*	SC	Estuaries; spawns in freshwater	Widely distributed in salt water; freshwater in lower reaches of large rivers from Sacramento-San Joaquin River system north	Highly unlikely, this fish occurs in large rivers and spawns in >3 feet of water
river lamprey, *Lampetra ayresi*	SC	Coastal streams and ocean	From Alaska to San Francisco Bay; most abundant in the lower Sacramento-San Joaquin River system	Highly unlikely
Pacific lamprey, *Lampreta tridentata*	SC	Ocean and freshwater rivers and streams. In freshwater prefers gravel and rocks, and occassionally sand.	Baja California, to the Bering Sea in Alaska and Asia.	Highly unlikely
longfin smelt, *Spinichus thaleichthys*	SC	Estuaries; euryhaline species, can survive in salt water and freshwater	Pacific Coast estuaries and Sacramento-San Joaquin delta; most abundant in San Pablo and Suisun Bays although spawns in upper end of Suisun Bay and lower reaches of the Delta; small population in Humboldt Bay and the Eel River	Highly unlikely, rarely found upstream from the delta
Invertebrates				
Conservancy fairy shrimp, *Branchinecta conservation*	E	Vernal pools with highly turbid water	Vina Plains, Tehama County, south of Chico, Butte County, Jepson Prairie, Solano County, Sacramento National Wildlife Refuge, Glenn County, near Haystack Mountain, Merced County, and Lockewood Valley, Ventura County	No vernal pool occurrence within the project area.

Table 3-9. Special-Status Species with Potential to Occur in the Project Area (cont.)

Species	Status Fed/St/1	Habit Requirements	Distribution	Occurrence in Project Area
Invertebrates (cont.)				
vernal pool tadpole shrimp, *Lepidurus packardi*	E	Vernal pools and swales containing clear to highly turbid water	Sacramento Valley from Butte County to south of the Sacramento area in Sacramento County and west to the Jepson Prairie region of Solano County	No documented occurrence within the project area.
vernal pool fairy shrimp, *Branchinecta lynchi*	T	Vernal pools in grass or mud bottomed swales, earth sumps, or basalt flow depression pools in unplowed grasslands	Tehama County south through most of the Central Valley and along the south and central Coast Ranges to Santa Barbara County	No documented occurrence within the project area.
valley elderberry longhorn beetle, *Desmocerus californicus dimorphus*	T	Elderberry shrubs in moist valley oak woodlands along the margins of streams and rivers	Northern San Joaquin and southern Sacramento valleys	Evidence (emergence holes) of this species has been observed on the project area.
Antioch dunes anthicid beetle, *Anthicus antiochensis*	SC	Loose, sandy soils occurring as dunes or along riparian areas	Antioch Dunes Preserve	No documented occurrence within the project area.
Sacramento anthicid beetle, *Anthicus sacramento*	SC	Loose sandy soils occurring as dunes or along riparian areas	Sacramento, Solano, and Butte Counties	No documented occurrence within the project area.
Midvalley fairy shrimp, *Branchinecta mesovallensis*	SC	Vernal pools and temporary ponded waters without fish.	California Central Valley	No documented occurrence within the project area.
California linderiella fairy shrimp, *Linderiella occidentalis*	SC	Vernal pools in grass or mud bottomed swales, earth sumps, or basalt flow depression pools in unplowed grasslands	Scattered locations in the Central Valley from east of Red Bluff in Tehama County to east of Tulare in Tulare County, across the Sacramento Valley to the San Francisco Bay, along the Coast Range from Mendocino County to	No documented occurrence within the project area.
Plants				
palmate-bracted bird's beak, *Cordylanthus palmatus*	E	Saline-alkaline soils and is a component of alkali sink scrub vegetation in relatively undisturbed, seasonally flooded lowlands	Populations occur at Delevan, Colusa and Sacramento National Wildlife Refuges. Also in Yolo, Madera, Alameda and Fresno Counties.	Documented occurrence near Woodland. No documented occurrence within project area.
Colusa grass, *Neostaphia colusana*	T	Occurs only on the muds of large or deep vernal pools	Merced, Stanislaus, Solano, and Yolo counties	Vernal pools absent from project area.

Table 3-9. Special-Status Species with Potential to Occur in the Project Area (cont.)

Species	Status Fed/St/1	Habit Requirements	Distribution	Occurrence in Project Area
Plants (cont.)				
Solano Grass (Crampton's tuctoria), *Tuctoria mucronata*	E	Grows in the clay bottoms of vernal pools	Currently known from two vernal lakes within the Jepson Prairie, Solano County	Vernal pools absent from project area.
alkali milk-vetch, *Astragalus tener* var. *tener*	SC*	Valley grassland, alkali sink, vernal pool	Known only from Merced, Solano, and Yolo counties.	Documented occurrrence southeast of Woodland at Willow Slough. No documented occurrence within the study area.
Ferris's milk-vetch, *Astragalus tener* var. *ferrisiae*	SC*	Playas or clay soils in valley grassland, meadows, and seeps.	Found in scattered localities throughout the Sacramento Valley	Does not occur within the project area.
brittlescale, *Atriplex depressa*	SC	Shadscale scrub, valley grassland, alkali sinks. Clay alkaline soil on alkaline substrate in playa habitats.	Found in scattered localities throughout the Central Valley	Documented occurrence east of Woodland.
valley spearscale, *Atriplex joaquiniana*	SC*	Shadscale scrub, valley grassland, meadows and seeps. Alkaline soil on alkaline substrate in meadow habitats.	Found in scattered localities throughout the Central Valley	Documented occurrence east of Woodland.
Snow Mountain buckwheat, *Eriogonum nervulosum*	SC	Serpentine substrate in chaparral habitat	Found in Glenn, Colusa, Yolo, Lake, Napa, Sonoma	Serpentine habitat does not exist within the project area.
adobe lily, *Fritillaria pluriflora*	SC	Clay soil in chaparral, valley grassland, foothill woodland	Foothills of northwest Sierra Nevada and north Coast Ranges.	Does not occur within the project area
drymaria dwarf-flax, *Hesperolinon drymarioides*	SC	Serpentine substrate in chaparral, valley grassland, foothill woodland, closed-cone pine forest.	Found in Glenn, Colusa, Yolo, Lake, Napa, and Mendocino counties.	Serpentine habitat does not exist within the project area.
Northern California black walnut, *Juglans californica* var.*hindsii*	SC*	Riparian forest, Riparian woodland	Found throughout the State of California.	Potential habitat exists within the study area.
Heckard's peppergrass *Lepidium latipes* var.*heckardii*	SC	Alkaline flats in valley grassland	Found in Glenn, Yolo, and Solano counties.	Documented occurrence near Woodland. No documented occurrence within project area.

Table 3-9. Special-Status Species with Potential to Occur in the Project Area (cont.)

Species	Status Fed/St/1	Habit Requirements	Distribution	Occurrence in Project Area
Plants (cont.)				
Hall's madia, *Madia hallii*	SC	Serpentine chaparral. Dry, sunny, rocky, ultramafic, brushy or grassy slopes/ & ridgetops; in serpentine formations.	Known only from Colusa, Lake, Napa, and Yolo Counties.	Serpentine habitat does not exist within the project area.

Key:		
E	Endangered	Listed (in the Federal Register) as being in danger of extinction.
T	Threatened	Listed as likely to become endangered within the foreseeable future.
P	Proposed	Officially proposed (in the Federal Register) for listing as endangered or threatened.
PX	Proposed	Proposed as an area essential to the conservation of the Species.
C	Candidate	Candidate to become a proposed species.
SC	Species of Concern	May be endangered or threatened. Not enough biological information has been gathered to support listing at this time
MB	Migratory Bird	Migratory Bird
D	Delisted	Delisted. Status to be monitored for 5 years.
CA	State-Listed	Listed as Threatened or endangered by the State of California.
*	Extirpated	Possibly extirpated from this quad.
**	Extinct	Possibly extinct.
	Critical Habitat	Area essential to the conservation of a species.
***	Unlisted	Included on the USFWS species list as CA

LOWER CACHE CREEK, YOLO COUNTY, CA
CITY OF WOODLAND AND VICINITY

DRAFT FEASIBILITY REPORT
FOR POTENTIAL FLOOD DAMAGE
REDUCTION PROJECT

Chapter 4

CHAPTER 4
ENVIRONMENTAL CONSEQUENCES

Cobble Weir, Cache Creek Settling Basin in 1958.

CHAPTER 4.0

ENVIRONMENTAL CONSEQUENCES

4.1 Introduction

This chapter discusses the potential effects of the various plans on the significant environmental resources described in Chapter 3. The existing, or future without-project, conditions described in Chapter 3 are compared with future conditions with the project plans in place. The existing and with-project comparisons show the probable consequences of each plan on significant environmental resources. Both beneficial and adverse effects are considered. The effects discussed in this chapter are organized by resource category. The resources are presented in the same sequence as Chapter 3. The basis of significance (criteria) for each resource is identified to evaluate the significance of any adverse effects, and measures are proposed to avoid, minimize, or mitigate any significant adverse effects for each resource.

A project or action can cause direct, indirect, and cumulative effects on the environment. Direct effects occur at the same time and place as the action and include effects from construction of the project, both on a short-term and long-term basis. Indirect effects are caused by the action but occur later in time or are farther removed in distance, but are reasonably foreseeable. Indirect effects may include growth-inducing effects and related effects on natural systems. Cumulative effects are those which result from the incremental effect of the action when added to other past, present, and reasonable foreseeable future actions. This chapter discusses both direct and indirect project effects. Cumulative effects are described in Chapter 5.

The bases of significance are founded on NEPA and CEQA requirements. The Corps has integrated NEPA requirements into its regulations and policies. Engineering Regulation 1105-2-100, "Planning Guidance Notebook," April 2000, establishes the following significance criteria:

- Significance based on institutional recognition means that the importance of the effect is acknowledged in the laws, adopted plans, and other policy statements of public agencies and private groups. Institutional recognition is often in the form of specific criteria.

- Significance based on public recognition means that some segment of the general public recognized the importance of the effect. Public recognition may take the form of controversy, support, conflict, or opposition expressed formally or informally.

- Significance based on technical recognition means that the importance of an effect is based on the technical or scientific criteria related to critical resource characteristics.

For this Draft EIS/EIR, these three NEPA criteria apply to all resources and are not repeated under each resource. CEQA requirements are more specific to the resource and are listed in Appendix G of the CEQA Guidelines. Relevant CEQA criteria, as well as other agency criteria and thresholds of significance that apply to each resource, are identified under the appropriate resource.

4.2 Potential Effects on Social and Economic Resources

This section evaluates the effects of the three plans on the social and economic resources in the project area. The discussion includes effects on population, housing, employment, economic conditions, and minorities and low-income populations. An effect would be considered significant if it would:

- Displace existing housing, especially affordable housing, without providing appropriate compensation and/or relocation assistance.
- Impede the economic development of the city of Woodland.
- Result in an inconsistency with the residential, commercial, industrial, and agricultural developments as outlined by the city and county General Plans.
- Cause changes in the ways members of the surrounding community live, work, relate to one another, or otherwise function as members of society.
- Cause substantial environmental, human health, or economic effects on minority and low-income populations.

4.2.1 No-Action Plan

On a short-term basis, floods that have a greater flow than one having a 1 in 10 to 1 in 20 chance of occurring in any given year could significantly disrupt economic activity in Woodland, Yolo, and the unincorporated community in the project area, depending on floodflow and duration.

On a more permanent basis, landowners with a Federally insured mortgage and some businesses/facilities would be required to purchase flood insurance. New development in the FEMA 1 in 100 chance flood plain would be possible (limited to that which would not increase the 1 in 100 chance floodplain water surface elevation more than one foot) but only with flood proofing measures and added insurance costs. Woodland's industrial sector could be less competitive due to potential risk and insurance costs. The city may not attract as many new businesses for the same reasons. The loss of businesses in the city would cost Woodland revenue. Existing utility systems (wells, sewer, storm drainage and the wastewater treatment plant) would have to be protected from flood impacts.

The unincorporated community members in the county would also be required to pay for flood insurance since their lands would remain within the flood plain.

4.2.2 Lower Cache Creek Flood Barrier Plan

The proposed LCCFB Plan would physically define the existing urban limit line, consistent with City and County General Plans. Both city and county residents north of the barrier would benefit from protection of the basic public services (school, medical, fire protection, and shopping). Portions of the unincorporated community could lose some agricultural value due to the potential for extended flood duration. Implementation of the mitigation measures listed in Section 4.2.4 would reduce this potentially significant effect to less than significant.

The flood barrier would convert 102 acres of farmland for flood damage reduction purposes. This could result in some decrease in revenue for the county and business to the suppliers by means of taking farmland out of production. However, the overall percentage of farmland removed from production as compared with the remainder of farmland in Yolo county is extremely small, less than one tenth of one percent. Additionally, the loss of acreage is small to each individual farm. Since the amount of farmland removed from production is low, a decrease in labor would not be expected. Without a labor decrease or risk of unemployment, there would not be significant economic effects to minority or low-income populations.

If the flood barrier is constructed, Woodland would be able to complete its General Plan goals to develop up to the urban limit line. This would include development of the land in the eastern part of the city zoned for industrial use but currently vacant. These new businesses would bring increased revenue for the city and the county. Furthermore, city residents would save money since they would no longer need to buy flood insurance.

Flood insurance requirements would not change for landowners north of the flood barrier. The value of land in the vicinity of the settling basin, 1,816 acres, may decrease since loans may only be available for row crops. The more profitable tree crops could not survive long-term inundation and could be too risky for banks to finance. Implementation of the mitigation measures listed in Section 4.2.4 would reduce this potentially significant effect to less than significant.

One home (not considered part of an affordable housing unit) would be relocated. No businesses north or south of the flood barrier would be displaced.

The construction of the flood barrier would have a less-than-significant effect on current and/or planned population and housing growth patterns within the city of Woodland; the flood barrier would make easier the development already planned for in the City of Woodland General Plan. The flood barrier would not increase future population growth and need for housing beyond what has already been projected.

Construction of the flood barrier could include removal, modification, and/or protection of existing gas, water, sewer, power, and communication lines. Disruptions would be temporary, lasting approximately 4 hours, during these activities.

With the mitigation measures described in Section 4.2.4, the flood barrier would cause a less-than-significant effect on social and economic resources.

4.2.3 Modified Wide Setback Levee Plan

The Modified Wide Setback Levee Plan would remove a significant amount of unincorporated land south of Cache Creek and the city of Woodland from the FEMA 100-year flood plain. Additionally, land north of the creek and east of CR 97B, including the town of Yolo, would be protected from flooding. Basic public services (school, medical, fire protection, and shopping) would be protected. The City would be able to complete its General Plan goals to develop up to the urban limit line. This would include development of the land zoned for industrial use but currently vacant in the eastern part of the city. These new businesses would bring increased revenue for the city and county. Landowners would not have the additional cost of flood insurance.

The setback levees would remove at least 158 acres, and potentially up to an additional 1,254 acres, of farmland from production (depending on uneconomic remnant determination). This could result in some decrease in revenue for the county and business to the suppliers by taking farmland out of production. However, the overall percentage of farmland removed from production as compared with the remainder of farmland in Yolo county is extremely small, 0.03 percent to 0.2 percent. Since the amount of farmland removed from production is low, a decrease in labor would not be expected. Without a labor decrease or risk of unemployment, there would not be significant economic effects to minority or low-income populations.

There would also be a displacement of people living within the proposed levee alignment; 32 residences (none of which are considered affordable housing units) and 182 farm support structures would need to be relocated. The residences and farm structures that would need to be relocated are currently within the FEMA 1 in 100 chance flood plain. However, under the Modified Wide Setback Levee Plan, the existing levees would be notched, resulting in flooding between the levees from greater flows than one having a 1 in 5 chance of occurring in any given year. Structures confined by the levees would receive significant damage; relocation would ensure protection against loss of property and life.

The construction of the Modified Wide Setback Levee Plan would have a less than significant effect on current and/or planned population and housing growth patterns within Yolo County; the Modified Wide Setback Levee Plan would not affect the population and housing goals as outlined in the County General Plan.

Construction of the Modified Wide Setback Levee Plan would include removal, modification, relocation, and/or protection of existing gas, water, sewer, power, and communication lines. Disruption would be temporary, lasting approximately 4 hours, during these activities.

With the mitigation described in Section 4.2.4, the Modified Wide Setback Levee Plan would cause a less-than-significant effect on social and economic resources.

4.2.4 Mitigation

Lower Cache Creek Flood Barrier Plan

Residential, commercial, industrial, and agricultural development would continue according to the City and County General Plans. Depending on the significance of changes in flooding, homes and farm support structures would be raised, flood proofed, or given a flowage easement. Fair market value would be paid for the one home that would need to be relocated. Agricultural land with diminished value due to potential for project-induced flooding would be compensated through easement fees or direct purchase to the extent required by law.

Modified Wide Setback Levee Plan

Residential, commercial, industrial, and agricultural development would continue according to the City and County General Plans. Owners of homes and farm support structures that would be taken due to their placement within the levee alignment would be paid fair market value for their structures and land to the extent required by law.

4.3 Potential Effects on Land Use

This section evaluates the consistency of the proposed plans with the types and intensities of existing and planned land uses in the project area. These land uses are identified by the Yolo County and City of Woodland General Plans. An effect would be considered significant if it would:

- result in an inconsistency with land use designations or goals;
- result in land uses that are incompatible with existing or proposed land uses in the area; and
- physically divide an established community.

4.3.1 No-Action Plan

Without a flood damage reduction project, new developments would need to be in accordance with the National Flood Insurance Program. Increased costs associated with flood damage reduction may adversely affect the number of residents and businesses that move to or remain in Woodland.

The land north of city limits is zoned by Yolo County for agriculture. Unless zoning laws are altered, no significant change is expected for this land. The City of Woodland has development plans for much of the eastern and northern portions of the city bordering the settling basin and unincorporated Yolo County. However, with these portions of land within the FEMA 1 in 100 chance flood plain, added flood damage reduction costs necessary for development may encourage developers to look elsewhere.

4.3.2 Lower Cache Creek Flood Barrier Plan

The flood barrier would extend along 6 miles of Woodland's urban limit line. The flood barrier would convert land currently designated for agricultural uses. The flood barrier footprint covers approximately 100 acres of row crops, 2 acres of orchards, and 2 acres of farmland support structures. Other land uses affected by the project include agricultural fields (easements, staging, and borrow areas) and undeveloped farmland/riparian habitat (easements and training levee removal).

Consistency with General Plan

Because county lands would be used to construct the flood barrier, the greatest land use effect is to the county. The County General Plan aims to "…vigorously conserve and preserve the agricultural land in Yolo County" (Yolo County General Plan, p. 14); however, it also aims to "control flooding and avoid the effects of flooding" (Yolo County General Plan, p. 8). Although the LCCFB Plan would cause the conversion of agricultural land, it would do so for the purpose of public safety. This does not represent an inconsistency with the County General Plan and is therefore a less-than-significant effect.

Land Use Compatibility

The flood barrier would create an incompatible land use with farming. Therefore, it would represent a significant, but unavoidable effect.

Divisiveness

The flood barrier physically defines the existing urban limit line. The city of Woodland would no longer be in the FEMA 1 in 100 chance flood plain. All land south of the flood barrier would be developed as is currently planned by the City of Woodland. Land north of the flood barrier currently is, and would continue to be, in the FEMA 100-year flood plain. All land uses north of the barrier would continue consistent with the County General Plan. There would be no division of community based on project-related effects, and is therefore a less-than-significant effect.

The overall effect of the flood barrier on land use would be significant.

4.3.3 Modified Wide Setback Levee Plan

The modified wide setback levees would be constructed along both sides of Cache Creek in the project area. The Modified Wide Setback Levee Plan would also include channel armoring, bridge replacement, and the isolation of farmland. The setback levee would convert land currently designated for agricultural uses. The plan would convert 123 acres of row cropped agricultural land, 35 acres of orchard, 11 acres of undeveloped farmland/riparian habitat, and 47 acres of other land. Land confined between the levees would include 932 acres of row cropped agricultural land, 322 acres of orchards, 441 acres of undeveloped farmland/riparian habitat, and 440 acres of other lands. Included in the 440 acres of other lands are 32 homes and 182 farm support structures.

General Plan Consistency

Because County lands would be used to construct the setback levees, the greatest land use effect is to the County. The County General Plan aims to "vigorously conserve and preserve the agricultural land in Yolo County" (Yolo County General Plan, p. 14); however, it also aims to "control flooding and avoid the effects of flooding" (Yolo County General Plan, p. 8). Although the Modified Wide Setback Levee Plan would cause the conversion of agricultural land, it would do so for the purpose of public safety. This does not represent an inconsistency with the County General Plan and is therefore a less-than-significant effect.

Land Use Compatibility

The setback levee would create an incompatible land use for farming. Therefore, it would represent a significant, but unavoidable effect.

The setback levees would isolate sections of farmland on the creekside of the levee as well as fragments of parcels on the landside of the levee. According to the California Code of Regulations (CCR), an "uneconomic remnant" is "a parcel of real property in which the owner retains an interest after partial acquisition of his property and which has little or no utility or value to such owner." At the time of this document, an analysis of what parcels would be considered an uneconomic remnant has not been undertaken (a determination of uneconomic remnants would be made only if the setback levee plan was chosen). Depending on the size of the remnant, accessibility, and other factors, the land could either be leased back to farmers and remain farmed, or bought and used for mitigation.

Divisiveness

The setback levees would not divide an existing community. All residences within the setback alignment would be relocated. This represents a less-than-significant effect.

The overall effect of the setback levees on land use would be significant.

4.3.4 Mitigation

Lower Cache Creek Flood Barrier Plan

Mitigation, if required, would be based on effects to the following three significance criteria:

1. Inconsistency with the General Plan;

The LCCFB Plan is consistent with the General Plan, which aims to protect farmland and provide flood damage reduction. This effect is less-than-significant, and no mitigation is required.

2. Incompatibility with existing land uses;

The LCCFB Plan is incompatible with existing land uses. This is a significant effect; however, the loss of farmland cannot be mitigated.

3. Division of a community.

The LCCFB Plan does not divide a community; the footprint would physically define the existing urban limit line. This effect is less-than-significant, and no mitigation is required.

The overall effect of the LCCFB Plan on land use would be significant even after the implementation of mitigation.

Modified Wide Setback Levee Plan

Mitigation, if required, would be based on affects to the following three significance criteria:

1. Inconsistency with the General Plan;

The Modified Wide Setback Levee Plan is consistent with the General Plan, which aims to protect farmland, and provide flood damage reduction. This effect is less-than-significant, and no mitigation is required.

2. Incompatibility with existing land uses;

The Modified Wide Setback Levee Plan is incompatible with existing land uses. This is a significant effect; however, the loss of farmland cannot be mitigated.

3. Division of a community.

The Modified Wide Setback Levee Plan would not divide a community; all residences within the alignment would be relocated. This effect is less-than-significant, and no mitigation is required.

The overall effect of the modified wide setback levee on land use would be significant even after the implementation of mitigation.

4.4 Potential Effects on Agriculture, Prime and Unique Farmlands

This section identifies potential project-related effects on prime and unique farmlands. Project effects would be considered significant if:

- the project would convert prime farmland, unique farmland, or farmland of statewide importance to nonagricultural uses.

A Farmland Conversion Impact Rating form was evaluated by the National Resource Conservation Service (NRCS) to determine the percentage of prime and locally

important farmland affected by the alternative plans. A copy of data received from the NRCS is supplied in Appendix D. Originally, the Narrow Setback Levee Plan and the Flood Barrier Plan were sent to the NRCS for farmland determination. These are Site A and B respectively on the Impact Rating form. Upon the development of the Wide Setback Plan, the alignment was sent to the NRCS as Site C. Given the similar alignments of the Wide and Modified Wide Setback Levee Plans (the significant difference occurs at the bridges and on the north side of the creek between I-5 and SH 113), the percentage of land found to be prime farmland for the Wide Setback Levee Plan was applied to the Modified Wide Setback Levee Plan.

4.4.1 No-Action Plan

Under the No-Action Plan, the potential for flooding during major storm events would remain. Temporary flooding would have little to no adverse effects on prime and unique farmlands. The possibility of future rezoning of prime and unique farmlands for development would decrease with no flood damage reduction project due to flood proofing costs for developers.

4.4.2 Lower Cache Creek Flood Barrier Plan

Close to 100 percent of the farmland in this project area is considered prime farmland. The flood barrier would result in a direct loss of 100 acres of prime farmland and 2 acres of statewide important/locally important farmland. This conversion includes the flood barrier footprint and permanent maintenance easements.

Flooding would not have any direct or indirect effects on the classification of prime and statewide important farmland. These designations are based on the physical properties of the soils; short-term inundation would not alter the properties of the soils.

The conversion of prime and statewide-important farmland represents a significant effect.

4.4.3 Modified Wide Setback Levee Plan

Most of the farmland in this project area is considered prime farmland. The Modified Wide Setback Levee Plan would result in the loss of 158 acres of prime farmland from direct effects from the levee footprint and permanent easements. An additional 1,254 acres confined between the levees has the potential of conversion due to indirect effects. Acres indirectly affected are those that are confined between the levees and the creek and are not suitable for farming due to size or irregular shape. The determination of what would be considered an uneconomic remnant, and therefore not farmable, has not yet been undertaken by the Corps. This determination would be made after a plan is selected. If lands are deemed uneconomic remnants, the land would most likely be used for habitat areas as mitigation. Prime farmlands would lose their designation as such if they remained unfarmed for more than 3 years.

Flooding would not have an effect on the classification of prime and statewide important farmland. These designations are based on the physical properties of the soils; short-term inundation would not alter the properties of the soils.

The conversion of prime and statewide-important farmland represents a significant effect.

4.4.4 Mitigation

Lower Cache Creek Flood Barrier Plan

The acreage of prime farmland converted cannot be mitigated since the qualities that distinguish prime farmland cannot be re-created. The conversion of prime and statewide-important farmland represents a significant effect.

Modified Wide Setback Levee Plan

The acreage of prime farmland converted cannot be mitigated since the qualities that distinguish prime farmland cannot be re-created. The conversion of prime and statewide-important farmland represents a significant effect.

4.5 Potential Effects on Transportation

This section identifies potential adverse project-related effects on transportation in the project area. The evaluation includes direct effects such as increased traffic due to haul trucks traveling to/from construction areas and indirect effects such as road closures due to project-related induced flooding. The project-related effects on transportation would be considered significant if they cause any of the following:

- An increase in traffic, which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections).
- Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways.
- Substantially increase hazards to a design feature (i.e., sharp curves or dangerous intersections) or incompatible uses.
- Result in inadequate emergency access.
- Result in inadequate parking capacity.
- Conflict with adopted policies supporting alternative transportation.

There would be no direct adverse effects to parking availability since there are no parking lots located in the project area. Additionally, there would be no hazards due to a design feature since roadways would maintain their basic footprint, but would be widened and/or raised.

4.5.1 No-Action Plan

Under the No-Action Plan, the potential remains for flooding during major storm events. Transportation would be affected during a severe storm due to the disruption and potential damage to the California Northern Railroad and to I-5. The portion of I-5 east of the city would be particularly subject to disruption and damage because the floodflows would pond against the Yolo Bypass levees. County roads within the project would also be flooded during flood events.

4.5.2 Lower Cache Creek Flood Barrier Plan

Construction

Haul routes would be on a construction easement along the north side of the proposed flood barrier embankment. For construction west of I-5, borrow material would come from the drainage channel excavation so no truck trips would be necessary to bring additional material from a distant borrow pit. For construction east of I-5, trucks would be traveling from the borrow areas just north and east of the alignment along the easement to construct the levee.

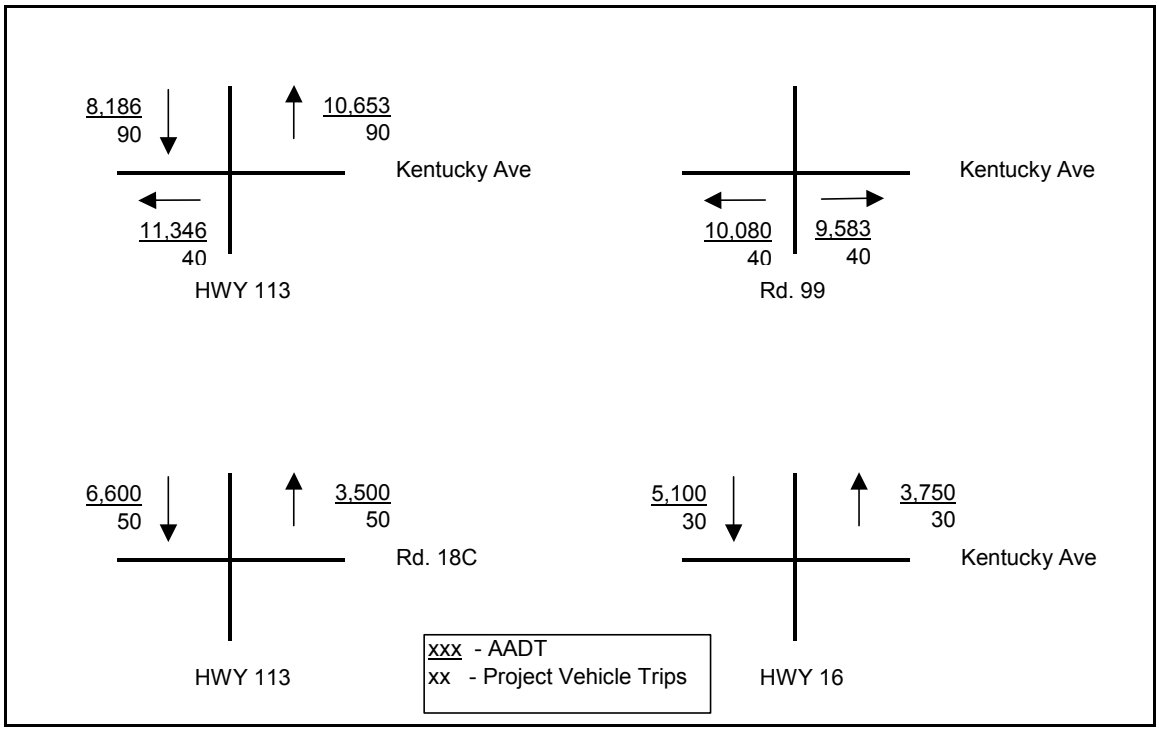
Trucks bringing concrete and aggregate materials would travel from the source (located on CR 20) to SH 16 and along the construction easement for levee work west of I-5. Trucks carrying concrete and aggregate materials would travel on CR 20 to Kentucky Avenue to SH 113 and along the construction easement for levee work east of I-5.

Riprap would be brought in from Yuba City. For construction east of I-5, trucks would travel down SH 113 and along the easement to distribute the riprap. The trucks would need to continue from SH 113 to Kentucky Avenue and then to CR 99 to access the construction easement on the west side of I-5.

The flood barrier would be constructed during the dry season over the course of 2 years. During this time there would be an increase in traffic volume on roads used as haul routes and roads accessed by construction workers. During peak construction periods, an additional 90 truck trips and 50 construction worker vehicles per day would be on different roads throughout the project area. (Appendix E includes the project-related numbers of trucks, truck trips, vehicle miles traveled, and construction worker vehicle trips necessary for project completion.) Figure 4-1 shows existing versus project-related Average Annual Daily Traffic (AADT) at key intersections. In all cases, the additional project-related traffic volume would be l percent or less of the existing traffic volumes. This small percentage would not be considered a substantial increase in traffic and would therefore be a less-than-significant effect.

The environmental analysis was prepared for a range of levee crown widths between 12 and 20 feet. Construction of a 20-foot levee crown width would require additional truck trips to haul materials. Trucks used to transport soil for levee construction would travel from the borrow areas along construction easements; these truck trips would not add additional trucks onto public roadways. Trucks required to haul the remainder of the materials on public roadways would increase the truck trips per day by less than 4 percent as compared to the total trips produced during construction of the 12-foot levee crown. Under the 12-foot levee crown width, direct transportation effects were less than significant. The 20-foot levee crown width would produce a slight increase in truck trips, but overall the effects on transportation would remain less than significant.

Figure 4-1. Projected Increase in Traffic Volume – Lower Cache Creek Flood Barrier Plan



For the Lower Cache Creek Flood Barrier Plan, CR 19B, CR 97A, CR 99, CR 101, and Frontage Road, as well as SH 16, would need to be raised to go over the top of the flood barrier. Churchill Downs would also need to be modified to meet CR 101. CR 102 would be raised slightly and go through the flood barrier, not over the top of the flood barrier. In each of these cases, traffic patterns would be temporarily altered. As the roads are being raised, the northbound and southbound lanes would be closed alternately, letting traffic flow through one lane as construction proceeds on the other. CR 102 would require approximately 2 months to construct. Each of the other roads that would need to be raised would require less construction time than CR 102.

There would be no modification to the railroad; however, construction would occur surrounding the tracks. There is the potential for short-term disruption in service while construction equipment is in close proximity to the tracks.

The only bike lane in the project area, along CR 102, would be affected in the same manner as the roadway. One lane would be closed at a time, allowing for traffic to pass in the open lane.

Implementation of the mitigation measures described in Section 4.5.4 would reduce these potentially significant transportation effects to less than significant.

Given the small increase in project-related traffic volume, the level of service (LOS) on roadways in the project area is not expected to change. The roadways used by construction vehicles in the project area are mainly rural in nature, without stoplights, pedestrian crossings, and large intersections. These features are a key source in the delay in travel time (major component of LOS) when additional vehicles travel through them. Without these features on most roadways, it is unlikely that the additional truck trips would cause substantial delays in travel time; therefore, the LOS standard would not be exceeded. This effect on transportation would be less than significant.

Flooding

Indirect transportation effects of the flood barrier would include increased depth and duration of flooding on some roadways traversing the project area. A flood warning system would be in place to warn residents to evacuate, and alternate evacuation routes would be made available.

The project effects on transportation have the potential to affect residential, commercial, and agricultural travel. During a flood with a greater flow than one having a 1 in 40 chance of occurring in any given year, changes in depth and duration of flooding would increase moving west to east across the project area. Overbank flow or levee overtopping/failure on Cache Creek would result in sheet flow and would result in flooding and closure of I-5 for approximately 12 hours. SH 113 and CR 101 would be flooded and closed for a few days. CR 102 would see the most significant effect – flooding and closure would last approximately 3 weeks. Figure 2-4 shows the sections of the roadways that would be affected by the flooding from Cache Creek. Under existing conditions, the levee height perpendicular to CR 102 is approximately 5 feet. The flood barrier would increase this levee height to 18 feet, thus increasing the depth and duration of flooding at CR 102.

Residential traffic between the city of Woodland and the unincorporated community to the north would be affected during a flood that has a greater flow than one having a 1 in 40 chance of occurring within any given year, during which CR 101, 102 and SH 113 would be closed. CR 101 and SH 13 may be closed for a few days, and CR 102 may be closed for approximately 3 weeks. During the period that all three of these roads are closed, rerouted traffic could affect traffic/congestion on typically less-traveled, smaller roads.

A flood warning system would give residents more time to evacuate. Once the emergency was over, alternate routes would be available to enable residents to travel between their homes and/or businesses while CR 102 remained flooded.

Commercial traffic such as trucks carrying goods to/from a warehouse or a retail store would not be significantly affected. I-5 would only be temporarily closed and would reopen within hours after the storm event. Under existing conditions, I-5 would be closed in several locations both north and south of the project area as well, affecting traffic flow. Therefore, the project effects as compared to existing conditions would not be significant.

During the flood (winter) season, farmers would be transporting fewer goods/supplies than during the summer, resulting in an easier rerouting of traffic. The closure of I-5, and for a greater period of time, CR 102 would be an inconvenience; however, due to the infrequency of this event as well as the reopening of I-5 within a couple of days and the use of SH 113 as a detour, the effects would not be considered significant.

During flooding and road closures, the amount of time required for emergency vehicles to respond could be greater. Within a few days, all access ways would be open except for CR 102. CR 102 is a major access road for emergency vehicles traveling north from Woodland. However, there are several County roads in close proximity to CR 102. The use of detours to circumvent the flooding would reduce this impact significant, however, not to a less-than-significant level.

4.5.3 Modified Wide Setback Levee Plan

Construction

Haul routes would be on construction easements on the waterside of the proposed modified wide setback levee alignment. Access to these easements would be along CR 102, CR 101, SH 113, SH 16, and CR 99.

Trucks bringing concrete and aggregate materials would travel from the source (located on CR 20) to Kentucky Avenue to SH 113 and along the construction easements for reaches east of I-5. For reaches west of I-5, trucks would use SH 16 to access the construction site.

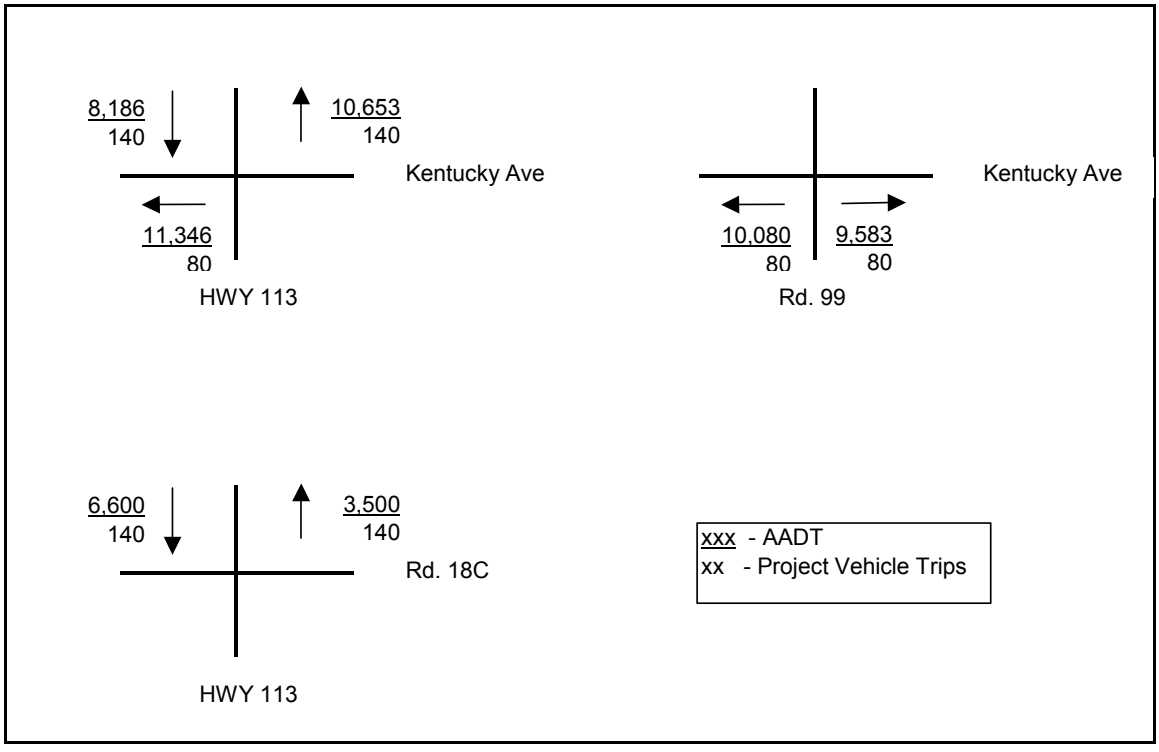
Riprap would be brought from Yuba City. For reaches east of I-5, trucks would travel down SH 113 and along the easements to distribute the riprap. The trucks would need to continue from SH 113 to Kentucky Avenue, and then to SH 16 to access the construction easements on the west side of I-5.

The setback levees would be constructed over the course of 3 years. The construction would be scheduled during the dry season from mid-April to mid-November (except in areas of potential giant garter snake habitat where construction would be limited to May through September). During this time, there would be an increase in traffic volume on roads used as haul routes and roads accessed by construction workers. During construction year 1, an average of approximately 80 additional round trip truck

trips per day would be required as well as an additional 60 worker vehicle round trips. During construction years 2 and 3, an average of approximately 50 additional round trip truck trips per day would be required as well as an additional 35 worker vehicle round trips. At peak construction periods, 100 additional roundtrip truck trips per day and 70 worker vehicle roundtrips would be required (Appendix E shows the project-related numbers of trucks, truck trips, vehicle miles traveled, and construction worker vehicle trips necessary for project completion). Figure 4-2 shows existing AADT versus project-related increases in AADT (year 1 average) at key intersections. The additional project-related traffic volume would range from approximately less than 1 percent to at most 4 percent for vehicles traveling north on SH113 north of CR 18C.

The environmental analysis was prepared for a range of levee crown widths between 12 and 20 feet. Construction of a 20-foot levee crown width would require additional truck trips to haul materials. Scrapers would be used to transport soil for levee construction and would therefore not add additional trucks onto public roadways. Trucks required to haul the remainder of the materials on public roadways would increase the truck trips per day by 8 percent as compared to the total trips produced during construction of the 12-foot levee crown. Under the 12-foot levee crown width, direct transportation effects were less than significant. The 20-foot levee crown width would produce an increase in truck trips, but overall the effects on transportation would remain less than significant.

Figure 4-2. Project Increase in Traffic Volume – Modified Wide Setback Levee Plan



CR 97A, CR 18B, CR 17, and CR 18A would need to be realigned. Viaducts would need to be built at CR 102 and SH 113 as well as I-5, the railroad, and CR 99W. The only bike lane in the project area, along CR 102, would be affected in the same manner as the roadway.

The bridge at CR 102 would be closed, demolished, and rebuilt. During this time, traffic over the CR 102 bridge would be detoured to the SH 113 bridge. South of Cache Creek, the detour would use CR 18C. North of Cache Creek, the detour would be over to CR 17. The detour would be in place approximately 6 months. The SH 113 bridge would be replaced during the following year. During closure of the SH 113 bridge, the CR 102 bridge would be used as a detour.

Construction of the new viaduct at CR 99W would require closure of CR 99W in both directions over the bridge. A detour would route traffic onto I-5. South of Cache Creek, traffic would be routed onto/off of I-5 at the Junction of CR 16 and CR 18. North of Cache Creek, traffic would exit/enter I-5 at the Yolo Interchange/CR 17. Local traffic heading south on CR 99W needing to access the town of Yolo would be permitted to continue past the CR 17/I-5 junction on CR 99W. Local traffic heading north on CR 99W needing to access the town of Yolo would be required to detour onto I-5, exit at CR 17, and head south on CR 99W.

The railroad bridge crossing Cache Creek would need to be replaced. The existing railroad bridge would remain open while a second bridge would be built next to it. Upon completion of the new bridge, tracks would be laid just north and south of the old bridge to connect the tracks over to the new bridge. The switch to the new bridge would be completed in 1 day.

The I-5 viaducts, northbound and southbound lanes, would be completed for one direction at a time. During construction for the northbound bridge, traffic would be detoured onto the southbound bridge and then back onto the northbound lanes just north of the bridge. A temporary road would be built to connect the northbound and southbound lanes just north and south of the bridges. The southbound bridge lanes would be converted from two lanes flowing south to one lane in each direction to accommodate the northbound traffic. The traffic patterns would be reversed during construction for the southbound bridge.

With the mitigation measures described in Section 4.5.4, transportation effects due to lane closures during bridge/road replacement would be considered less than significant.

Given the small increase in project-related traffic volume, the level of service (LOS) on roadways in the project area is not expected to change. The roadways used by construction vehicles in the project area are mainly rural in nature, without stop lights, pedestrian crossings, and large intersections. These features are a key source in the delay in travel time (major component of LOS) when additional vehicles travel through them. Without these features on most roadways, it is unlikely that the additional truck trips

would cause substantial delays in travel time; therefore, the LOS standard would not be exceeded. This transportation effect is considered less than significant.

Flooding

After the completion of the Modified Wide Setback Levee Plan, all bridges would reliably be protected from floods that have a 1 in 100 chance of occurring in any given year. This represents a significant increase in protection compared to the No-Action Plan under which the bridges would be closed during flood events.

The overall effect on transportation would be less than significant with mitigation.

4.5.4 Mitigation

There would be no adverse effects on parking since construction equipment would be based at staging areas constructed specifically for the project. The following best management practices would be implemented to reduce the direct construction effects associated with project activities.

- Trucks would use construction easements as much as possible when hauling materials to the construction site.
- Traffic would be rerouted when necessary to avoid construction areas.
- Flaggers would be stationed to slow or stop approaching vehicles to avoid conflicts with construction vehicles or equipment.

Additionally, all proposed activities involving encroachments within, under, or over county or city road rights-of-way must be covered by an encroachment permit. Appropriate local agencies would be consulted by the non-Federal sponsor as necessary to obtain enroachment permits. Encroachment permits would also be required for State highways and railroads.

Lower Cache Creek Flood Barrier Plan

Keeping only one lane open during road raising would be of greatest concern on the heavier traveled roadways such as CR 102 and SH 16. Implementation of the above BMP's would facilitate safe passage of bicycles, automobiles, trucks, and agricultural equipment traveling the roadways. Construction of each roadway would take approximately 2 months; therefore, this would only be a temporary effect.

Emergency vehicles would be made aware of construction ahead of time in order to incorporate any new detours into their response paths.

A flood warning system giving residents extra time to evacuate would be in place. This would allow time for residents to clear the area before the roads become flooded. After the emergency is over, alternate routes would be identified for the time that the few roads would remain flooded.

Mitigation would reduce the effects, but not to a less-than-significant level.

Modified Wide Setback Levee Plan

During the realignment of CR 97A, CR 18B, CR 17, and CR 18A, traffic controls would be in effect. One lane would be kept open while construction proceeds in the other lane. Flaggers would be stationed to aid traffic flow through the one open lane.

During the construction of the new viaducts on CR 102 and SH 113, reduced speed signs would be placed on detour CR 18C and CR 17 to allow trucks traveling in opposite directions to pass safely. Caution signs would also be placed on CR 102 and SH 113 to warn traffic of slow vehicles entering from CR 18C and CR 17. Signs would be placed on CR 102 and SH 113 noting the dates of the detour.

Signs indicating reduced speed would be placed along the detour over the I-5 bridges to allow traffic traveling in opposite directions to pass safely. Caution and merge signs would be placed prior to the detour to warn northbound motorists of the upcoming lane shift onto the southbound bridge. Merge and caution signs would also be placed prior to the southbound bridge to allow motorists time to reduce speed and merge into one lane.

During construction of the southbound bridge, the similar traffic controls would also be in place.

Emergency vehicles would be made aware of construction ahead of time in order to incorporate any new detours into their response paths.

With mitigation, overall effects due to construction of the modified wide setback levee are less than significant.

4.6 Potential Effects on Noise

This section evaluates the effects of the plans on noise levels in the project area. Under the Federal Noise Control Act, the EPA identified outdoor limits of 55 decibels as desirable to protect against speech interference and sleep disturbance for residential, educational, and healthcare areas. The U.S. Department of Housing and Urban Development considers noise levels above 65 decibels as “normally unacceptable.” For the purpose of this analysis, the project-related noise would be considered significant if:

- the noise exceeds 60 decibels at sensitive receptor locations.

As the distance from the noise source increases, the decibel level decreases such that for every doubling of distance, the decibel level is reduced by 6 dB. Assuming that average levee construction noise is 88 dB unmitigated at 50 feet, a radius of approximately 1,600 feet would be affected with noise above 60 dB.

4.6.1 No-Action Plan

If no flood protection project is built, existing noise levels would remain constant. Future development and predicted increased population may result in a slight increase in ambient noise levels.

4.6.2 Lower Cache Creek Flood Barrier Plan

Project construction noise would result from engine exhaust, fans, transmissions, and other mechanical equipment. Construction noise would be more heavily concentrated at the staging areas located at the intersections of the flood barrier with CR 97A, CR 99, CR 102, CR 101, and SH 113 and SH 16.

Adjacent land uses to the construction area include industrial, agricultural, commercial, and residential. The following sensitive noise receptors are located near the project area:

1. Residence and Valley Oaks Inn – Churchill Downs and SH 113
1A. Dubach Park – SH 113 and I-5
2. Residence – I-5 and CR 99
3. Residence – SH 16
4. Residence – CR 19A
5. Residences – CR 96B and CR 19B
6. Residence – South of CR 19B
7. Residence – Between CR 19B and CR 20
8. Residence – Kentucky Avenue and SH 16
9. Residence – SH 16 north of Kentucky Avenue
10. Residences – SH 16 about one-half mile north of Kentucky Avenue
11. Residences – Cherry Lane
12. Residences – CR 98B north of Kentucky Avenue
13. Residences and Traynham Park - CR 98B north of Kentucky Avenue
14. Residence – CR 99 about one-half mile north of Kentucky Avenue
15. Residence – CR 99 and Kentucky Avenue
16. Residence – Kentucky Avenue between N. College St. and SH 113
17. Best Western – SH 113 and I-5

Figure 4-3 shows the location of the sensitive receptors within the project-related noise contours.

The significance of project-related noise would be less if the sensitive receptors are already located near and exposed to existing noise sources such as Interstate 5. Table 4-1 lists the sensitive receptors indicated above as well as bordering land uses.

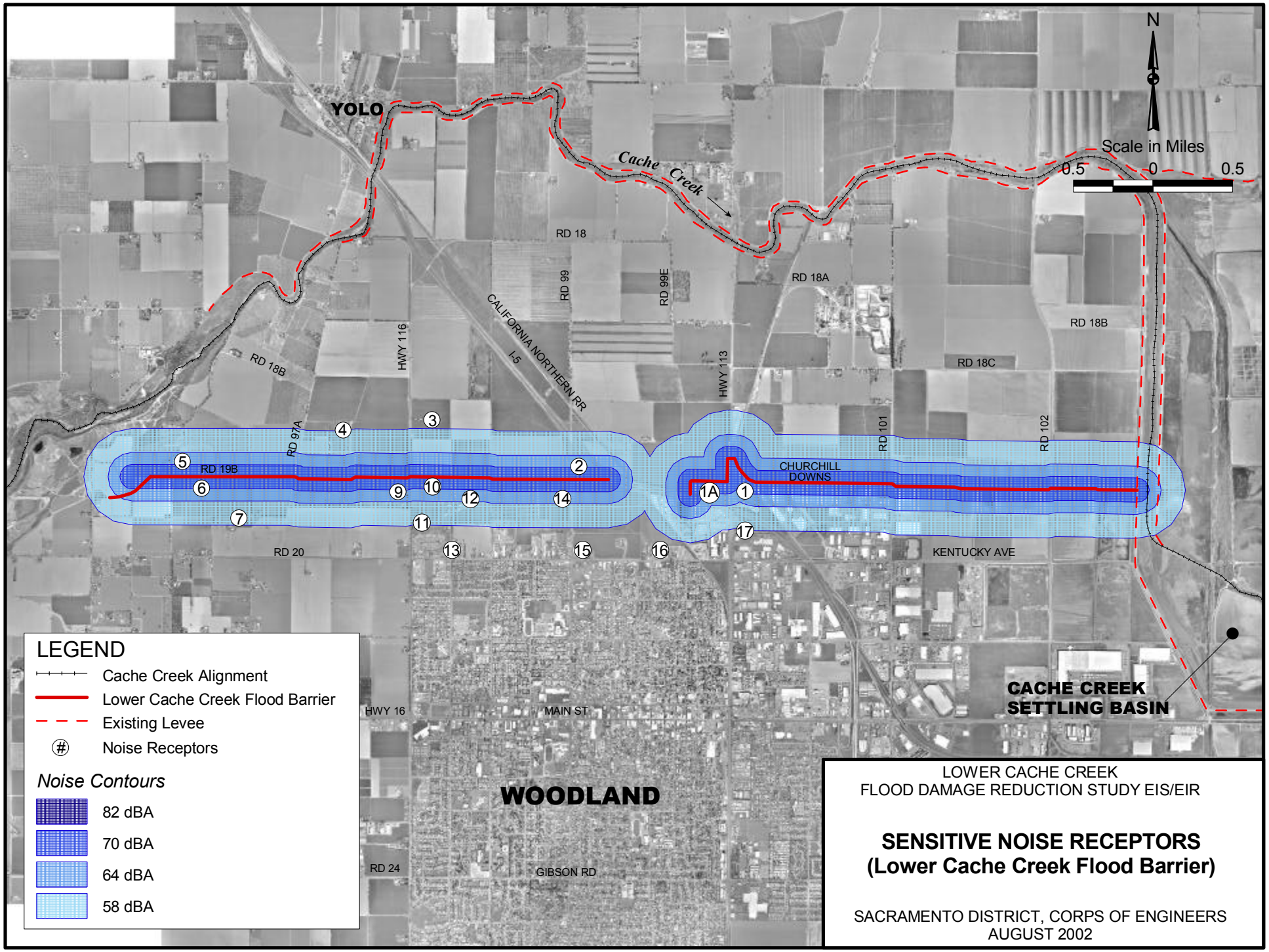
Figure 4-4 shows the sensitive receptors and existing noise sources from roadways and railroads. Sensitive receptors located at points 1, 1A, 2, 5, 6, 10, and 14 are the closest to construction and would be subjected to decibels ranging in the low to mid 70's. Half of these receptors are currently subject to significant noise levels due to existing conditions. Existing conditions at these receptors include noise from the railroads that can produce levels of approximately 75 decibels at 100 feet (Sutter County, 2001). The freeway and SH 113 produce a more constant noise source and average 70 decibels at 100 feet. Kentucky Avenue, which according to the Woodland General Plan is a truck route, and SH 16 can produce approximately 62 decibels 100 feet from the roadways (Yolo County, 1996). Agricultural fields, while in production, create noise during farming, primarily from tractors, and can produce noise levels of 78 dBA at 100 feet (Sutter County, 2001). Even with all of these existing noise sources and the mitigation measures described below, the construction of the flood barrier would produce decibel levels above the significance threshold for some sensitive receptors temporarily during construction. This represents a temporary significant effect.

Table 4-1. Land Uses Bordering Sensitive Receptors (Including With-Project Noise Levels)

Sensitive Receptors	dBA[1] Range With Project	Bordering Land Uses
1	73-76	SH 113, I-5
1A	73-76	SH 113, I-5
2	68-71	SH 113, Railroad, Ag
3	<58	SH 16, Ag
4	57-60	County roads, Ag
5	68-72	County roads, Ag
6	68-72	County roads, Ag
7	58-61	County roads, Ag
8	<58	Kentucky Avenue, SH 16, Ag
9	68-71	SH 16, Ag
10	74-77	Ag
11	57-60	SH 16, Ag
12	63-66	Ag
13	<58	Kentucky Avenue
14	65-69	Ag
15	<58	Kentucky Avenue
16	<58	Kentucky Avenue
17	56-59	SH 113, I-5

[1] dBA: A weighted decibel scale.

Kentucky Avenue would be a haul route used in the construction of the flood barrier. Given that sensitive receptors occur on either side of the roadway, noise levels due to project-related truck traffic were evaluated. Noise levels increase about 3-dBA for each doubling of roadway traffic volume, given that the speed and vehicle types remain constant (City of Los Angeles, 1998). Since Kentucky Avenue is a haul route already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YOLO
Cache Creek
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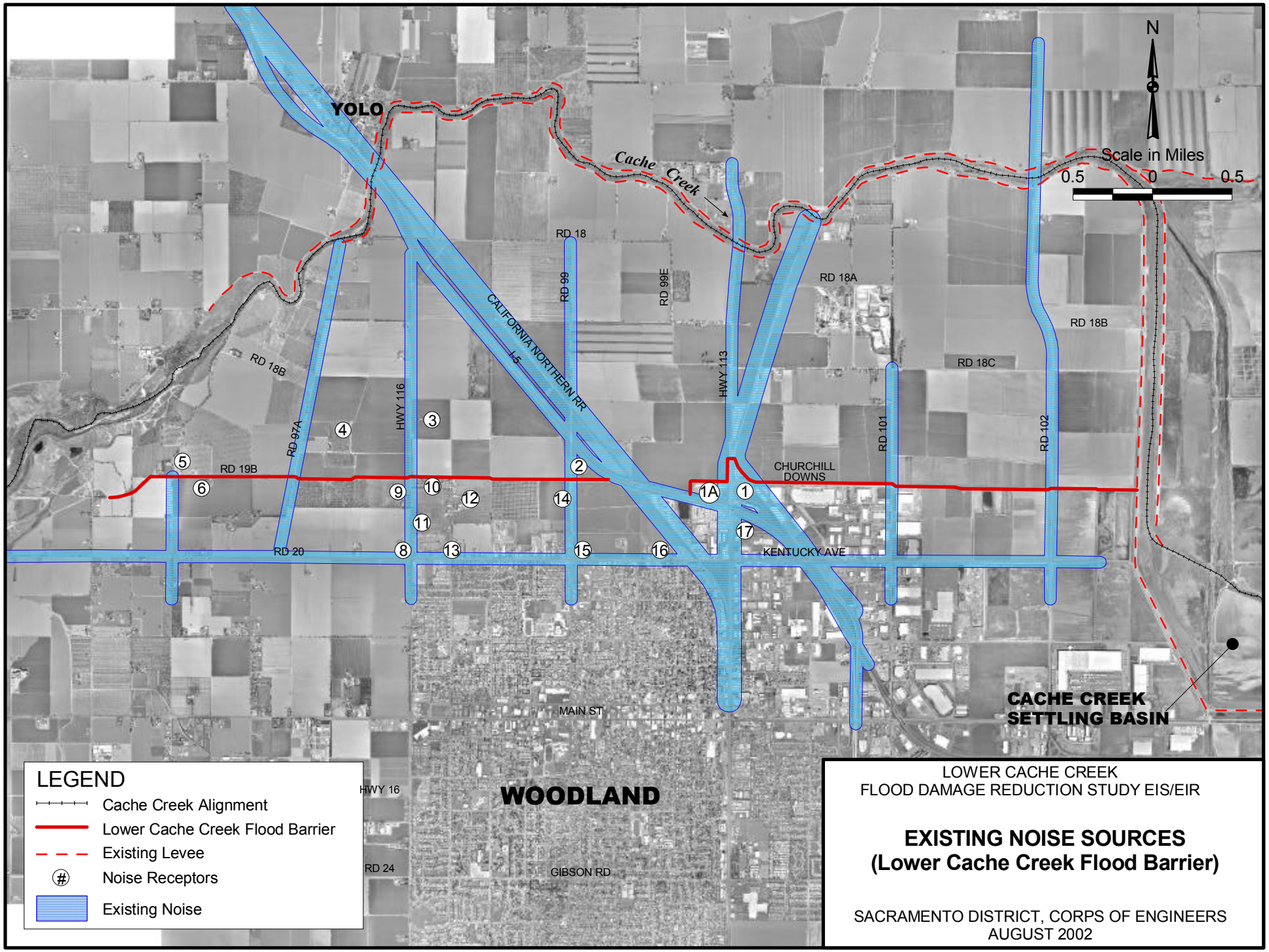
RD 99
RD 99E
RD 18A
RD 18B
RD 18C
HWY 116
HWY 113
CALIFORNIA NORTHERN RR
I-5
RD 97A
RD 19B
RD 101
RD 102
CHURCHILL DOWNS
RD 20
KENTUCKY AVE
HWY 16
MAIN ST
WOODLAND
RD 24
GIBSON RD
CACHE CREEK SETTLING BASIN
1
1A
2
3
4
5
6
7
9
10
11
12
13
14
15
16
17
LEGEND
Cache Creek Alignment
Lower Cache Creek Flood Barrier
Existing Levee
Noise Receptors
Noise Contours
82 dBA
70 dBA
64 dBA
58 dBA
LOWER CACHE CREEK
FLOOD DAMAGE REDUCTION STUDY EIS/EIR
SENSITIVE NOISE RECEPTORS
(Lower Cache Creek Flood Barrier)
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
AUGUST 2002

Figure 4-3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Cache Creek Alignment
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Noise Receptors
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FLOOD DAMAGE REDUCTION STUDY EIS/EIR
EXISTING NOISE SOURCES
(Lower Cache Creek Flood Barrier)
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
AUGUST 2002

Figure 4-4

traveled by trucks, additional project-related truck volume would not alter the vehicle type on the roadway. The project would also not add enough truck trips to double the existing traffic. Therefore, mobile noise effects would result in less than a 3-dBA increase surrounding Kentucky Avenue. Traffic-related noise would not result in a significant noise effect.

The overall noise effect would be significant.

4.6.3 Modified Wide Setback Levee Plan

Project construction noise would result from engine exhaust, fans, transmissions and other mechanical equipment during the demolition and construction of the setback levees.

The noise contours from levee construction and the sensitive noise receptors were mapped to identify where they overlapped (Figure 4-5). The majority of the sensitive receptors would be located far enough from the construction sites that the decibel range at their property would be in the mid-50's. West of I-5, a few homes close to the proposed setback levee alignment would have decibel ranges in the low to mid-70's. Within the town of Yolo, homes that currently border the levee would be exposed to decibel ranges in the 70's during modifications of the existing levee. East of I-5, there are fewer sensitive receptors than on the west side; however, they are closer to the construction site and would therefore experience a louder noise effect.

Most of the sensitive receptors in the project area are homes that border agricultural land. The exception is the entire town of Yolo, which also borders I-5 and the railroad and includes additional sensitive receptors such as a school and church. Figure 4-6 shows the sensitive receptors and existing noise sources from roadways and railroads. A portion of the town of Yolo is currently subject to significant noise levels due to existing conditions. Existing conditions at these receptors include noise from the railroads that can produce levels of approximately 75 decibels at 100 feet (Sutter County, 2001). Additionally, receptors that border State highways and county roads are also subject to traffic noise. I-5 and SH 113 produce more constant noise sources and average 70 decibels at 100 feet. Agricultural fields, while in production, create noise during farming, primarily from tractors, and can produce noise levels of 78 dBA at 100 feet (Sutter County, 2001). Additional noise sources include crop dusters; pumps; diesel haul trucks; and during peak harvesting, farm equipment that creates noise 24 hours a day.

Even with all of these existing noise sources and the mitigation measures described below, the construction of the setback levee would produce decibel levels above the significance threshold for some sensitive receptors temporarily during construction. This represents a temporary significant effect.

The overall noise effect would be significant.

4.6.4 Mitigation

Lower Cache Creek Flood Barrier Plan

Construction equipment would be outfitted and maintained with noise-reduction devices such as mufflers to minimize construction noise. Use of noise-reduction devices would reduce noise by an average of 5 to 10 dBA at 50 feet. Wherever possible, noise-generating construction equipment would be shielded by the use of buffers such as structures or truck trailers.

Construction would be limited to daytime hours to minimize noise effects on nearby residents, workers, and the general public during noise-sensitive periods.

Mitigation would reduce the effects, but not to a less-than-significant level.

Modified Wide Setback Levee Plan

Construction equipment would be outfitted and maintained with noise-reduction devices such as mufflers to minimize construction noise. Use of noise-reduction devices would reduce noise by an average of 5 to 10 dBA at 50 feet. Wherever possible, noise-generating construction equipment would be shielded by the use of buffers such as structures or truck trailers.

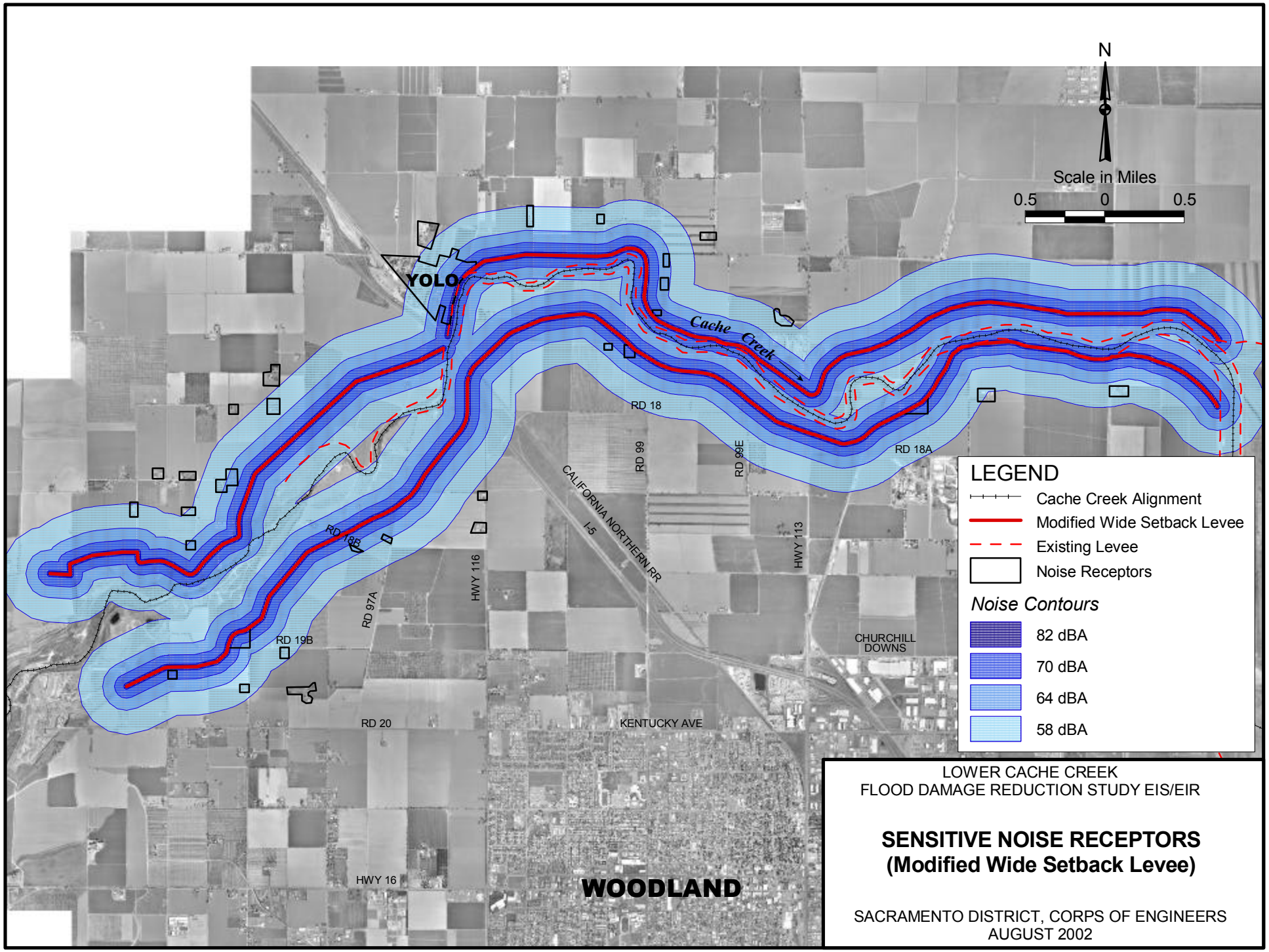
Construction would be limited to daytime hours to minimize noise effects on nearby residents, workers, and the general public during noise-sensitive periods.

Mitigation would reduce the effects, but not to a less-than-significant level.

4.7 Potential Effects on Air Quality

Effects on air quality are considered significant if the project would:

- Conflict with or obstruct implementation of the applicable air quality plan.
- Violate any air quality standard or contribute to an existing or projected air quality violation.
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable Federal or State ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors).
- Expose the public (especially schools, day care centers, hospitals, retirement homes, convalescence facilities, and residences) located within one-fourth mile of the construction area to substantial pollutant concentrations.
- Create objectionable odors affecting a substantial number of people.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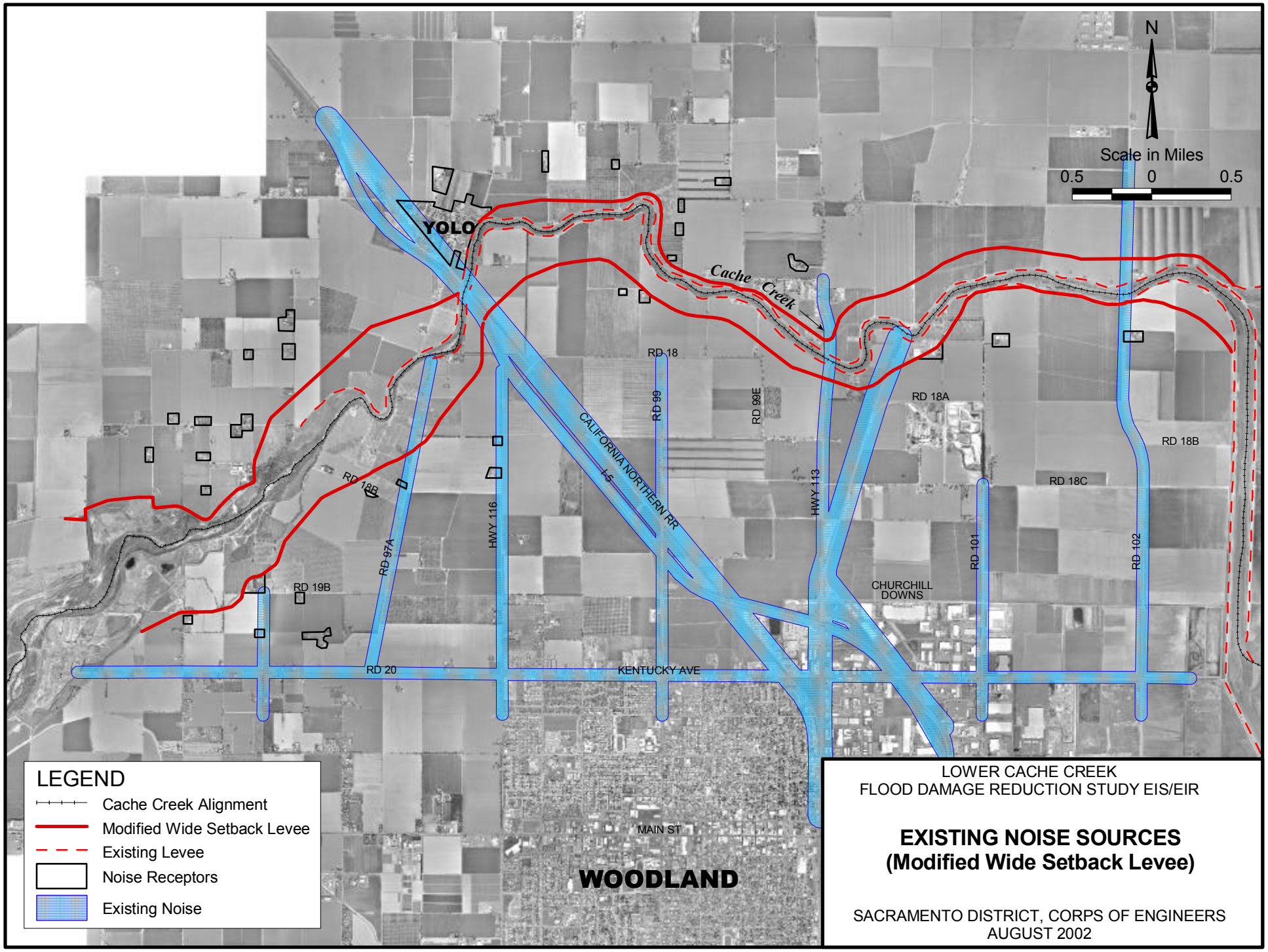
FLOOD DAMAGE REDUCTION STUDY EIS/EIR
SENSITIVE NOISE RECEPTORS
(Modified Wide Setback Levee)
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
AUGUST 2002

Figure 4-5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I-5
HWY 113
HWY 116
RD 97A
RD 18B
RD 19B
RD 20
RD 101
RD 102
CHURCHILL DOWNS
KENTUCKY AVE
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WOODLAND
LEGEND
Cache Creek Alignment
Modified Wide Setback Levee
Existing Levee
Noise Receptors
Existing Noise
LOWER CACHE CREEK
FLOOD DAMAGE REDUCTION STUDY EIS/EIR
EXISTING NOISE SOURCES
(Modified Wide Setback Levee)
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
AUGUST 2002

Figure 4-6

Significance criteria developed by the Yolo-Solano Air Quality Management District (YSAQMD) and conformity thresholds established by the EPA were used to determine the significance of project-related air quality effects. Project-related emissions were considered significant if NO_x, ROG, or PM_{10} exceeded 82 lbs/day. Additionally, project-related emissions were considered significant if they exceeded the EPA's general conformity thresholds. Yolo County is considered a severe nonattainment area for ozone. The threshold for ozone precursors, NO_x and ROG, is set at 25 tons/yr. Conformity thresholds are not set for other pollutants since Yolo County is considered in attainment for those pollutants.

Emissions associated with each plan would be primarily direct effects from construction. Emissions include exhaust from construction equipment, fugitive dust from construction activities, exhaust from worker vehicle trips to and from the sites, and exhaust from construction vehicles traveling to and from borrow sites. Emissions for each of these activities were estimated as follows.

4.7.1 Methodology

The first step involved estimating exhaust emissions related to off road construction equipment. Off road construction equipment was inventoried. For each type of equipment, total hours necessary for project completion were estimated. The total hours were then multiplied by the average horsepower and the load and emission factors to determine the total pollutants per year (ARB, 2001).

The second step involved estimating the dust associated with construction activities generated at the borrow sites, staging areas, and construction areas. The acreage of these sites was estimated and multiplied by an emission factor (MRI, 1996) to obtain PM_{10} dust emissions.

The third step involved estimating on road vehicle emissions, including employee vehicle trips and haul trips to/from borrow sites. Employee vehicle trip and borrow site trip haul emissions were estimated by multiplying total miles traveled by an emission factor. The emission factors were obtained by running the EMFAC2000 Model for Yolo County (ARB, 2001).

The fourth step involved estimating fugitive dust emissions from trucks and employee vehicles traveling on paved roads. Road surface silt loading and an average vehicle weight were estimated and entered into an equation to determine pounds/VMT (Vehicle Miles Traveled). This number was multiplied by the total VMT of trucks traveling to/from borrow sites and employees traveling to/from the construction site to determine the fugitive dust emissions (EPA, 2001; Gaffney and Shimp, 1997).

The final step was to sum the emissions calculated in each step. Project-related emissions were compared to the YSAQMD's significance criteria and the conformity thresholds to determine the significance of the effects. The results for each plan are described below. Calculations for each step listed above can be found in Appendix F.

4.7.2 No-Action Plan

The No-Action Plan would not generate any construction-related emissions. Air quality in the project area would continue to be affected by local emissions and would experience a potential increase in emissions as the population grows. However, stricter air quality standards implemented by the YSAQMD and the California Air Resources Board may aid in improving current conditions and may help in avoiding future rises in emissions.

4.7.3 Lower Cache Creek Flood Barrier Plan

This plan is not expected to have any long-term effects on air quality. However, construction would result in two types of short-term effects on air quality. These direct effects are combustion emissions and dust emissions. Table 4-2 summarizes the estimated emissions in lbs/day and tons/yr for 1 year. The total emissions for the 2-year project were calculated and halved to obtain the yearly results.

Table 4-2. Estimated Combustion and Dust Emissions (Lower Cache Creek Flood Barrier Plan – Unmitigated)

	Emissions (tons/yr)				
Pollutant	Offroad Construction Vehicles	Onroad Construction Vehicles	Worker Vehicle Trips	Total	EPA Threshold
Combustion Emissions					
ROG	0.86	0.31	0.09	1.26	25.00
CO	2.93	1.15	1.83	5.91	N/A
NO_x	7.28	6.51	0.18	13.97	25.00
PM_{10}	26.00	0.89	0.03	26.92	N/A

	Emissions (lbs/day)				
Pollutant	Offroad Construction Vehicles	Onroad Construction Vehicles	Worker Vehicle Trips	Total	YSAQMD Threshold
Combustion Emissions					
ROG	9.48	3.44	1.00	13.92	82.00
CO	32.61	12.78	20.33	65.72	550.00
NO_x	80.91	72.33	2.00	155.24	82.00
PM_{10}	288.92	9.84	0.30	299.06	82.00

Short-term construction-related emissions for NO_x of 155 lbs/day and PM_{10} emissions (combustion and fugitive dust) of approximately 300 lbs/day would exceed the 82 lbs/day significance threshold established by the YSAQMD. ROG emissions of 14 lbs/day would not exceed the 82 lbs/day threshold. CO emissions of 65 lbs/day would not exceed the 550 lbs/day significance threshold established by the YSAQMD.

The environmental analysis was prepared for a range of levee crown widths between 12 and 20 feet. Construction of the 20-foot levee crown would produce an increase in combustion emissions from construction equipment. Combustion emissions, specifically ROG, CO, NO_x, and PM_{10} would increase by 4 percent as compared to the total emissions produced during construction of the 12-foot levee crown. PM_{10} and NO_x

emissions were above the Yolo-Solano Air Quality Management District's (YSAQMD) threshold, and considered a short-term significant impact, under the 12-foot levee crown width. These pollutants would also be considered a short-term significant impact under the 20-foot crown width. ROG and CO emissions did not exceed YSAQMD thresholds. The emissions for ROG and CO would be increased slightly under the 20-foot crown width, but the emissions would continue to be less than the threshold.

The sensitive receptors located within one-fourth mile of the construction area are shown in Figure 4-7. These receptors would be affected most by the dust generated from construction. A dust suppression plan as outlined under Section 4.7.5 would reduce dust emissions, but not to a less-than-significant level. This would represent a significant but unavoidable effect.

Implementing the mitigation measures identified under Section 4.7.5 would reduce these air quality effects; however, the NO_x and PM_{10} emissions would still exceed the significance thresholds established by the YSAQMD. These exceedences would only occur during the 2-year construction period. Although temporary, the exceedences would represent a significant and unavoidable effect.

Construction of the setback levees would not produce any changes or increases in odors compared to existing conditions for the surrounding sensitive receptors.

Under EPA's conformity guidelines, the project would have to produce less than 25 tons/year of NO_x. The project would produce 13.9 tons/year, which is less than this threshold. The emission levels for the year would also have to be less than 10 percent of the nonattainment area's emission inventory. For Yolo County, the emission inventory is 24.6 tons/day for NO_x; 10 percent would equal 2.46 tons/day. The 155 lbs/day of NO_x emitted from the project would be less than the 2.46 tons/day significance threshold.

According to the conformity review process, the project-related emissions would not be high enough to trigger a conformity determination.

The overall effect on air quality, due to construction of the LCCFB Plan, would be significant.

4.7.4 Modified Wide Setback Levee Plan

This plan is not expected to have any long-term effects on air quality. However, construction would result in two types of short-term effects on air quality. These direct effects are combustion emissions and dust emissions. Table 4-3 summarizes the estimated emissions in lbs/day and tons/yr for 1 year. The total emissions for the 3-year project were calculated and divided by three to obtain the yearly results.

Table 4-3. Estimated Combustion and Dust Emissions (Modified Wide Setback Levee Plan – Unmitigated)

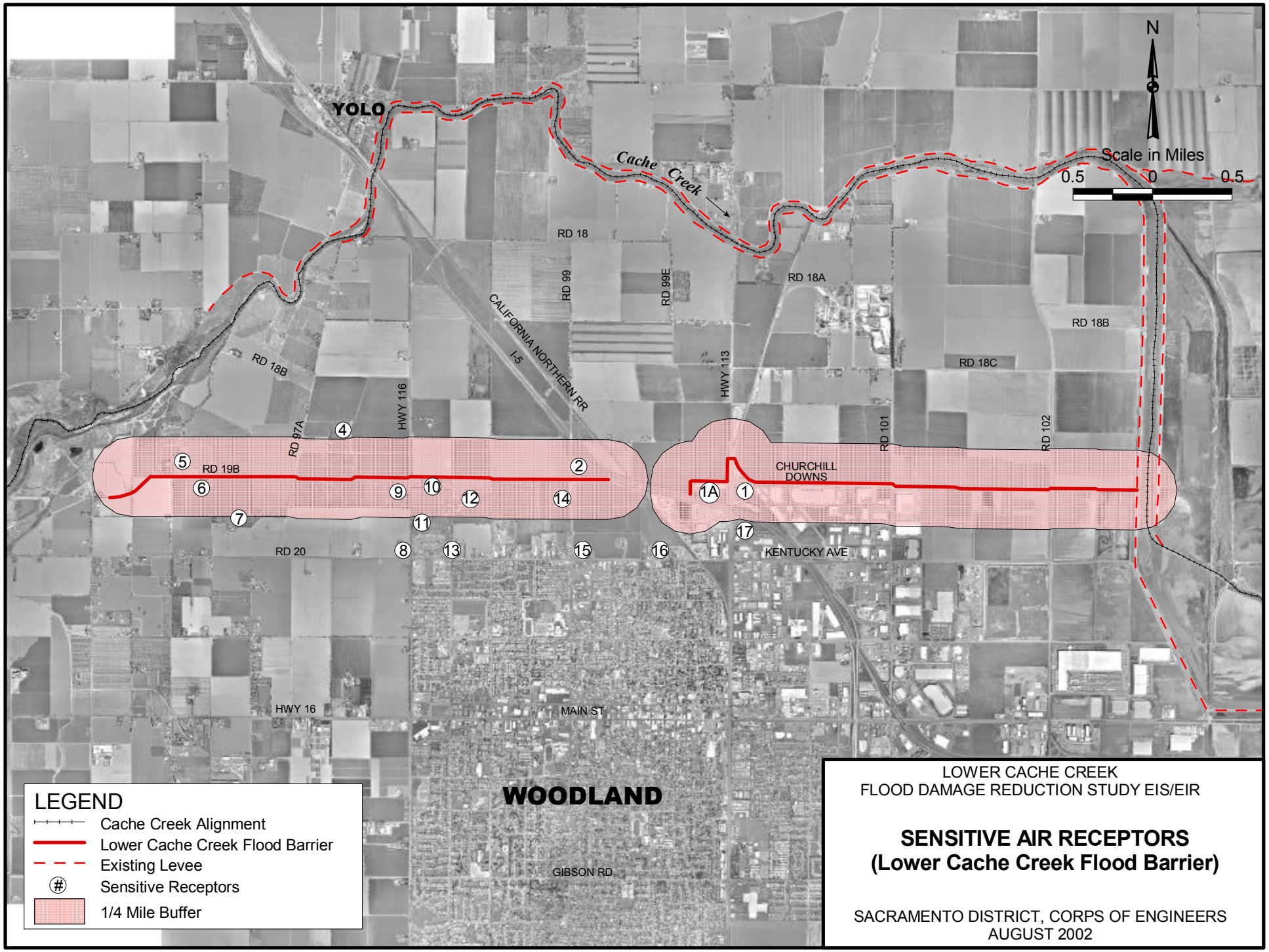
Emissions (tons/yr)					
Pollutant	Offroad Construction Vehicles	Onroad Construction Vehicles	Worker Vehicle Trips	Total	EPA Threshold
Combustion Emissions					
ROG	1.27	0.22	0.07	1.56	25.00
CO	3.97	0.81	1.42	6.20	N/A
NO_x	15.88	4.56	0.14	20.58	25.00
PM_{10}	46.98	1.02	0.02	48.02	N/A

Emissions (lbs/day)					
Pollutant	Offroad Construction Vehicles	Onroad Construction Vehicles	Worker Vehicle Trips	Total	YSAQMD Threshold
Combustion Emissions					
ROG	14.08	2.44	0.78	17.31	82.00
CO	44.16	9.00	15.78	68.94	550.00
NO_x	176.47	50.67	1.56	228.69	82.00
PM_{10}	522.07	21.38	0.35	543.80	82.00

Short-term construction-related emissions for NO_x of 229 lbs/day and PM_{10} emissions (combustion and fugitive dust) of 523 lbs/day would exceed the 82 lbs/day significance threshold established by the YSAQMD. ROG emissions of 17 lbs/day would not exceed the 82 lbs/day threshold. CO emissions of 69 lbs/day would not exceed the 550 lbs/day significance threshold established by the YSAQMD.

The environmental analysis was prepared for a range of levee crown widths between 12 and 20 feet. Construction of the 20-foot levee crown would produce an increase in combustion emissions from construction equipment. Combustion emissions, specifically ROG, CO, NO_x, and PM_{10} would increase by 10 percent as compared to the total emissions produced during construction of the 12-foot levee crown. PM_{10} and NO_x emissions were above the Yolo-Solano Air Quality Management District's (YSAQMD) threshold, and considered a short-term significant impact, under the 12-foot levee crown width. These pollutants would also be considered a short-term significant impact under the 20-foot crown width. ROG and CO emissions did not exceed YSAQMD thresholds as analyzed under the 12-foot crown width. The emissions for ROG and CO would be increased under the 20-foot crown width, but the emissions would continue to be less than the threshold.

The sensitive receptors located within one-fourth mile of the construction area are shown on Figure 4-8. These receptors would be affected most by the dust generated from construction. A dust suppression plan as outlined under Section 4.7.5 would reduce dust emissions, but not to a less-than-significant level. This would represent a significant but unavoidable effect.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CHURCHILL DOWNS
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KENTUCKY AVE
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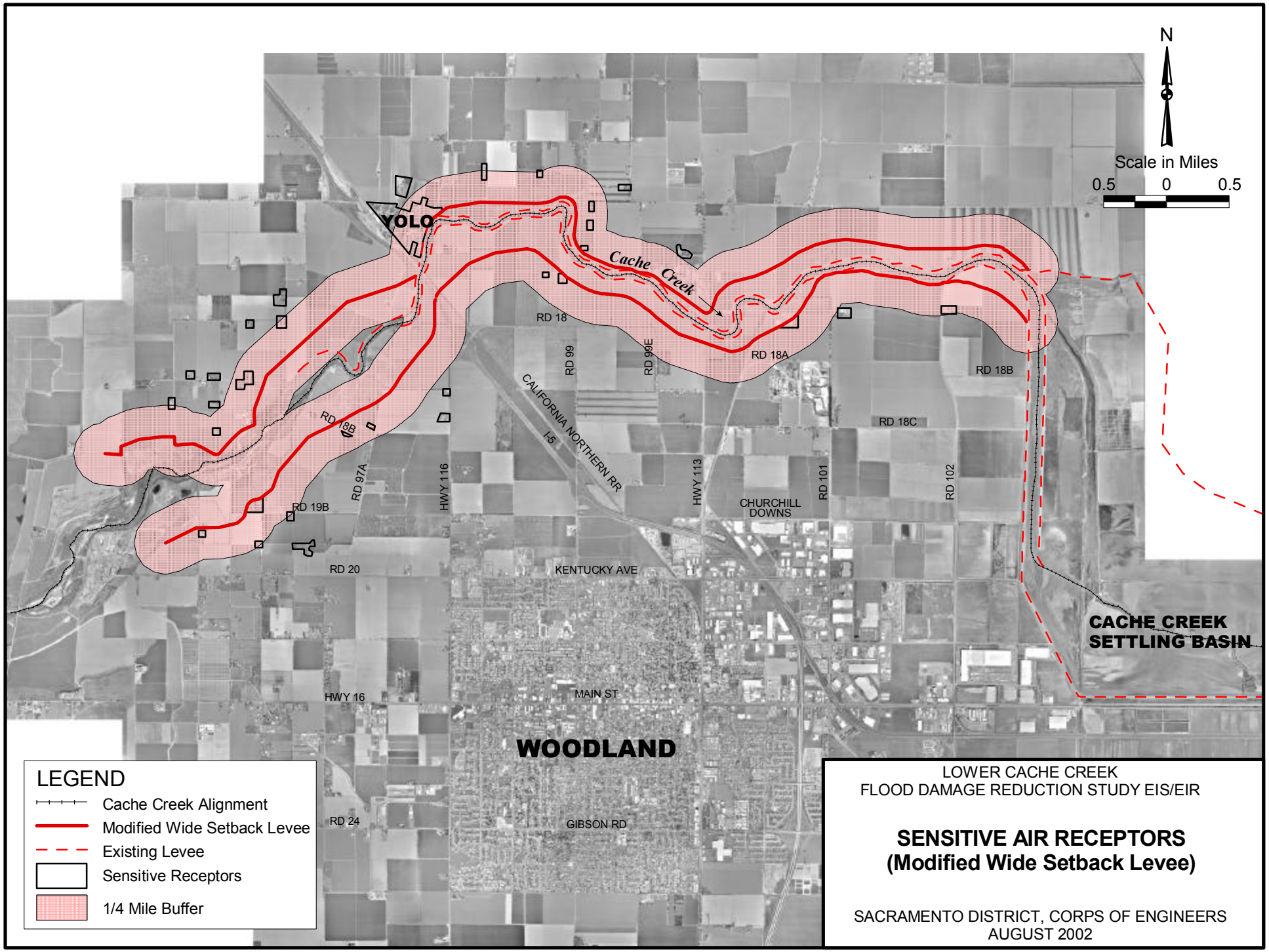
LEGEND
Cache Creek Alignment
Lower Cache Creek Flood Barrier
Existing Levee
Sensitive Receptors
1/4 Mile Buffer
LOWER CACHE CREEK
FLOOD DAMAGE REDUCTION STUDY EIS/EIR
SENSITIVE AIR RECEPTORS
(Lower Cache Creek Flood Barrier)
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
AUGUST 2002

Figure 4-7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HWY 113
RD 101
RD 102
CHURCHILL DOWNS
RD 19B
RD 20
KENTUCKY AVE
CACHE CREEK SETTLING BASIN
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WOODLAND
RD 24
GIBSON RD
LEGEND
Cache Creek Alignment
Modified Wide Setback Levee
Existing Levee
Sensitive Receptors
1/4 Mile Buffer
LOWER CACHE CREEK
FLOOD DAMAGE REDUCTION STUDY EIS/EIR
SENSITIVE AIR RECEPTORS
(Modified Wide Setback Levee)
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
AUGUST 2002

Figure 4-8

Implementing the mitigation measures identified in Section 4.7.5 would reduce these air quality effects; however, the NO_x and PM_{10} emissions would still exceed the significance thresholds established by the YSAQMD. These exceedences would only occur during the 3-year construction period. Although temporary, the exceedences represent a significant but unavoidable effect.

Construction of the setback levees would not produce any changes or increases in odors compared to existing conditions for the surrounding sensitive receptors.

Under EPA's conformity guidelines, the project would have to produce less than 25 tons/year of NO_x. The project would produce 21 tons/year, which is less than this threshold. The emission levels for the year would also have to be less than 10 percent of the emission inventory for the nonattainment area. For Yolo County, the emission inventory is 24.6 tons/day for NO_x; 10 percent would equal 2.46 tons/day. The 229 lbs/day of NO_x emitted from the project would be less than the 2.46 tons/day significance threshold. According to the conformity review process, the project-related emissions would not be high enough to trigger a conformity determination.

The overall effect on air quality, due to construction of the modified wide setback levee, would be significant.

4.7.5 Mitigation

Lower Cache Creek Flood Barrier Plan

The following mitigation measures would be used to reduce the construction-related air quality effects:

- Prepare and implement a dust suppression plan.
- Incorporate NO_x mitigation measures into construction plans and specifications.

Prepare and Implement a Dust Suppression Plan

A dust suppression plan would be submitted to the YSAQMD for review before initiating construction activities. The plan would include as many of the following mitigation measures as are applicable to each project site:

- All construction areas, unpaved access roads, and staging areas would be watered as needed during dry soil conditions, or soil stabilizers would be applied.
- All trucks hauling soil or other loose material would be covered or have at least 2 feet of freeboard. Wherever possible, construction vehicles would use paved roads to access the construction site.

- Vehicle speeds would be limited to 15 mph on unpaved roads and construction areas, or as required to control dust.

- Streets would be cleaned daily if visible soil material is carried onto adjacent public streets.

- Soil stabilizers would be applied daily to inactive construction areas as needed.

- Exposed stockpiles of soil and other excavated materials would be enclosed, covered, watered twice daily, or applied with soil binders as needed.

- Vegetation would be replanted in disturbed areas as quickly as possible following the completion of construction.

Incorporate NO_x Mitigation Measures into Construction Plans

Construction contractors would limit NO_x emissions by implementing the following measures:

- Use Caterpillar prechamber diesel engines (or equivalent) together with proper maintenance and operation.

- Use electric equipment, where feasible.

- Maintain equipment in tune with manufacturers' specifications.

- Use gasoline-powered equipment installed with catalytic converters.

- Substitute gasoline-powered for diesel-powered equipment, where feasible.

- Use compressed natural gas or onsite propane mobile equipment instead of diesel-powered equipment, where feasible.

If the mitigation measures are implemented, dust-related PM_{10} emissions would be reduced by 60 percent (SCAQMD, 1992), and NO_x emissions would be reduced by 5 percent. Even with these mitigation measures, the project would still exceed YSAQMD significance thresholds for both NO_x and PM_{10}. However, the exceedences would only occur during the 7-month construction year for 2 years.

Mitigation would reduce air quality effects, but not to a less-than-significant level.

Modified Wide Setback Levee Plan

The mitigation measures for this alternative plan would be the same as the mitigation measures listed above for the LCCFB Plan. Mitigation would reduce air quality effects, but not to a less-than-significant level.

4.8 Potential Effects on Sedimentation and the Settling Basin

This section identifies potential adverse project-related effects on the settling basin. The evaluation includes effects such as changes in sediment loading and structural alterations to the basin. The effects would be considered significant if:

- The service life of the settling basin is reduced to less than 50 years.

4.8.1 No-Action Plan

The existing Cache Creek levee system and settling basin were designed to contain flows of up to 30,000 cfs. Flows exceeding this level could potentially result in short-term overbank flow and risk of a levee failure on the creek that would cause flooding to the surrounding area. A portion of the sediment load would be deposited on the surrounding flood plain during these events.

Consequently, the amount of sediment that reaches the settling basin is reduced during these high flows, and the settling basin is not exposed to loading rates that exceed its design capacity and alter the projected 50-year lifespan of the basin.

4.8.2 Lower Cache Creek Flood Barrier Plan

The LCCFB Plan requires a 3,000-foot section of the west levee of the settling basin to be lowered for installation of a 3,000-foot inlet weir. This would allow water to drain from the flood plain west of the settling basin into the settling basin following storms with spills from Cache Creek. In addition, three box culverts would be installed in the west levee to provide additional drainage for impounded floodwaters contained below the weir crest elevation of 45 feet msl (NAVD88). When ponding is greater than 45 feet msl (NAVD88) in elevation in the southwest portion of the flood plain, water would be overtopping the inlet weir and flowing through the box culverts – in addition to water entering the settling basin from Cache Creek directly. This may change the flow pattern within the basin.

The sediment load entering the basin during large flow events would not be significantly greater than for normal flows because some of the sediment would be deposited on the flood plain prior to flowing into the settling basin. Only a fraction of the remaining suspended sediment would enter the settling basin, either over the inlet weir or through the box culverts.

A 5,250-foot section of the training levee within the settling basin would also be removed as part of the LCCFB Plan. The removal of this training levee section could alter the sediment distribution within the basin, potentially causing a greater degree of sedimentation in the northern portion of the settling basin. A hydraulic study conducted by Northwest Hydraulic Consultants, Inc. (See Feasibility Report), investigated whether increase in flow velocities would alter the deposition of sediments and initiate scour in the settling basin. It was concluded that the alteration of settling basin flows would not induce significant scour (sediment transport) in the settling basin. The removal of the training levee is a component of the settling basin maintenance plan. According to the

initial design plans in 1991, the levee is planned to be removed in increments. The first 500 feet is to be removed when the settling basin is operating at less than 30 percent trapping efficiency or in 2017.

The lifespan of the settling basin would not be affected by flood barrier construction.

4.8.3 Modified Wide Setback Levee Plan

Under the existing levee system, storms that exceed the design limit of 30,000 cfs may result in short-term overbank flow and risk of levee failure. A portion of the sediment-laden creek would flow onto adjacent farmland. In contrast, the setback levees would contain the creek up to the new design flow. These higher flows would be conveyed directly into the settling basin, resulting in a potential for higher sediment loading during infrequent flood events. Due to the infrequent occurrence of high flows (once every 20 years), the increased sedimentation is not expected to significantly alter the life span (50 years) of the settling basin.

For example, a flow of approximately 53,000 cfs would temporarily increase the sediment loading to the basin, but statistically it occurs only once every 50 years. Thus, large flooding events are likely not to be frequent enough to significantly affect the lifespan of the settling basin.

A hydraulic study conducted by Northwest Hydraulic Consultants, Inc. (See Feasibility Report), investigated whether the increase in flow velocities during high flow events for the setback levee plans would significantly alter the deposition of sediments and initiate scour in the settling basin. Results indicated that a flood event of 70,000 cfs (flood that has, at a minimum, a 1 in 200 chance of occurring in any given year) would increase the velocities within most of the settling basin by only zero to 1.5 feet per second. It was concluded that this would not induce significant scour within the basin (Northwest Hydraulic Consultants, Inc. 2001).

The Modified Wide Setback Levee Plan also requires the removal of the training levee, increasing the flow capacity at the inlet of the settling basin to reduce backwater in the lower portion of Cache Creek during high flows. According to the initial design plans in 1991, the levee is planned to be removed in increments with the first 500 feet to be removed when the settling basin is operating at less than 30 percent trapping efficiency or in 2017. This is intended to encourage a broad distribution of sediments over the project's lifespan. The removal of the entire levee under the Modified Wide Setback Levee Plan could influence the distribution of deposition, but is not expected to affect the sediment trapping efficiency of the settling basin.

The lifespan of the settling basin would not be affected by modified wide setback levee construction.

4.8.4 Mitigation

Lower Cache Creek Flood Barrier Plan

Since there would be no adverse effects on the life span of the settling basin, no mitigation would be required.

Modified Wide Setback Levee Plan

Since there would be no adverse effects on the life span of the settling basin, no mitigation would be required.

4.9 Potential Effects on Water Quality

This section is intended to identify any potential adverse project-related effects on water quality. The effects would be considered significant if the flood damage reduction plan would:

- Result in an increase of mercury contamination into the Sacramento and Delta River systems.
- Substantially degrade surface-water or groundwater quality such that it would violate criteria or objectives identified in the Central Valley RWQCB basin plan, or otherwise substantially degrade water quality to the detriment of beneficial uses.
- Substantially deplete groundwater supplies or interfere with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level.
- Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems.

4.9.1 No-Action Plan

Water quality would likely remain generally the same as under current conditions, assuming no significant changes in land use upstream from the project area. The current source of impairment, mercury, and high concentrations of boron would persist unless mitigated.

4.9.2 Lower Cache Creek Flood Barrier Plan

Under the LCCFB Plan, the existing Cache Creek levee system is expected to continue, although it is not a part of the LCCFB Plan. All creek flow below the design capacity (30,000 cfs) would be contained within the levees for discharge into the settling basin. After 30,000 cfs, there is an increase in the risk of levee failure and overflow onto farmland. This overflow would result in some sediment deposition onto the farmland, whereas the remaining sediment in the channel would be conveyed directly to the settling

basin. Currently, there are no data regarding the sediment distribution in relation to water depth during flood events, and it is not possible to quantify the amount of mercury-laden sediment that could be deposited on agricultural land.

The main contaminants of note are boron and mercury. The accumulation of boron can be harmful to certain agricultural plants. Initially, this may appear to be an environmental concern. However, the flooding of the agricultural land would be relatively infrequent. (Floods that have greater flows than a flow with a 1 in 10 to 1 in 20 chance of occurring in any given year.) Also, mercury concentrations within the water column are typically not very high (0.2 to 0.5 ppm dry weight sediment), and the primary environmental concern is the bioaccumulation of mercury in wetlands, not farmland. The infrequency of flooding and relatively low concentrations in the floodwaters would not be an environmental/human health hazard for agricultural purposes. The LCCFB Plan would not produce an increase in contamination to the system.

Yolo County is underlain by a considerable amount of groundwater. To date, County water demands have not caused a significant depletion or lowering of the groundwater basin. However, groundwater pumping by Davis, Woodland, and the surrounding agricultural areas has reversed the historic west to east gradient. Groundwater recharge occurs through rainfall percolation, applied irrigation water, and water flowing from Cache and Putah Creeks. Recharge also occurs from the east Yolo Bypass area due to pumping depressions created by the cities of Woodland and Davis. This project would not utilize groundwater, nor would it contribute to any changes in groundwater recharge. Therefore, there would be no long-term effects from this project on groundwater.

The LCCFB Plan would include a drainage canal on the waterside of the levee that would direct agricultural and stormwater runoff north of the barrier eastward toward the settling basin. Water would drain through culverts into the settling basin, minimizing the amount of water that flowed through the City's drainage system. The effect of the LCCFB Plan on the existing drainage system would be beneficial.

Construction of the LCCFB Plan would require a temporary haul route across the low-flow channel of Cache Creek in order to allow removal of the training levee material. The haul route would be 30 feet wide, 400 feet long, and located at the southern or downstream end of the existing west levee and training levee. Typically the channel in this area is shallow with a soft, muddy bottom and patches of emergent vegetation. Surface water may not be present by late summer or early fall. Approximately 1500 cubic yards of clean rock/cobble would be placed in the channel around three 24 inch CMP culverts. The rock would be capped by 2 feet of earth fill (1000 cubic yards) and 6 inches of aggregate base. A layer of geotextile fabric would be placed between the culverts and the earth material. The haul route would result in the placement of 0.28 acre of fill into waters under the jurisdiction of the United States for one construction season only (May through October). Once the training levee material is removed, the haul route would also be removed and the stream channel restored to its previous condition.

For the haul route, conditions of the Corps of Engineers Nationwide Permit 33 *Temporary Construction, Access, or Dewatering*, would be met since construction and use are both temporary, they would occur during the dry season, and a minimum amount of fill would be required. No migratory fish would be affected, and the warmwater fish and other aquatic animals would have access up or downstream through the culverts. No special status species or cultural resources would be affected by the haul route. Best management practices would include development of an erosion and sediment control plan by the contractor.

Other construction practices that also have the potential to degrade water quality. The following activities that could occur on the construction site have the potential to disturb soil and affect surface water quality: levee removal; paving of the levees; material delivery, storage and material use; vehicle/equipment cleaning; vehicle/equipment fueling; and vehicle/equipment maintenance.

The overall affect to water quality is potentially significant. Implementation of the mitigation measures listed in Section 4.9.4 would reduce this potentially significant effect to a less-than-significant level.

4.9.3 Modified Wide Setback Levee Plan

In comparison to the flood barrier, the setback levee system would convey larger flows directly through the settling basin into the Yolo Bypass. Consequently, a potential exists to increase the amount of suspended mercury-laden sediments to be directly flushed into the settling basin. Due to the infrequent nature of the high flow events, the amount of additional mercury deposition is expected to be insignificant compared with the amount deposited in typical yearly flow events.

Under the Modified Wide Setback Levee Plan, the settling basin could also serve as a potential source of mercury release into the Yolo Bypass. Under large flow events, water velocities of higher magnitude could potentially initiate scour in the base of the settling basin. These scoured, mercury-laden sediments could then flow into the Yolo Bypass, degrading the water quality downstream. However, a study on the settling basin has indicated that a flood event of 70,000 cfs (at a minimum, a 1 in 100 chance of occurring in any given year) would only increase the velocities within the settling basin by zero to 1.5 fps (See Feasibility Report). This would not induce the level of scour necessary to influence the mercury concentrations downstream. The Modified Wide Setback Levee Plan would not produce an increase in contamination to the system.

This project would not utilize groundwater, nor would it contribute to any changes in groundwater recharge. Therefore, there would be no long-term effects from this project on groundwater.

The Modified Wide Setback Levee Plan would reduce the amount of agricultural land that would produce runoff that would drain into the City's drainage system. The land confined by the levees would still produce runoff, however it would drain into the settling basin and not flow through the City's system. The Modified Wide Setback Levee

Plan would therefore have a beneficial effect by reducing the amount of runoff water that would enter the existing stormwater drainage system.

Work within Cache Creek for this plan would affect waters under the jurisdiction of the United States and therefore requirements of Section 404 of the Clean Water Act must be met. The modification of the bridges, slope protection, placement of riprap, gabions, and hard points in or along the creek could result in significant effects unless mitigation measures were developed and implemented. The non-Federal sponsor would be responsible for obtaining the Section 404 permit from the Corps, and the Section 1601/1603 (streambed alteration agreement) from the State Department Fish and Game. , The Corps would obtain the Section 401 water quality certification from the California RWQCB.

Other construction practices also have the potential to degrade water quality. The following activities that could occur on the construction site have the potential to disturb soil and allow sediments/pollutants to enter Cache Creek: levee removal; paving of the levees; material delivery, storage and material use; vehicle/equipment cleaning; vehicle/equipment fueling; and vehicle/equipment maintenance.

The overall affect to water quality is potentially significant. Implementation of the mitigation measures listed in Section 4.9.4 would reduce this potentially significant effect to a less-than-significant level.

4.9.4 Mitigation

Lower Cache Creek Flood Barrier Plan

The settling basin may be used to mitigate mercury contamination originating from the upper reaches of Cache Creek. Mercury is typically highly affiliated with sediments, and the sediment deposition in the settling basin could potentially remove significant amounts of mercury from the water column.

The construction of the LCCFB Plan could temporarily alter the quality of stormwater runoff. Construction would require a large amount of earthmoving, which could result in the release of pollutants from various construction equipment and materials. Furthermore, nonvegetated areas in the construction zone would be more susceptible to erosion. Appropriate measures would be implemented to mitigate for these effects by minimizing the amount of soil erosion and pollutants entering the system. As a requirement of the Clean Water Act, an NPDES permit would be obtained prior to construction activity. For any discharges that would be exempt from the NPDES permit, waste discharge requirements would be followed. Required monitoring and BMP's would be enforced to ensure that the project is within compliance throughout the duration of construction. Such BMP's would include:

- The lead agency would prepare a stormwater pollution prevention plan. A portion of this plan would specifically address erosion and sediment control.

- Construction crews would install erosion controls such as hay bales, water bars, covers, sediment fences, and sensitive-area access restrictions where necessary and appropriate before initiating extensive clearing and grading.

- The lead agency would prepare a Hazardous Substance Control and Emergency Response Plan.

- The lead agency would comply with all Section 404 requirements.

Mitigation would reduce effects on water quality to a less-than-significant level.

Modified Wide Setback Levee Plan

The settling basin may be used to mitigate mercury contamination originating from the upper reaches of Cache Creek. Mercury is typically highly affiliated with sediments, and the sediment deposition in the settling basin could potentially remove significant amounts of mercury from the water column.

The construction of the Modified Wide Setback Levee Plan could temporarily alter the quality of stormwater runoff. Construction would require a large amount of earthmoving, which could result in the release of pollutants from various construction equipment and materials. Furthermore, nonvegetated areas in the construction zone would be more susceptible to erosion. Appropriate measures would be implemented to mitigate for these effects by minimizing the amount of soil erosion and pollutants entering the system. For any discharges that would be exempt from the NPDES permit, waste discharge requirements would be followed. Required monitoring and BMP's would be enforced to ensure that the project is within compliance throughout the duration of construction. Such BMP's would include:

- The lead agency would prepare a stormwater pollution prevention plan. A portion of this plan would specifically address erosion and sediment control.

- Construction crews would install erosion controls such as hay bales, water bars, covers, sediment fences, and sensitive-area access restrictions where necessary and appropriate before initiating extensive clearing and grading.

- The lead agency would prepare a Hazardous Substance Control and Emergency Response Plan.

- The lead agency would comply with all Section 404 requirements.

Requirements under Section 404 of the Clean Water Act, water quality certification under Section 401 of the Clean Water Act, and a California State Fish and Game Section 1601/1603 streambed alteration agreement would be met prior to any construction activity. Mitigation measures would include revegetation of exposed areas soon after construction is completed. Sediment barriers would be installed along the perimeter of work areas to prevent the accidental discharge of sediment. An inspection and monitoring program would be implemented to ensure the effectiveness of all erosion

control efforts. In addition, BMPs would be implemented to avoid and minimize potential disturbances to habitat and fisheries resources.

Mitigation would reduce effects on water quality to a less-than-significant level.

4.10 Potential Effects on Vegetation and Wildlife

This section is intended to identify any potential adverse effects on vegetation and wildlife resources. Project effects on these resources would be both temporary and permanent. Temporary effects would result from construction activities, while permanent effects would result from new flood damage reduction structures. These effects are summarized in Tables 4-4 and 4-5.

A Habitat Evaluation Procedures (HEP) analysis was conducted by the USFWS in the project area to determine project-related effects on vegetation that support a variety of wildlife resources in the project area. This section includes a summary of the HEP analysis. The complete results of the analysis are in the draft CAR (Appendix A).

Under criteria based on the State CEQA Guidelines, the proposed project would be considered to have a significant effect on vegetation and wildlife if it would result in any of the following:

- A substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations, or by the California DFG or USFWS.
- A substantial adverse effect on Federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, and coastal) through direct removal, filling, hydrological interruption, or other means.
- Substantial interference with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.
- A conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.
- A conflict with the provisions of an adopted Habitat Conservation Plan, Natural Conservation Community Plan, or other approved local, regional, or State habitat conservation plan.

4.10.1 No-Action Plan

The No-Action Plan would include continued O&M by DWR. O&M activities consist of vegetation clearing on the levees and within the stream channel to reduce any hindrances to flow. Flood fighting and repair would also be necessary due to the current 30,000-cfs design flow (approximately a flooding event with a 1 in 10 chance of occurring in any

given year, although historically the existing levees have held floods with up to a 1 in 20 chance of occurring) and serious erosion of the creek banks. Without flood fighting and repair work, flooding risk to the unincorporated community and the city of Woodland would increase. These repairs, over the 50-year life of the project, have been estimated to likely include 2,100 lineal feet of slope protection and 30,750 lineal feet of 150-foot setback levee. (See Feasibility Report)

These activities would degrade an already heavily affected lower Cache Creek by removing or altering its remaining habitat and altering its hydraulics. Shaded riverine aquatic (SRA) habitat would be lost during the construction of 2,100 lineal feet of slope protection. Riparian habitat would also be affected by slope protection and by any new setback levee construction. Agricultural lands, although of lesser habitat value, do provide cover, forage, and nesting for wildlife species and would also be affected by new levee construction.

Effects to vegetation and wildlife from flood fighting and repair are potentially significant. The loss of SRA habitat would also reduce the quality of fish habitat within the creek. These effects to fish habitat would be less than significant as a result of the diminished value of fish habitat due to low flow and a disconnection with the Sacramento River system.

4.10.2 Lower Cache Creek Flood Barrier Plan

With the LCCFB Plan, the current levee system would still require O&M and potential flood fighting and repair activities under the direction of the DWR. In this case, effects from these activities, although the same as stated above, would be considered cumulative effects and be accounted for in Section 5.2.

Under the LCCFB Plan, the USFWS has identified five vegetation communities involved in levee construction, thereby affecting wildlife. Table 4-4 summarizes effects due to construction of the flood barrier as noted in the draft CAR.

Borrow material would be derived from the removal of the settling basin training levee and elsewhere in the settling basin, and from the construction of the toe drain. The effects of using this material has already been accounted for in the acreages listed in Table 4-1 and in Section 4.11.2.

Construction activities could also have effects on wildlife, such as birds, ground squirrels, rabbits, snakes, and lizards. Effects may include direct mortality through being struck by equipment or the crushing of burrows; disturbance and abandonment of territories, occupied habitat, and nests/young during the breeding season, and increased competition for resources in adjoining areas. Any displaced wildlife would be expected to return to the area after construction.

Both effects from construction activities and long-term project-related effects would be potentially significant. Implementation of the mitigation measures listed in Section 4.10.4 would reduce these potentially significant effects to less than significant.

Table 4-4. Lower Cache Creek Flood Barrier Plan Effects and Mitigation

HABITAT TYPE	EFFECTS	BASIS FOR MITIGATION	MITIGATION PROPOSED	COMMENTS
Native Trees	54 trees	5:1 replacement of trees	270 native trees	Trees would be planted on 2.89 acres of mitigation site.
Non-native Trees	46 trees	1:1 replacement of trees	46 native trees	See above
Scrub Shrub	0.28 acre	Habitat Evaluation Procedure analysis	0.31-acre scrub shrub habitat	Reseeding the haul route provides 0.28 acre. Remaining 0.03 acre would be planted in mitigation site.
Agricultural	121.9 acres	Minimize loss of habitat value	121.9 acres native grasses and forbs[1]	Reseeding the Flood Barrier provides 121.9 acres.
Ruderal Upland	0.52 acres	Minimize loss of habitat value	0.52 acre native grasses and forbs[1]	Covering and reseeding riprap provides 0.52 acre.

[1]Addressed through project design; additional mitigation lands not required.

4.10.3 Modified Wide Setback Levee Plan

Under the Modified Wide Setback Levee Plan, the USFWS has identified four vegetation communities involved in levee construction, thereby affecting wildlife. Table 4-5 summarizes effects due to construction of the Modified Wide Setback Levee Plan according to the draft CAR. There would be an additional loss of upland and aquatic habitat during bridge and construction of streambank protection (hard-points). Mitigation for these and other losses to riparian and SRA would be met through compensation requirements for lost giant garter snake habitat.

Borrow material would be derived from the removal of the existing Cache Creek levee system and from adjacent agricultural fields. The effects of using material from the existing levee system has already been accounted for in Section 4.11.2. There would be no effects to vegetation and wildlife from obtaining borrow material in adjacent agricultural fields because borrow activities would be confined to currently tilled lands.

Construction activities could also have effects on wildlife, such as birds, ground squirrels, rabbits, snakes, and lizards. Effects may include direct mortality through being struck by equipment or the crushing of burrows; disturbance and abandonment of

territories, occupied habitat, and nests/young during the breeding season; and increased competition for resources in adjoining areas. Any displaced wildlife would be expected to return to the area after construction.

Both effects from construction activities and long-term project-related effects would be potentially significant. Implementation of the mitigation measures listed in Section 4.10.4 would reduce these potentially significant effects to less than significant.

Table 4-5. Lower Cache Creek Modified Wide Setback Levee Plan Effects and Mitigation

HABITAT TYPE	EFFECTS	BASIS FOR MITIGATION	MITIGATION PROPOSED	COMMENTS
Native and Non-native Trees	1,176 trees	1.5:1 replacement of trees	1,764 native trees	Trees would be planted on 16.2 acres of mitigation site.
Agricultural/Ruderal	174 acres	Minimize loss of habitat value	174 acres native grasses and forbs[1]	Reseeding the Flood Barrier provides at least 174 acres.
Riparian	9.01 acres	Minimize loss of habitat value	[2]	Mitigation for losses of riparian habitats would be met through requirements for lost giant garter snake habitat.
SRA	0.69 acre	Minimize loss of habitat value	[2]	Mitigation for losses of riparian habitats would be met through requirements for lost giant garter snake habitat.

[1]Addressed through project design; additional mitigation lands not required.
[2]Mitigation requirements would be decided during formal Section 7 consultation.

4.10.4 Mitigation

Lower Cache Creek Flood Barrier Plan

The CAR outlines mitigation for effects to vegetation and wildlife resources for the LCCFB. This mitigation is summarized in Table 4-4. The agricultural land would be mitigated with the planting of native forbs and grasses on non-riprapped areas of the new flood barrier. The trees would be replaced at a 5:1 (native) and 1:1 (nonnative) ratio for a

total of 316 native trees on approximately 2.89 acres. Mitigation for lost scrub shrub habitat during removal of the training levee would include the replanting of the haul route after construction and the creation of an additional 0.03 acre for a total of 0.31 acre of scrub shrub. Placing approximately 18 inches of soils over the riprap and then reseeding the soil with native grasses and forbs would mitigate for the loss of upland habitat along I-5.

Appendix I includes a Habitat Mitigation Alternatives Analysis document that explores the effectiveness of mitigating for effects to both special-status species and wildlife habitat at five different sites. A habitat mitigation alternatives analysis was performed, rather than an incremental cost analysis, because it is expected that nearly all of the general habitat impacts will be offset by non-discretionary incidental take conditions resulting from formal consultations for endangered species and by project design features. Only minimal additional measures would be required to fully mitigate the remaining general habitat impacts as recommended by USFWS. Therefore, a habitat mitigation alternatives analysis was performed to identify the least cost mitigation plan that would effectively meet both the anticipated incidental take conditions and the minor remaining general habitat mitigation recommendations. The overall conclusion was to use project facilities where possible and then mitigate for the remaining effects by purchasing credits at a mitigation bank.

Additional mitigation would include:

- Limiting construction crews to the right-of-way and confinement of disturbance to as small an area as possible;
- Requiring construction crews to maintain a 15-m.p.h. speed limit on all unpaved roads to reduce the chance of wildlife being mortally wounded if struck by construction equipment;
- Avoidance of effects to Cache Creek's water quality by taking appropriate measures to prevent construction materials (fuels, oils, and lubricants) from spilling or otherwise entering the creek;
- Avoidance of effects to woody vegetation at all construction sites, staging areas, borrow sites, and haul routes by fencing them with orange construction fencing;
- Minimization of effects to trees along the construction area by having all trimming performed by a qualified arborist to ensure tree survival after the project;
- Conducting of nest surveys prior to the removal of any trees or scrub shrub to ensure migratory birds would not be lost during construction, pursuant to the Migratory Bird Treaty Act; and
- Revegetation of borrow, staging, turn-arounds, and any other disturbed areas with native grasses and forbs.

- Development of a mitigation and remediation plan for the project by the lead agency.

These mitigation recommendations are also listed in Section 5.7. Both long-term and construction activity effects would be mitigated, using USFWS recommendations, to a less-than-significant level.

Modified Wide Setback Levee Plan

The CAR outlines mitigation for effects to vegetation and wildlife resources for the Modified Wide Setback Levee Plan. This mitigation is summarized in Table 4-5. Because the LCCFB was identified as the preliminary Least Environmentally Damaging plan, a detailed Mitigation Alternative Analysis was not completed for the Modified Wide Setback Levee. A discussion of mitigation for the Modified Wide Setback Levee Plan is limited to Sections 4.10.4 and 5.7 of this EIS/EIR.

Agricultural land would be mitigated with the planting of native forbs and grasses on non-riprapped areas of the new setback levee. The trees would be replaced at a 1.5:1 ratio. Because riparian and SRA habitats are also potential threatened or endangered species habitat, mitigation for effects on these habitats would be addressed during Section 7 consultation for the giant garter snake.

The land that would be constrained by the setback levees could serve as a mitigation site. This land also has the potential to serve as a site for future restoration of the lower Cache Creek ecosystem, providing substantial environmental benefits. Any additional mitigation requirements would be met by purchasing credits at a mitigation bank.

Additional mitigation for effects would include:

- Limiting construction crews to the right-of-way and confinement of disturbance to as small an area as possible;

- Requiring construction crews to maintain a 15 m.p.h. speed limit on all unpaved roads to reduce the chance of wildlife being mortally wounded if struck by construction equipment;

- Avoidance of effects to Cache Creek's water quality by taking appropriate measures to prevent construction materials (fuels, oils, and lubricants) from spilling or otherwise entering the creek;

- Avoidance of effects to woody vegetation at all construction sites, staging areas, borrow sites, and haul routes by fencing them with orange construction fencing;

- Minimization of effects to trees along the construction area by having all trimming performed by a qualified arborist to ensure tree survival after the project; and

- Conducting of nest surveys prior to the removal of any trees or scrub shrub to ensure migratory birds would not be lost during construction, pursuant to the Migratory Bird Treaty Act.

- Revegetation of borrow, staging, turn-arounds, and any other disturbed areas with native grasses and forbs.

- Development of a mitigation and remediation plan for the project by the lead agency.

These mitigation recommendations are also listed in Section 5.7. Both long-term and construction activity effects would be mitigated, using USFWS recommendations, to a less-than-significant level.

4.11 Potential Effects on Special-Status Species

This section is intended to identify any potential adverse project-related effects on special-status species. Project effects on special-status species would be both temporary and permanent. Temporary effects would result from construction activities, while permanent effects would result from new flood control structures.

A Special-Status SpeciesTechnical Appendix (Appendix B) was developed by the Corps to identify affected special-status species and project-related effects to these species. A species list was requested from the USFWS and can be found in Appendix G. The USFWS has provided a more current species list as an appendix to its draft CAR (Appendix A). Correspondence with NMFS regarding special-status fish species within their jurisdiction can be found in Appendix H. Because the LCCFB was identified as the preliminary Least Environmentally Damaging plan, the Special-Status Species Technical Appendix, and subsequently the Biological Assessment, does not include special-status species affected by construction of the Modified Wide Setback Levee Plan. A discussion of these species is limited to Section 4.11.3 of this EIS/EIR. The information contained within the Special-Status Species Technical Appendix and the rest of the draft EIS/EIR will be used as supporting documents for the Biological Assessment. The Biological Assessment will be submitted to the USFWS and NMFS concurrently with the submittal of the Draft EIS/EIR to initiate formal consultation.

Under criteria based on the State CEQA Guidelines, the proposed project would be considered to have a significant effect on special-status species if it would result in any of the following:

- Interfere substantially with the movement of any resident or migratory fish species or impede use of nursery sites.

- An adverse effect, either directly or through habitat modifications, to any endangered, rare, or threatened species, as listed in Title 14 of the California Code of Regulations (sections 670.2 or 670.5) or in Title 50, Code of Federal Regulations (sections 17.11 or 17.12).

- A substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies or regulations, or by the DFG or USFWS.

4.11.1 No-Action Plan

The No-Action Plan would include continued O&M by DWR. O&M activities consist of vegetation clearing on the levees and within the stream channel to reduce any hindrances to flow. Flood fighting and repair would also be necessary due to the current 30,000-cfs design flow (approximately a flooding event with a 1 in 10 chance of occurring in any given year although historically the existing levees have held floods with up to a 1 in 20 chance of occurring) and serious erosion of the creek banks. Without flood fighting and repair work, flooding risk to the unincorporated community and the city of Woodland would increase. These repairs, over the 50-year life of the project, have been estimated to likely include 2,100 lineal feet of slope protection and 30,750 lineal feet of 150-foot setback levee. (See Feasibility Report)

These activities would degrade an already heavily affected lower Cache Creek by removing or altering its remaining habitat and altering its hydraulics. Shaded riverine aquatic (SRA) habitat would be lost during the construction of 2,100 lineal feet of slope protection. Riparian habitat would also be affected by slope protection and by any new setback levee construction. Agricultural lands, although of lesser habitat value, do provide cover, forage, and nesting for wildlife species and would also be affected by new levee construction.

Effects on special-status species could include the loss of habitat, direct mortality during construction, disturbance and abandonment of territories, occupied habitat, and nests/young during the breeding season, and increased competition for resources in adjoining areas. In particular, there could be effects to Swainson's hawk nesting and foraging habitats; northwestern pond turtles and giant garter snake aquatic and upland habitat; valley elderberry longhorn beetle habitat; and bank swallow nesting habitat. The various effects on these special-status species would be considered potentially significant.

The No-Action alternative is not likely to significantly affect special-status fish within Cache Creek because population numbers are limited to the occasional migrant and existing habitat is already severely degraded.

4.11.2 Lower Cache Creek Flood Barrier Plan

With the LCCFB Plan, the current levee system would still require O&M and potential flood fighting and repair activities under the direction of the DWR. In this case, effects from these activities, although the same as stated above, would be considered cumulative effects and be accounted for in Section 5.2.

According to information provided by USFWS and NMFS, which has been incorporated into the Special-Status Species Technical Appendix, the LCCFB plan has the potential to affect the threatened giant garter snake and Central Valley steelhead, and the endangered chinook salmon. The specifics for the giant garter snake would be

addressed during formal Section 7 consultation with the USFWS. For planning purposes to develop the overall mitigation strategy for Cache Creek and conservation measures for the snake, the findings from prior consultation between the Corps and the USFWS regarding the snake in similar settings are considered in this document.

A field survey conducted by Sycamore Environmental biologist Dr. John Little, a recognized expert on the life history of the giant garter snake, determined that the bed and bank of Cache Creek and adjacent levees and several areas of agricultural drainage ditch along the project footprint and the west levee of the settling basin are potential giant garter snake habitat. Construction of the LCCFB would remove 17,000 feet of agricultural drainage ditch regarded as potential snake aquatic habitat. Riprap placed along the LCCFB between CR 101 to the west levee and along the west levee north to CR 102 would affect 22.7 acres of potential snake upland habitat. Removal of 3,000 feet of the west levee of the settling basin and 5,250 feet of the training levee adjacent to Cache Creek would affect 15.9 acres of potential upland snake habitat.

Placement of the haul route over the low-flow channel of the settling basin would affect 0.33 acre of aquatic habitat for the giant garter snake, chinook salmon, and steelhead (also designated as essential fish habitat for the Chinook salmon). This habitat would be temporarily affected and restored to pre-project conditions after construction; therefore, no additional habitat mitigation would be required for this effect. Individual steelhead and salmon are not expected to be affected because construction would occur during low-flow periods. Informal consultation with USFWS and NMFS would verify these conclusions.

Affected State-listed and species of special concern include the northwestern pond turtle and Swainson's hawks. The northwestern pond turtle also often uses giant garter snake habitats. Nesting Swainson's hawks may be located within large trees in the project area and may be disturbed by construction equipment and personnel, causing nest abandonment.

All these actions would be addressed by implementing the conservation measures listed in Sections 4.11.4 and 5.7, and incidental take conditions set out in the USFWS and NMFS Biological Opinions, thereby reducing any effects to less than significant.

4.11.3 Modified Wide Setback Levee Plan

According to information provided by USFWS and NMFS, the Modified Wide Setback Levee Plan has the potential to affect the threatened giant garter snake and Central Valley steelhead, and the endangered chinook salmon and valley elderberry longhorn beetle. If the Modified Wide Setback Levee Plan is chosen for construction, specific conservation measures for Federal special-status species would be addressed during formal Section 7 consultation with the USFWS and NMFS. For planning purposes to develop the overall mitigation strategy for Cache Creek and conservation measures for special-status species, the findings from prior consultation between the Corps and the USFWS regarding the effects to special-status species in similar settings are considered in this document.

A preliminary field survey conducted by Mr. John Downs, a CDM biologist, determined that construction of the Modified Wide Setback Levee Plan would include effects to, and the loss of up to, 100 elderberry shrubs directly removed and 2,000 shrubs indirectly affected through bridge expansion activities and the removal of portions of the existing levee system. The shrub is the habitat of the valley elderberry longhorn beetle, an endangered species. The creek is also considered habitat for the giant garter snake (aquatic and upland) and northwestern pond turtle (aquatic and upland). Any construction within Cache Creek or along its banks for bridge expansion and slope protection would cause habitat loss and disturbance effects. This plan also includes the removal of the entire training levee, which is considered upland giant garter snake habitat. A total of 121 acres of giant garter snake habitat (and consequently northwestern pond turtle habitat) would be lost during construction of the Modified Wide Setback Levee Plan.

Cache Creek is also a historic chinook salmon and Central Valley steelhead stream. Current mercury surveys within the creek by UC Davis researchers have turned up several potential redds and a few adult salmon. Construction of the Modified Wide Setback Levee Plan would cause the loss of habitat for the steelhead and essential fish habitat for the chinook salmon. Incidental take conditions aimed at reducing impacts to this habitat would be determined during Section 7 consultation with NMFS. Due to the limited number of salmon and steelhead within Cache Creek and construction during low-flow summer conditions, construction of the Modified Wide Setback Levee Plan would have an insignificant effect on individual salmon and steelhead.

Affected State-listed and species of special concern include the northwestern pond turtle and Swainson's hawks. The northwestern pond turtle also often uses giant garter snake habitats. Nesting Swainson's hawks may be located within large trees in the project area and may be disturbed by construction equipment and personnel, causing nest abandonment.

All these actions would be addressed by implementing the conservation measures listed in Sections 4.11.4 and 5.7, and incidental take conditions set out in the USFWS and NMFS Biological Opinions, thereby reducing any effects to less than significant.

4.11.4 Mitigation

Lower Cache Creek Flood Barrier Plan

Appendix I includes a Habitat Mitigation Alternatives Analysis document that explores the effectiveness of mitigating for effects to special-status species and wildlife habitat at five different sites. These effects were determined during informal consultation with the resource agencies during development of the draft CAR. The overall conclusion was to use project facilities where possible and then mitigate for the remaining effects by purchasing credits at a mitigation bank.

In addition, the Corps is proposing the following conservation measures as part of the Biological Assessment and the project description. These measures would be further refined, and additional incidental take conditions may be added during Section 7

consultation with the USFWS and NMFS, which would be initiated concurrent to the EIS/EIR release for public review.

The conservation measures for the giant garter snake include those taken from the "Programmatic Formal Consultation for U.S. Army Corps of Engineers 404 Permitted Projects with Relatively Small Effects on the Giant Garter Snake within Butte, Colusa, Glenn, Fresno, Merced, Sacramento, San Joaquin, Solano, Stanislaus, and Yolo Counties, California," (November 13, 1997). Measures include:

- Seasonal restrictions (construction from May 1 to October 1 only) to avoid overwintering giant garter snakes;
- Ensuring that dewatered habitat remains dry for at least 15 consecutive days after April 15 and prior to excavation or filling;
- An environmental awareness program for construction workers;
- Avoidance of giant garter snake identified during completion of pre-construction surveys 24 hours prior to commencement of construction by a qualified biologist, who would remain available thereafter to provide additional services should a snake be encountered during construction;
- Halting of all construction activities within the area should a giant garter snake be encountered during construction until the snake has had time to move away from the area;
- Confinement of construction activities to the minimal area necessary to facilitate construction;
- Flagging and avoidance of areas that would not be affected by construction and are designated Environmentally Sensitive to the giant garter snake;
- Restoration of all riprap areas to upland habitat by placing at least an 18- to 24-inch layer of soil over the rock and reseeding the area with native grasses and forbs; and
- Compensation of lost habitat according to ratios agreed upon by the Corps and the USFWS.

Conservation measures for chinook salmon and steelhead are based on the recommendations outlined in the "Guidelines for Salmonid Passage at Stream Crossings," (September, 2001). In addition to guidance specific to culverts, the following general conservation measures would be observed (the final determination of specific conservation measures would be determined during consultation with NMFS):

- Minimization of erosion and sediment delivery through the use of erosion control devices such as hay bales, water bars, covers, and sediment fences where necessary and appropriate;

- Restriction of access to sensitive-areas to minimize streamside habitat effects;

- Installation of culverts in a de-watered site with a sediment control and flow routing plan;

- Use of pumps with fish screens to dewater the site; and

- Restoration of the affected area to pre-project conditions including reseeding using locally native riparian and other vegetation.

Conservation measures for Swainson's hawks would include:

- Replacement of non-native trees at a 1:1 ratio and native trees at a 5:1 ratio.

- Avoidance of hawks identified during pre-construction surveys conducted according to Swainson's Hawk Technical Advisory Committee guidelines (2000); and

- Prohibition of construction activities within one-half mile of a nesting hawk until young fledge.

These conservation measures for the giant garter snake would provide sufficient conservation measures for the northwestern pond turtle.

Appendix I includes a Habitat Mitigation Alternatives Analysis document that explores the effectiveness of mitigating for effects to special-status species and wildlife habitat at five different sites. The overall conclusion was to use project facilities where possible and then mitigate for the remaining construction effects by purchasing credits at a mitigation bank.

All these actions would require compliance with incidental take conditions set out in the USFWS and NMFS Biological Opinions, thereby reducing any effects to less than significant.

Modified Wide Setback Levee Plan

Because this plan was not selected as the Least Environmentally Damaging plan, further investigation (mitigation alternatives analysis or incremental analysis) into mitigation requirements and conservation measures was not conducted, and a biological assessment was not drafted. However, if this plan is selected for construction, conservation measures and incidental take conditions related to effects on special-status species would be determined through formal consultation with the USFWS and NMFS and outlined in the project Biological Assessment and the USFWS and NMFS Biological Opinions. The land that would be constrained by the setback levees could serve as a

mitigation site. This land also has the potential to serve as a site for future restoration of the lower Cache Creek ecosystem, providing numerous environmental benefits. Any additional mitigation or conservation requirements would be met by purchasing credits at a mitigation bank.

The Corps proposes the following conservation measures should the Modified Wide Setback Levee Plan be selected for construction. These measures would be further refined, and additional incidental take conditions may be added if and when Section 7 consultation with the USFWS and NMFS is initiated through the submittal of a biological assessment.

The following conservation measures for the valley elderberry longhorn beetle include those taken from the "Conservation Guidelines for the Valley Elderberry Longhorn Beetle," (July 9, 1999). Measures include:

- All areas to be avoided during construction activities would be fenced at 100-feet from the dripline of each elderberry plant;
- Signs would be erected along the edge of the avoidance area designating the area as environmentally sensitive for the valley elderberry longhorn beetle;
- An environmental awareness program for construction workers; and
- Compensation of lost habitat according to ratios agreed upon by the Corps and the USFWS.

The following conservation measures for the giant garter snake include those taken from the "Programmatic Formal Consultation for U.S. Army Corps of Engineers 404 Permitted Projects with Relatively Small Effects on the Giant Garter Snake within Butte, Colusa, Glenn, Fresno, Merced, Sacramento, San Joaquin, Solano, Stanislaus, and Yolo Counties, California," (November 13, 1997). Measures include:

- Seasonal restrictions (construction from May 1 to October 1 only) to avoid overwintering giant garter snakes;
- Ensuring that dewatered habitat remains dry for at least 15 consecutive days after April 15 and prior to excavation or filling;
- An environmental awareness program for construction workers;
- Avoidance of giant garter snake identified during completion of pre-construction surveys 24 hours prior to commencement of construction by a qualified biologist, who would remain available thereafter to provide additional services should a snake be encountered during construction;

- Halting of all construction activities within the area should a giant garter snake be encountered during construction until the snake has had time to move away from the area;

- Confinement of construction activities to the minimal area necessary to facilitate construction;

- Flagging and avoidance of areas that would not be affected by construction and are designated Environmentally Sensitive to the giant garter snake;

- Restoration of all riprap areas to upland habitat by placing at least an 18- to 24-inch layer of soil over the rock and reseeding the area with native grasses and forbs; and

- Compensation of lost habitat according to ratios agreed upon between the Corps and the USFWS.

Conservation measures for chinook salmon and steelhead are based on the recommendations outlined in the "Guidelines for Salmonid Passage at Stream Crossings," (September, 2001). In addition to guidance specific to culverts, the following general conservation measures would be observed:

- Minimization of erosion and sediment delivery through the use of erosion control devices such as hay bales, water bars, covers, and sediment fences where necessary and appropriate;

- Restriction of access to sensitive-areas to minimize streamside habitat effects;

- Installation of culverts in a de-watered site with a sediment control and flow routing plan;

- Use of pumps with fish screens to dewater the site; and

- Restoration of the affected area to pre-project conditions including reseeding using locally native riparian and other vegetation.

Conservation measures for Swainson's hawks would include:

- Replacement of non-native trees at a 1:1 ratio and native trees at a 5:1 ratio.

- Avoidance of hawks identified during pre-construction surveys conducted according to Swainson's Hawk Technical Advisory Committee guidelines (2000); and

- Prohibition of construction activities within one-half mile of a nesting hawk until young fledge.

These conservation measures for the giant garter snake would provide sufficient conservation measures for the northwestern pond turtle.

All these actions would require compliance with incidental take conditions set out in the USFWS and NMFS Biological Opinions, thereby reducing any effects to less than significant.

4.12 Potential Effects on Cultural Resources

This section describes direct effects of the proposed project on cultural resources and suggests mitigation measures for those effects. An effect would be considered significant if the project would:

- Cause a substantial adverse change in the significance of a historical resource.

- Cause a substantial adverse change in the significance of a unique archaeological resource.

Under the National Historic Preservation Act of 1966, as amended (NHPA), proposed Federal projects, or other actions, must take into account the effects of those actions upon cultural resources identified as historic properties; that is, those eligible for, or listed on, the National Register of Historic Places. Section 106 of the NHPA and its implementing regulations (36 CFR 800) require that the Advisory Council on Historic Preservation, the State Historic Preservation Officer, and the interested public, including Native Americans, be provided an opportunity to comment on the effects that the proposed action may have on historic properties.

Because virtually none of the project area has been systematically examined for historic or prehistoric resources due to real estate and other constraints, and because many of the structures have not been evaluated for the NRHP, a draft Programmatic Agreement (PA) is included here (Appendix C) that stipulates the steps to be taken to be in compliance with the Section 106 of the NHPA and 36 CFR 800. Under Section 106 and the 36 CFR 800 regulations, consultation with the SHPO and others would be initiated during the next planning phase of the project. The PA would be reviewed by all parties concerned and finalized after comments have been addressed. The Section 106 consultation process would be concluded after the PA is signed. Implementation of the steps outlined in the PA would take place, as appropriate, beginning with a more complete inventory and evaluation of the resources. Mitigation would be accomplished during project construction.

If avoidance of effects to cultural resources is not possible, the Protection of Historic Properties (36 CFR 800.9) defines how the effects are determined based on the "criteria of effect." Adverse effects include but are not limited to:

- Physical destruction, damage, or alteration of all or part of the property.

- Isolation of the property from or alteration of the character of the property's setting when that character contributes to the property's qualifications for the National Register.

- Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting.

- Neglect of a property, resulting in its deterioration or destruction.

- Transfer, lease, or sale of the property.

4.12.1 No-Action Plan

In general, the FIRM/FEMA map for the existing conditions shows that all cultural resources in the project area from the approximate vicinity of Court Street in Woodland north and west to Cache Creek are in the FEMA 100-year flood plain. In addition, any archeological sites and structures that might be determined historic west of I-5 and north of Cache Creek to CR 17 are in the flood plain. Yolo and other areas north of Cache Creek were not mapped. The Corps 100-year flood plain mapping excludes some areas, but is similar in coverage to the FIRM/FEMA map.

Under this plan, flooding could cause erosion to archeological sites and damage to historic structures. Owners of private property could alter historic structures to cause the buildings to be ineligible for any historic listing. Archeological sites could continue to be degraded from various activities including farming and construction.

4.12.2 Lower Cache Creek Flood Barrier Plan

Under this plan, cultural resources south of the flood barrier would be protected from flood damage. Owners of private property could alter historic structures so that the buildings would not be eligible for any historic listing. There are no known prehistoric archeological sites; unrecorded historic archeological sites could be disturbed by construction in Woodland.

Cultural resources between the flood barrier and the creek would still be subject to flooding and other damages as they are currently under the FIRM/FEMA delineation, with the exception of those located in the southeastern part where the flood barrier and the present west levee meet. Estimates provided in the Feasibility Report show that known cultural properties such as the Robinson olive trees, Nelson's Grove, and the Camillus Nelson residence could be flooded in a high flood, but the depth and duration of water ponding would vary depending on the location of the resource. For example, it is projected that the duration of ponding near the Camillus Nelson residence might be a few days longer than under existing conditions.

The effect on cultural resources, due to construction of the flood barrier, would be less than significant with the implementation of the mitigation measures listed in Section 4.12.4.

4.12.3 Modified Wide Setback Levee Plan

The creation of causeways under this plan could affect the California Northern Railroad and CR 99 bridges. If the bridges meet the NRHP criteria, this would be considered an adverse effect. The Wells Fargo station and prehistoric archeological sites CA-YOL-71 and CA-YOL-100 would be on the waterside of the levee and would be subject to erosion from floodflows. Other unrecorded archeological and historic structures could be inside the levee, and those meeting the NRHP criteria would be adversely affected by this plan.

Additional archeological and historic sites could be affected by levee construction, degradation of the present levee, and accelerated erosion. Cultural resources surveys and evaluations would need to be conducted under this variation to determine what, if any, other sites would be affected.

The effect on cultural resources, due to construction of the modified wide setback levee, would be less than significant.

4.12.4 Mitigation

Lower Cache Creek Flood Barrier Plan

Mitigation to Nelson's Grove and Robinson olive trees would not be required due to construction of the flood barrier. The frequency, depth, and duration of water ponding would likely not cause an adverse effect to these properties if they are determined eligible for the NRHP. Additional studies would need to be undertaken for the Camillus Nelson residence to more accurately determine if the property would be affected as a result of construction of the flood barrier. If it is determined that this property would be adversely affected, mitigation measures would be developed in consultation with the SHPO and other interested parties. Raising the home and outbuildings could cause the delisting of the property from the NRHP. Constructing a ring levee may be feasible, but an analysis to determine feasibility, as well as the placement of such a levee, would need to be completed. Any flood proofing measures would need to be esthetically designed to avoid altering the historic setting of the affected property. Mitigation costs would be cost shared between the Corps and the non-Federal sponsor.

Mitigation for cultural sites elsewhere between the flood barrier and Cache Creek would not be required since these sites would still be in the FIRM/FEMA 1 in 100 chance flood plain and the project would not have any adverse effects on them.

In addition to the above mitigation measures, the following BMP's would also be followed:

- If previously unidentified cultural materials and/or features are discovered during construction, all work in the immediate area would cease and a cultural resources specialist would be immediately contacted for identification and evaluation.

- If the materials and/or features are determined to be significant and cannot be avoided, a site-specific mitigation plan would be prepared in consultation with interested parties and the SHPO.

- If human remains were encountered, a cultural resources specialist and county coroner would be contacted in compliance with State law.

Mitigation would ensure that the overall effect on cultural resources remains less-than-significant.

Modified Wide Setback Levee Plan

Mitigation measures for historic properties would be determined in accordance with stipulations in the Programmatic Agreement and could consist of avoidance; data recovery; and for structures, recordation under criteria of the Historic American Buildings Survey/Historic American Engineering Recordation (HABS/HAER). Flood proofing measures of the Wells Fargo station, if it meets the NRHP criteria, would need to address issues of environmental setting, effectiveness, and esthetics. Mitigation costs for archeological properties meeting the NRHP criteria would be borne by the Federal Government up to 1 percent of total Federal project costs. Costs above that amount, if approved, would be cost shared at the same ratio as stated in the project cost agreement. Mitigation for historic structures meeting the NRHP criteria would be cost shared.

In addition to the above mitigation measures, the following BMP's would also be followed:

- If previously unidentified cultural materials and/or features are discovered during construction, all work in the immediate area would cease and a cultural resources specialist would be immediately contacted for identification and evaluation.

- If the materials and/or features are determined to be significant and cannot be avoided, a site-specific mitigation plan would be prepared in consultation with interested parties and the SHPO.

- If human remains were encountered, a cultural resources specialist and county coroner would be contacted in compliance with State law.

Mitigation would ensure that the overall effect on cultural resources remains less-than-significant.

4.13 Potential Effects on Esthetic and Visual Resources

Under criteria based on the State CEQA Guidelines, the proposed project would be considered to have a significant effect on esthetic and visual resources if it would result in any of the following:

- Have a substantial adverse effect on a scenic vista.

- Substantially damage scenic resources including, but not limited to, trees, rock outcroppings, and historic buildings near a State Scenic Highway.

- Substantially degrade the existing visual character or quality of the site and its surroundings.

- Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area.

In assessing the esthetic effects of a project, the visual sensitivity of the site must be considered. Areas of high visual sensitivity are highly visible to the general public. Scenic highways, tourist routes, and recreational areas generate sensory reactions and evaluations by the observer. The evaluations of a particular scene would vary depending on the perceptions and values of the observer. The determination of significance of potential esthetic effects is based on the change in visual character as determined by the obstruction of a public view, creation of an esthetically offensive public view, or adverse changes to objects having esthetic significance.

4.13.1 No-Action Plan

The No-Action Plan would include continued O&M by the DWR. O&M activities consist of vegetation clearing on the levees and within the stream channel to reduce any hindrances to flow. Because these activities already are part of the existing levee system O&M, effects to esthetic and visual resources would be less than significant.

4.13.2 Lower Cache Creek Flood Barrier Plan

Although not a part of the LCCFB Plan, the current levee system would still require O&M, flood fighting, and repair activities under the direction of the DWR. Effects from these activities are the same as stated in Section 4.14.1.

Construction activities such as the operation of heavy equipment and material storage would change the visual character of the area. However, these effects would be temporary and not considered significant as compared to the visual effects of the flood barrier itself. The borrow sites are located within agricultural fields. Excavation of these sites would not affect the esthetics of the area assuming these sites are restored as agricultural land.

The flood barrier would introduce a linear feature into a landscape with existing linear features (the I-5 right-of-way). The barrier would vary in height from approximately 2.5 feet above the ground in its western most origin to 18 feet where the levee joins the settling basin. At SH 16, where the greatest concentration of houses along the footprint of the LCCFB exists, the wall would be 5 feet high and would form a view block as compared to the existing open rural landscape. Portions of existing tree lines in this area would also be removed, therefore altering the visual character of the area. East of SH 16, the height would increase; however, the residential areas within close proximity to the flood barrier end after CR 98B. Although east of I-5 the LCCFB would be larger than to the west, it would be a view block to an industrialized area of Woodland

rather than a residential area. The LCCFB would have a significant effect because it changes the esthetic quality of the area, specifically for local residents west of I-5. The mitigation measures listed in Section 4.14.4 would lessen the effects, however not to a less-than-significant level.

There are no State-designated visual resources within the project area. Within the study area, SH 16 is eligible for a scenic highway designation (from Capay to its intersection with SH 20); however, this project would have no bearing on its continued candidacy. The construction of this project does not include additional sources of light; therefore, there would be no effect to nighttime views.

The overall effect to esthetics and visual resources would be significant.

4.13.3 Modified Wide Setback Levee Plan

Construction activities such as the operation of heavy equipment and material storage would change the visual character of the area. However, these effects would be temporary and are not considered significant. The borrow sites are located within agricultural fields. Excavation of these sites would not affect the esthetics of the area, assuming these sites are restored as agricultural land.

Cache Creek presents a curvilinear feature within the checkerboard pattern of rural Yolo County. The existing levee system closely follows the curving path of the creek. The setback levees would introduce new curvilinear features paralleling the creek at a 100-foot to 1,000-foot distance. The height of new setback levees would be 2 feet above the ground at its western most origin. The height would increase to 12 feet where it joins I-5. Downstream of I-5, the levee would maintain a height of at least 10 feet to where it joins the settling basin. The levees would form a new view block to residences that previously had a more open line-of-sight. The view block is considered significant because it changes the esthetic quality of the area for local residents. Implementation of the mitigation measures listed in Section 4.14.4 would reduce the effects, however not to a less-than-significant level.

The land constrained between the levees has the potential to be restored to its historical natural state of riparian forest habitat. This would increase the scenic quality of Cache Creek, presenting a potential beneficial effect on esthetic and visual resources.

There are no State-designated visual resources within the project area. Within the study area, SH 16 is eligible for a scenic highway designation (from Capay to its intersection with SH 20); however, this project would have no bearing on its continued candidacy. The construction of this project does not include additional sources of light; therefore, there would be no effect to nighttime views.

The overall effect to esthetics and visual resources would significant.

4.13.4 Mitigation

Lower Cache Creek Flood Barrier Plan

The levees would be reseeded with native grasses and forbs. However, mitigation would not reduce the effect to a less-than-significant level.

Modified Wide Setback Levee Plan

The levees would be reseeded with native grasses and forbs. However, mitigation would not reduce the effect to a less-than-significant level.

LOWER CACHE CREEK, YOLO COUNTY, CA
CITY OF WOODLAND AND VICINITY

DRAFT ENVIRONMENTAL IMPACT STATEMENT/
ENVIRONMENTAL IMPACT REPORT
FOR POTENTIAL
FLOOD DAMAGE REDUCTION PROJECT

Chapter 5

CHAPTER 5
OTHER REQUIRED DISCLOSURES

Levee boils in 1983.

CHAPTER 5.0

OTHER REQUIRED DISCLOSURES

5.1 Introduction

This chapter describes other statutory requirements not discussed elsewhere in the Draft EIS/EIR. Cumulative effects and growth-inducing effects are discussed along with unavoidable adverse effects, the relationship of short-term uses and long-term productivity, and irreversible and irretrievable commitments of resources. Included is a section describing mitigation and environmental monitoring for the project and a section describing the project's compliance with applicable laws, policies, and plans. Finally, public involvement associated with the project is discussed.

5.2 Cumulative Effects

NEPA regulations and the CEQA Guidelines mandate that an EIS/EIR discuss effects that when combined with the effects of other projects, result in significant cumulative effects. NEPA regulations define a cumulative effect as:

> The effect on the environment which results from the incremental effect of the action when added to other past, present, and reasonable foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative Effects can result from individually minor but collectively significant actions taken over a period of time (40 CFR 1508.7).

CEQA Guidelines require that an EIR discuss cumulative effects "when they are significant" (Section 15130). The Guidelines define cumulative effects as "two or more individual effects which, when considered together, compound or increase other environmental effects" (Section 15355). Cumulative effects produced by several projects are defined as "the change in the environment which results from incremental effect of the project when added to other closely related past, present, and reasonable foreseeable actions" (Section 15355). This means that the incremental effects of the individual project would be considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (Section 15065(c)).

Section 15130(a)(3) states that an EIR may determine that a project's contribution to a significant cumulative effect would be rendered less than cumulatively considerable, and thus not significant, if a project is required to implement or fund its fair share of a mitigation measure or measures designed to alleviate the cumulative effect.

Section 15130(b) indicates that the level of detail of the cumulative analysis need not be as great as for the project effect analyses and that it should reflect the severity of

the effects and their likelihood of occurrence. It should be focused, practical, and reasonable.

To be adequate, a discussion of cumulative effects must include the following elements:

- Either (a) a list of past, present, and probable future projects including, if necessary, those outside the agency's control or (b) a summary of projections contained in an adopted general plan or related planning document, or in a prior adopted or certified environmental document, which described or evaluated regional or areawide conditions contributing to the cumulative effect provided that such documents are referenced and made available for public inspection at a specified location;

- A summary of expected environmental effects of individual projects, with specific reference to additional information stating where such information is available; and

- A reasonable analysis of all cumulative effects of the relevant projects, with an examination of reasonable, feasible options for mitigation or avoiding the project's contribution to such effects (Section 15130[b]).

For some projects, the only feasible mitigation measures would involve the adoption of ordinances or regulations, rather than the imposition of conditions on a project-by-project basis (Section 15130[c]).

5.2.1 Methodology

The cumulative effects section incorporates protocol written by the Council on Environmental Quality, Executive Office of the President, in Considering Cumulative Effects Under the National Environmental Policy Act as well as CEQA Guidance, as amended and revised. CEQA Guidelines require that an EIR discuss cumulative effects "when they are significant" (Guidelines Section 15130). Accordingly, this section consists of a discussion of past, present, and foreseeable future actions contributing to possible significant effects, regardless of what agency (Federal or non-Federal) or person undertakes such actions.

The cumulative analysis for this Draft EIS/EIR varies by topic area, but generally includes planned development in Yolo County, and is based on the County General Plan, Land Use designations, Yolo County Habitat Conservation Plan, Cache Creek Annual Status Report (p. 17), Off-Channel Mining Plan (OCMP), and the Cache Creek Resources Management Plan (CCRMP).

Analysis of cumulative effects incorporates the following criteria:

Health based standards	• Air pollutant emission standards, water pollutant discharge standards, and noise levels
Service capacity	• Water supply and wastewater treatment capacity
Ecological standards	• Effects on declared threatened or endangered species, loss of farmland, or wetland encroachment
Other standards	• Found in NEPA and CEQA Guidance regarding esthetics, population, and housing.

5.2.2 Related Projects in the Study Area

Existing and Ongoing Projects

- **North Woodland Stormwater Retention Pond**. Stormwater runs into the North Stormwater Retention Pond, an old borrow pit used for construction of Interstate 5. The area is south of I-5 where I-5 connects with County Road 98.

  The storage capacity within the pit is 430 acre feet, sufficient to prevent storm runoff from entering the city's storm drainage system (City of Woodland, 1998).

- **Camillus Nelson Historic Ranch and Cattle Company**. This nationally registered historic property includes tree lines that are over 100 years old. The property owners plan to restore the property to a historic working ranch. Without mitigation, this resource is at risk with the flood barrier alternative plan.

- **Off-Channel Gravel Mining.** There are currently seven off-channel mining operations (Schwarzgruber, Syar, Solano, Teichert [Woodland], Teichert [Esparto], Granite Capay, and Granite Woodland) that are permitted along Cache Creek (Yolo County, January 2001). The gravel mining reach of the Cache Creek Basin extends approximately 14.5 miles along Cache Creek between Capay and Yolo. Facilities include sand and gravel processing plants, asphalt-concrete hot mix plants, concrete batch plants, material stockpiles, settling ponds, water wells, stationary and mobile equipment, and haul roads (USACE, 1995). Instream mining is permitted by industry only as a flood control measure. This project began in 1996 and is expected to continue for 30 years.

- **Sacramento River Flood Control Project.** This project consists of a comprehensive system of levees, overflow weirs, outlet gates, pumping plants, bypass floodway, overbank floodway areas, improved channels, and dredging in the lower reach of the Sacramento River. The system functions to control and divert floodwater in the Sacramento River basin (USACE, 1995). This project is ongoing.

- **Cache Creek Settling Basin.** As part of the Sacramento River Flood Control Project, the Corps constructed the settling basin in 1937 to trap sediment from Cache Creek that would otherwise settle in the Yolo Bypass and restrict its capacity. The basin capacity was increased in 1991, resulting in increasing the life span of the facility.

- **Clear Lake Dam.** Water flows from Clear Lake through the Clear Lake Outlet Channel and Clear Lake Dam to Cache Creek. The dam regulates lake levels, regulates summer irrigation releases, and generates hydroelectric power (USACE, 1995).

- **Yolo Basin Wetlands (Section 1135).** There are three historic wetland restoration projects for 3,100 acres in the Putah Creek sinks area, 180 acres in the Yolo Causeway, and 400 acres of farmland northeast of Davis (USACE, 1995).

- **Yolo County Planning and Public Works Water Quality Monitoring Program.** Three times a year, samples are taken from four monitoring sites along Cache Creek to identify and monitor for the presence of various constituents found in the creek. The County also conducts biannual mercury monitoring as well (Yolo County, January 2001).

- **Cache Creek Conservancy and the County of Yolo Invasive Weed Removal Project.** The 10-year project (started in 2001) funded by the Wildlife Conservation Board and CALFED removes arundo and tamarisk from the lower reaches of Cache Creek for the purposes of flood control, bank stabilization, and habitat enhancement (Yolo County, January 2001).

- **Yolo County Survey.** The County is surveying and laying out 13 transects along the lower portion of Cache Creek to facilitate assessment of vegetation growth. Analysis of results would indicate areas requiring restoration (Yolo County, January 2001). The survey is scheduled for completion in May 2002.

- **Yolo County Administrative Draft of the Supplemental Environmental Impact Report for the Cache Creek Resource Management Plan.** The SEIR is being prepared to update the 1996 EIR prepared for the Cache Creek Resource Management Plan. The 1996 document was used as support for obtaining permits from the Corps, DFG, and the RWQCB to allow general permitting of projects pertaining to any instream projects. All three permits are expiring the summer of 2002. After the SEIR is completed, information would become part of the application to renew permits (Yolo County, January 2001).

- **Guinda Bridge Bank Stabilization Project.** Yolo County is completing bank stabilization at Guinda to prevent erosion and sediment transport downstream. Yolo County is in the early stages of the permitting process, and a Negative Declaration would be the appropriate document under CEQA

(Yolo County, January 2001). Completion of this project is expected to be at the end of 2002.

- **Joint Conjunctive Water Use Project.** Yolo County Flood Control and Water Conservation District is preparing a groundwater storage conjunctive-use program operating on farmland northwest of Woodland. Program goals are to enhance groundwater storage, raise groundwater pumping levels, potentially reduce pumping energy costs, and minimize subsidence. The flood barrier blocks surface runoff to Hoey and School House Ditches; however, a pipeline conducting flow over the flood barrier would be constructed to restore the connection (City of Woodland, December 2001). This project began in 2001 and completion is expected in mid-2002.

- **Yolo County Planning and Public Works Mine Reclamation Monitoring.** Yolo County considers mining an important activity and recognizes that the creek is integrally bound to the environmental and social resources of the county, including drainage/flood protection, water supply and conveyance, wildlife habitat, recreation, and agricultural productivity. Plans are to maintain Cache Creek's resources with an integrated management plan that balances gravel mining concerns with emphasis on habitat restoration. Goals are to cease instream mining and create recreational opportunities along with groundwater recharge and storage that would reverse overdraft of the aquifer by agricultural and urban uses (Yolo County, January 2001). This project began in 1996 and is scheduled to continue over the next 30 years.

- **Yolo County Historic Mine Reclamation Site.** East of the 95B Bridge at Teichert (Woodland) above I-5, Yolo County is reclaiming its old gravel extraction site previously used for county projects. The area would be reclaimed as required in the original mining and reclamation plan (Yolo County, January 2001). Completion of this project is expected to be in 2005.

Future Projects

- **City of Woodland Expansion of the Volkl Shed Storm Drainage Facility.** The City of Woodland plans to expand the Volkl Shed storm drainage facility that is designed to serve new growth in the northwest and convey runoff from agricultural land west of CR 98 and north to I-5. Storm drainage entering the Volkl Trunk west of I-5 would discharge into the Volkl Storm Water Detention Pond south of Kentucky Avenue between East Street and County Road 98 (City of Woodland, 1998).

- **FEMA Hazard Mitigation Projects.** The Phase IV – Lower Sacramento Area Levee Reconstruction Project is designed to restore Sacramento River Flood Control Project levees south of Sacramento and the Yolo Bypass. Economically feasible work consists of stabilizing and raising levees along Miner, Elk, Steamboat, and Sutter Sloughs. A final decision on this project is expected in mid 2002. The project would take about 6 weeks to complete.

- **Yolo County Landowner Guide for Bank Stabilization.** The landowner guide is being produced to facilitate landowner cooperation and participation in invasive weed removal. The program goal is to mitigate for continued erosion along Cache Creek (Yolo County, January 2001). Completion of this project is expected at the end of 2002.

- **Granite Construction Company.** Granite Construction Company is submitting a proposal to add an upland asphalt plant and move an existing upland off-channel concrete plant at the Capay facility. The existing permit would require reclamation of the concrete plant site (Yolo County, January 2001). Completion of this project is expected at the end of 2002.

- **Outfall Channel.** City storm drainage flows from west to east and discharges directly into the Yolo Bypass through a new outfall channel erected when the Corps constructed a new south levee to the settling basin in the early 1990s. Low flows are released from the settling basin into the Yolo Bypass immediately north of the city's outfall channel. The combined discharges lack a defined channel and have reportedly resulted in scouring of the Yolo Shortline Railroad trestle within the Yolo Bypass. A new outlet structure at the east end of the City's outfall channel, and a cross bypass low flow channel to the canal, is required to correct the erosion problems.

5.2.3 Evaluation of Cumulative Effects

Introduction

This chapter discusses the cumulative effects of the No Action, LCCFB, and Modified Wide Setback Levee Plans by looking at the effects of each plan on environmental resources. The existing conditions described in Chapter 3 are used to compare what, if any, adverse future conditions the project would cause.

A project can cause direct, indirect, and cumulative effects on the environment. Direct effects result from the immediate actions taking place during the length of the project; for example, construction. Indirect effects such as growth and development are the result of project actions that are likely to occur later in time. Cumulative effects are changes to the environment that are caused by an action in combination with other past, present, and future human actions.

Cumulative Effects on Social and Economic Resources

No-Action Plan

Under the No-Action Plan Woodland and portions of Yolo County would continue to be threatened by floods with a greater than 1 in 20 chance of occurring in any given year. This would have social and economic implications; however, no other reasonably foreseeable past, present, or future projects are expected to contribute to a cumulative effect.

Lower Cache Creek Flood Barrier Plan

The LCCFB Plan provides substantial economic benefits to the city of Woodland and the county lands south of the flood barrier. Social and economic effects of this alternative plan result in a potential decrease in land value for the land west of the settling basin due to the reduced ability to grow tree crops. Potential cumulative effects would include future projects that would alter land use such that land values would decrease. However, as a general rule, both the City and County place a high value on socioeconomics when considering potential projects. Cumulative economic effects on the community are less than significant.

Modified Wide Setback Levee Plan

The setback levee alternative plan provides substantial economic benefits to the town of Yolo, the city of Woodland, and the majority of the unincorporated community south of the levee system. The land confined between the levees has the potential to lose value due to the inability to grow tree crops. A total of 32 homes and 182 farm support structures would need to be relocated. Potential cumulative effects would include future projects that would alter land use such that land values would decrease. However, as a general rule, both the city and county place a high value on socioeconomics when considering potential projects. Cumulative economic effects on the community are less than significant.

Cumulative Effects on Land Use

No-Action Plan

Under the No-Action Plan land uses would remain the same unless zoning laws are altered. There would be no cumulative effects as a result of this plan.

Lower Cache Creek Flood Barrier Plan

Land use effects include the conversion of 104 acres for flood control purposes. However, future loss of agricultural land should be protected by the City of Woodland's General Plan. The Plan adopts an urban limit line restricting development north of the flood barrier through the year 2020. Furthermore, the Policy Document envisions establishing a permanent urban limit line to "protect agricultural land in perpetuity" (City of Woodland, 1996). Development beyond the urban limit line requires annexation from Yolo County, as well as amending the City's General Plan and zoning maps. Yolo County General Plan policies (LU-20 and LU-21) also discourage residential uses of parcels in agriculturally designated areas. Though cumulative effects on land use designations are possible, the City of Woodland's urban limit line and Yolo County's agricultural land policy are protective of current land uses and discourage residential development in agricultural communities. Cumulative effects on land use are less than significant.

Modified Wide Setback Levee Plan

Land use effects include the conversion of 216 acres for flood control purposes. Additionally, 2,135 acres confined by the levees could potentially be converted from current uses depending on uneconomic remnant determination. However, future loss of agricultural land should be protected by the City of Woodland's General Plan. The Plan adopts an urban limit line restricting development to the north through the year 2020. Furthermore, the Policy Document envisions establishing a permanent urban limit line to "protect agricultural land in perpetuity" (City of Woodland, 1996). Development beyond the urban limit line requires annexation from Yolo County, as well as amending the City's General Plan and zoning maps. Yolo County General Plan policies (LU-20 and LU-21) also discourage residential uses of parcels in agriculturally designated areas. Though cumulative effects on land use designations are possible, the City of Woodland's urban limit line and Yolo County's agricultural land policy are protective of current land uses and discourage residential development in agricultural communities. Cumulative effects on land use are less than significant.

Cumulative Effects on Agriculture, Prime and Unique Farmlands

No-Action Plan

The potential for flooding during major storm events would remain the same under the No-Action Plan. The possibility of future rezoning of farmlands for development may decrease due to flood protection costs for developers; therefore, the No-Action plan has a beneficial effect on agriculture, and prime and unique farmland. The No-Action Plan would not have a cumulative effect on agriculture and farmland.

Lower Cache Creek Flood Barrier Plan

The flood barrier results in direct effects to agriculture, and prime and unique farmlands. The barrier directly adversely affects 100 acres of productive prime farmland and 2 acres of locally important farmland. Development within Yolo County has led to a cumulative loss of prime and unique farmlands. Between 1996 and 1998, approximately 1,000 acres of important farmland in Yolo County were converted to urban and built-up land uses (California Department of Conservation, 2002). An example of this conversion occurred south of the city of Woodland. According to the Woodland General Plan, constraints to growth to the north, west, and east has left the ability for growth only towards the south, where urban development on agricultural lands is now permitted. Future conversion of prime and/or locally important farmland within the project area should be protected due to the existence of the urban limit line which limits urban development from occurring on the agricultural lands north of Woodland city limits.

Although there are policies with goals to protect important farmlands, conversion still occurs. Therefore, the cumulative effect on prime and unique farmlands is considered significant.

Modified Wide Setback Levee Plan

The setback levee results in direct effects to agriculture and prime and unique farmlands. The levee directly adversely affects 158 acres of productive prime farmland and potentially indirectly affects 1,254 acres confined between the levees. Development within Yolo County has led to a cumulative loss of prime and unique farmlands. Between 1996 and 1998, approximately 1,000 acres of important farmland in Yolo County were converted to urban and built-up land uses (California Department of Conservation, 2002). An example of this conversion occurred south of the city of Woodland. According to the Woodland General Plan, constraints to growth to the north, west, and east have left the ability for growth only towards the south, where urban development on agricultural lands is now permitted. Future conversion of prime and/or locally important farmland within the project area should be protected due to the existence of the urban limit line which limits urban development from occurring on the agricultural lands north of Woodland city limits.

Although there are policies with goals to protect important farmlands, conversion still occurs. Therefore, the cumulative effect on prime and unique farmlands is considered significant.

Cumulative Effects on Transportation

No-Action Plan

Under the No-Action Plan, major flooding would continue to disrupt transportation routes. However this effect would not contribute to a cumulative effect on transportation.

Lower Cache Creek Flood Barrier Plan

The LCCFB Plan would produce a less-than-significant direct effect on transportation. Project-related traffic would not be substantial in relation to existing traffic load and capacity of the street system. Additionally, with mitigation, construction on roadways (road raising) is a less-than-significant effect. Potential cumulative effects could occur if other construction projects take place simultaneously. However, it is unlikely that construction activities would overlap and affect any particular roadway(s). The potential for combined construction-related traffic to affect roadways is further limited by the fact that the traffic increase would be temporary and would diminish as each segment of the project is completed. Therefore, the cumulative direct effects on transportation are considered less than significant.

The LCCFB Plan would produce a significant indirect effect on transportation. Construction of this alternative plan would result in approximately 3 weeks of flooding of CR 102 for floods that have greater than a 1 in 40 chance of occurring during any given year. There are no past, present, or foreseeable projects that have or would increase the depth and/or duration of flooding to the county roads in the project area. Therefore, the cumulative indirect effects on transportation are considered less than significant.

Modified Wide Setback Levee Plan

The Modified Wide Setback Levee Plan would produce a less-than-significant direct effect on transportation. Project-related traffic would not be substantial in relation to existing traffic load and capacity of the street system. Additionally, with mitigation, construction on roadways (bridge modification) is a less-than-significant effect. Potential cumulative effects could occur if other construction projects take place simultaneously. However, it is unlikely that construction activities would overlap and affect any particular roadway(s). The potential for combined construction-related traffic to affect roadways is further limited by the fact that the traffic increase would be temporary and would diminish as each segment of the project is completed. Therefore, the cumulative direct effects on transportation are considered less than significant.

Cumulative Effects on Noise

No-Action Plan

Under the No-Action Plan there would be no effects to noise; therefore, there would be no cumulative effects.

Lower Cache Creek Flood Barrier Plan

The LCCFB Plan results in temporary significant effects to sensitive noise receptors. To the extent that multiple projects are constructed simultaneously, there would be the potential for an increased number of receptors to be affected. However, it is unlikely that simultaneous construction of multiple projects would affect any single receptor. The potential for cumulative effects on noise is considered less than significant.

Modified Wide Setback Levee Plan

The Modified Wide Setback Levee Plan results in temporary significant effects to sensitive noise receptors. To the extent that multiple projects are constructed simultaneously, there would be the potential for an increased number of receptors to be effected. However, it is unlikely that simultaneous construction of multiple projects would affect any single receptor. The potential for cumulative effects on noise is considered less than significant.

Cumulative Effects on Air Quality

No-Action Plan

The No-Action Plan would not contribute to increases in air pollutants; therefore, there would be no cumulative effects.

Lower Cache Creek Flood Barrier Plan

Construction of the LCCFB Plan would produce a significant direct effect on air quality. The effect is short term; no notable long-term air pollutant emissions would

occur. To the extent that multiple projects are constructed simultaneously, there could be additional increases in pollutant emissions. Furthermore, YSAQMD is currently designated as a nonattainment area for ozone. While construction does not emit enough pollutants to trigger a conformity determination, the project would contribute to the existing high levels of ozone precursors. Therefore, the cumulative effects on air quality are considered significant.

Modified Wide Setback Levee Plan

Construction of the Modified Wide Setback Levee Plan would produce a significant direct effect on air quality. The effect is short term; no notable long-term air pollutant emissions would occur. To the extent that multiple projects are constructed simultaneously, there could be additional increases in pollutant emissions. Furthermore, YSAQMD is already designated as a nonattainment area for ozone. While construction does not emit enough pollutants to trigger a conformity determination, the project would contribute to the already high levels of ozone precursors. Therefore, the cumulative effects on air quality are considered significant.

Cumulative Effects on the Settling Basin

No-Action Plan

The No-Action Plan would not expose the settling basin to loading rates that would exceed the design capacity or alter the lifespan of the settling basin. There would be no cumulative effects from the No-Action Plan.

Lower Cache Creek Flood Barrier Plan

Qualitative analysis indicates that the flood barrier does not have a significant direct effect on sediment transport, scouring, or the lifetime of the settling basin. Ongoing bank stabilization, wetland and habitat restoration, and storm drainage projects would have a neutral effect on the integrity of the basin.

Modified Wide Setback Levee Plan

The setback system enhances flow capacity that potentially results in increased sediment movement and scouring in the basin. Current qualitative analysis shows that due to infrequency of major flood events, the life span of the settling basin would not be affected.

Cumulative Effects on Water Quality

No-Action Plan

Under the No-Action Plan, water quality would remain the same; therefore this plan would not contribute to a cumulative effect.

Lower Cache Creek Flood Barrier Plan

The RWQCB is concerned about activity in the Cache Creek watershed that could result in disturbance of mercury-contaminated sediments. Although future projects within the Cache Creek watershed, such as mining, could mobilize mercury-laden sediments and cause cumulative effects, analysis of the LCCFB Plan shows no significant increase in the net loading of contamination into the system. Therefore, the LCCFB plan would not have a cumulative affect on mercury-contamination and would have an insignificant affect to water quality overall. Wetland restoration, urban stormwater enhancements, and historic mine reclamation further protect water quality. The Joint Conjunctive Water Use Project would also increase groundwater quantity. The cumulative long-term water quality effects are considered beneficial.

Modified Wide Setback Levee Plan

The RWQCB is concerned about activity in the Cache Creek watershed that could result in disturbance of mercury-contaminated sediments. Although future projects within the Cache Creek watershed, such as mining, could mobilize mercury-laden sediments and cause cumulative effects, analysis of the Modified Wide Setback Levee Plan shows no significant increase in the net loading of contamination into the system. Therefore, the Modified Wide Setback Levee plan would not have a cumulative affect on mercury-contamination and would have an insignificant affect to water quality overall. Wetland restoration, urban stormwater enhancements, and historic mine reclamation further protect water quality. The Joint Conjunctive Water Use Project would also increase groundwater quantity. The cumulative long-term water quality effects are considered beneficial.

Cumulative Effects on Vegetation and Wildlife

No-Action Plan

Under the No-Action Plan future repairs to the existing levee system are anticipated. This would affect vegetation and wildlife; however, current regulations require mitigating effects to a less-than-significant level. These regulations have and would apply to all past, present, and future projects; therefore, there should be no cumulative effects as a result of the No-Action Plan.

Lower Cache Creek Flood Barrier Plan

The LCCFB Plan adversely affects wildlife and its associated habitats. However, implementing all mitigation requirements minimizes effects to a less-than-significant level. Wetland and habitat restoration, invasive weed removal, and historic mine reclamation all incrementally reduce adverse effects. Full restoration requires the element of time to fully compensate for degraded habitat and species destruction.

Modified Wide Setback Levee Plan

The Modified Wide Setback Levee Plan adversely affects wildlife and its associated habitats. However, implementing all mitigation requirements minimizes effects to a less-than-significant level. Wetland and habitat restoration, invasive weed removal, and historic mine reclamation all incrementally reduce adverse effects. Full restoration requires the element of time to fully compensate for degraded habitat and species destruction.

The Modified Wide Setback Levee Plan provides an opportunity for other parties to restore habitat lost due to agricultural activities.

Cumulative Effects on Special-Status Species

No-Action Plan

Under the No-Action Plan future repairs to the existing levee system are anticipated. This would affect special-status species; however, current regulations require mitigating effects to less-than-significant level. These regulations have and would apply to all past, present, and future projects; therefore, there should be no cumulative effects as a result of the No-Action Plan.

Lower Cache Creek Flood Barrier Plan

Direct effects on special-status species would occur due to the LCCFB Plan. A Section 7 consultation with the USFWS would be required to develop conservation measures that minimize effects to a less-than-significant level. Agricultural land preservation potentially creates beneficial habitat for special-status species.

Modified Wide Setback Levee Plan

Direct effects on special-status species would occur due to the Modified Wide Setback Levee Plan. A Section 7 consultation with the USFWS would be required to develop conservation measures that minimize effects to a less-than-significant level. Agricultural land preservation potentially creates beneficial habitat for special-status species.

Cumulative Effects on Cultural Resources

No-Action Plan

Under the No-Action Plan, future floods may affect cultural resources. This in combination with other past, present, and reasonably foreseeable future projects may have a cumulative effect on cultural resources by continuing to degrade historical buildings and archaeological sites.

Lower Cache Creek Flood Barrier Plan

Known historic structures south of the flood barrier would be protected from flood damage. Some archeological sites and historic structures north of the barrier could be subject to greater flood damage. Direct and indirect effects from the LCCFB Plan are considered less than significant. It is unknown whether future projects would affect cultural resources; a records search would need to be completed for each project in order to identify cultural and historic resources. With the use of BMP's and adherence to permit requirements, cumulative effects on cultural resources are considered less than significant.

Modified Wide Setback Levee Plan

Archeological sites and historic structures eligible for the NHRP could be adversely affected by this alternative plan. Unrecorded sites inside the levees could be eroded. With mitigation, direct and indirect effects from the Modified Wide Setback Levee Plan are considered less than significant. It is unknown whether future projects would affect cultural resources; a records search would need to be completed for each project in order to identify cultural and historic resources. With the use of BMP's and adherence to permit requirements, cumulative effects on cultural resources are considered less than significant.

Cumulative Effects on Esthetic and Visual Resources

No-Action Plan

Under the No-Action Plan, the existing levee system would remain in place. Future O&M may remove vegetation including large trees that provide part of the visual character of Cache Creek. However, this effect would be less than significant because these actions are already a part of the existing levee system O&M. In combination with other past, present, and reasonably foreseeable future projects, there would be no cumulative effect on visual resources as a result of the No-Action Plan.

Lower Cache Creek Flood Barrier Plan

The flood barrier would allow the completion of the City's development plans, changing visual character of the eastern portion of Woodland from agricultural fields to residential and industrial warehouse-type structures. The visual character of the agricultural lands to the north would not be affected except for the presence of the flood barrier structure. The LCCFB would have a significant cumulative effect on the visual character of the eastern portion of Woodland by allowing continued industrial and urban development.

Modified Wide Setback Levee Plan

Due to the County General Plan protecting agricultural lands, there are no proposed projects that would change the visual character of the unincorporated

community. The city's visual character would change as under the LCCFB Plan; therefore, this plan would also have significant cumulative effects on visual resources.

Summary of Cumulative Effects

Project-related effects on resources can only be considered cumulatively significant if they are first found to be significant at the project level. Listed below are those resources for the LCCFB and Modified Wide Setback Plans that would be considered significantly affected due to the proposed project, and would further be considered cumulatively significant because of additional effects from past, present, or foreseeable future projects.

No-Action Plan

The No-Action Plan does not present any cumulative effects, with the exception of cultural resources. Cultural resources may be affected by future floods, the destruction of historic buildings by landowners, and the continued degradation of archaeological sites by farmers and construction.

Lower Cache Creek Flood Barrier Plan

The effects on prime and unique farmlands, air quality, and visual resources are considered cumulatively significant. Past projects have lessened the quantity/quality of these resources and present projects continue to do so as well. Currently there is no mitigation requirement for the loss of farmland. For air quality, mitigation measures in the form of stricter regulations could reduce the potential for continued adverse effects during future projects. There is also no mitigation requirement for cumulative effects to visual resources.

The cumulative effects on water quality were found to be beneficial. Increased awareness of the importance of water quality has resulted in more projects, which target the improvement of this resource.

Modified Wide Setback Levee Plan

The effects on prime and unique farmlands, air quality, and visual resources are considered cumulatively significant. Past projects have lessened the quantity/quality of these resources and present projects continue to do so as well. Currently there is no mitigation requirement for the loss of farmland. For air quality, mitigation measures in the form of stricter regulations could reduce the potential for continued adverse effects during future projects. There is also no mitigation requirement for cumulative effects to visual resources.

The cumulative effects on water quality were found to be beneficial. Increased awareness of the importance of water quality has resulted in more projects which target the improvement of this resource.

5.3 Growth-Inducing Effects

The growth-inducing section of this Draft EIS/EIR is required by CEQA. According to CEQA Guidelines, a growth-inducing effect is one that could foster economic or population growth, or directly or indirectly bring about construction of additional housing in the surrounding environment (Section 15126(g)). This section addresses existing population growth and densities in the project area and examines existing and with-project growth-inducing conditions.

5.3.1 No-Action Plan

The purpose of the No-Action Plan is to describe the changes expected in the project area over the period of analysis used for this study, assuming a long-term flood protection project is not built. These conditions serve as the base against which alternative flood protection plans are evaluated to determine their effectiveness and to identify effects that would result from them.

The city of Woodland is expecting continued growth of approximately 1.7 percent per year until population buildout in 2020. This population growth is expected to continue without a flood damage reduction project. No additional growth or development would occur beyond what is planned in the Woodland General Plan as a result of the No-Action Plan.

5.3.2 Alternative Plans

Lower Cache Creek Flood Barrier Plan

Construction of the flood barrier would allow development plans up to the urban limit line to be realized. All properties north of the flood barrier would be developed in accordance with the County's General Plan, land use designations, and zoning regulations. In addition, all development would need to comply with environmental laws and regulations and would require approval by local authorities.

With a flood damage reduction project in place, growth would still continue at approximately 1.7 percent per year until population buildout in 2020. No additional growth or development would occur beyond what is planned in the Woodland General Plan as a result of the LCCFB Plan.

Modified Wide Setback Levee Plan

The city of Woodland would develop to its city limits as is currently planned for in the Woodland General Plan. The setback levee system would remove the unincorporated community north and south of the new levee system from the FEMA 100-year flood plain. Although currently zoned as agricultural, elimination of the flood plain designation from the lands north of the city of Woodland could attract pressure for development and further reduction of farmland. However, the City of Woodland's 1996 General Plan confines development within well-protected urban limit line boundaries. The urban limit line was promulgated in 1979 and has continued to direct growth along

the extension of Churchill Downs since that time. Additionally, according to the Yolo County General Plan, "All commercial and industrial uses are prohibited in the agricultural area except those directly related to and incidental to the agricultural operation conducted on the land…" Future development would require rezoning by both the City of Woodland and Yolo County, an action that would be independent of this project. As such, the Modified Wide Setback Levee Plan would not induce growth and development.

5.4 Significant Adverse Effects Which Cannot Be Avoided if the Plan is Implemented

The CEQA Guidelines state that any significant environmental effects that cannot be avoided if the proposal is implemented must be described. This description extends to those significant effects that can be mitigated, but not reduced to a level of insignificance. Additionally, the reasons why the project is being proposed, notwithstanding their effect, should be described.

The Lower Cache Creek Flood Barrier and Modified Wide Setback Levee Plans would have significant unavoidable effects on the following five resources. The alternative plans' benefits do not reduce effects to less than significant, but are considered in the analysis of the overall environmental and economic feasibility of the project. A flood control structure would reduce damage (potential loss of property and life) associated with significant flooding.

Land Use

A total of 104 acres would be converted for flood control purposes under the LCCFB Plan; 216 acres would be converted for flood control purposes under the Modified Wide Setback Levee Plan. This loss of farmland and riparian habitat cannot be mitigated. Although a loss occurs under both plans, the tentatively recommended plan, the LCCFB Plan, would result in a lesser effect.

Agriculture, Prime and Unique Farmland

Close to 100 percent of the farmland in this project area is considered prime farmland. The flood barrier would result in a loss of 100 acres of prime farmland and 2 acres of statewide important/locally important farmland. The setback levees would result in a loss of 158 acres of prime farmland. The conversion of prime and statewide important farmland represents a significant effect that cannot be mitigated since the qualities that distinguish prime farmland cannot be re-created. Although a loss occurs under both plans, the recommended plan, the LCCFB Plan, would result in a lesser effect.

Air Quality

Due to construction, NO_X and PM_{10} emissions would exceed air quality standards, therefore creating a temporary significant effect that could not be mitigated to less-than-significant levels. Both alternative plans would produce pollutant emissions above significance thresholds.

Noise

Due to construction, noise levels would be considered significant at sensitive noise receptors located near the construction corridors. Both alternative plans would temporarily produce noise levels above significance thresholds.

Esthetic and Visual Resources

The levees would create a new linear feature and a viewblock to numerous residences. The levees would be reseeded; however, this would not reduce the effect to less than significant.

5.5 Relationship Between Local Short-Term Uses of the Environment and Maintenance of Long-Term Productivity

This section summarizes the relationship between short-term uses of the environment and the maintenance and enhancement of long-term productivity of the affected resources for the LCCFB and Modified Wide Setback Levee Plans. At issue is whether short-term effects are counterbalanced by long-term effects. The discussion of effects should include effects that narrow the range of beneficial uses of the environment or pose long-term risks to health and safety.

Both alternative plans implement flood control measures that involve building new levees, culverts, and other flood control structures. Industrial and site-specific resources comprise two categories of short-term effects: (1) affected general industrial resources are capital, labor, fuels, and construction materials; and (2) undeveloped land, prime soils, and agricultural crops comprise site-specific resources. The commitment of general industrial and site-specific resources must be compared with the long-term benefits provided by the Lower Cache Creek Potential Flood Damage Reduction Project.

General industrial resource commitment is largely irreversible since most of the construction material is unsalvageable. The capital required is lost to investment, and the labor and fuel used in the construction and operation of the project are irretrievable. The site-specific resources are long term for the life of the project and beyond.

Benefits include flood control and reduction of potential flood-related loss of resources, property, and human life. The environmental uses of these areas would not change, and habitat for a variety of species would still exist in the creek, levees, and streambanks. There are no adverse effects that would pose a long-term risk to health and safety.

The need for additional flood protection in the project area has been documented in the Feasibility Report and Chapter 1 of this Draft EIS/EIR. A full range of alternative plans were considered, and the LCCFB and Modified Wide Setback Levee Plans produce economic benefits in excess of project costs. It can be concluded that alternative plans for flood control would be feasible and that a project should be implemented soon to avoid the risk of future flooding, loss of life, and adverse economic effects.

5.6 Significant Irreversible Environmental Changes Associated with the Project

In accordance with the CEQA Guidelines (Sections 21083 and 21087), this section discusses any irreversible and irretrievable commitment of resources that would be involved in the LCCFB and Modified Wide Setback Levee Plans. Significant irreversible environmental changes are defined as uses of nonrenewable resources during the initial and continued phases of the alternative plans which may be irreversible since a large commitment of these resources makes future removal of nonuse unlikely.

The primary irreversible commitment of resources associated with the project alternative plans would be the permanent change in land use associated with levee construction. This land would become part of the flood control levee system providing flood protection to the project area.

Construction activities would involve the consumption of nonrenewable natural resources such as the soil, cement, and bentonite slurry mixture and petroleum for fuel. The resources used in site preparation, construction material transportation, borrow material transportation, fill material transportation, excavation, and disposal of excess excavated materials would be permanently committed to the project alternatives. In addition, the non-Federal sponsor would use petroleum for fuel in the continued operation and maintenance of the completed project. However, since the consumption or use of nonrenewable resources is relatively low for the project alternative plans, no significant adverse effects are expected.

Cultural resources are nonrenewable. Any destruction or loss of historical structures/sites could not be replaced. With good use of BMP's, the effect on cultural resources as a nonrenewable resource should be limited.

5.7 Mitigation and Environmental Monitoring

This section discusses the mechanisms needed to ensure that the mitigation measures identified in Chapter 4 would be accomplished. These measures consist of habitat improvements, best management practices, and other actions to reduce, minimize, and/or compensate for project-related effects. According to Section 21080 of the Public Resources Code, the public agency is required to adopt a reporting or monitoring program for the changes made to the project or conditions of a project. A project-wide mitigation plan would be created by the lead agency after an alternative plan is selected but prior to construction commencement.

Project-related effects associated with construction such as temporary effects due to transportation, noise, air quality, and water quality would be mitigated by use of BMP's implemented during construction. No long-term monitoring is needed for BMP's. Monitoring, however, would be required for mitigation measures to be conducted after construction such as creating additional habitat areas (to be outlined by resource agencies).

Mitigation would be an authorized project feature and would be included in the cost sharing by the Federal Government and the project's non-Federal sponsor. In

accordance with Section 906 of the Water Resources Development Act of 1986, mitigation for direct project effects would be accomplished prior to or concurrent with construction.

5.7.1 U.S. Fish and Wildlife Service Recommendations and Corps Responses

The following USFWS' recommendations are outlined in the Draft CAR. The Corps' response follows each recommendation in italics.

General

- Since the impacts to endangered and threatened species have not yet been determined, a recommendation of the least biologically damaging alternative cannot be made.

  A preliminary determination based on data gathered for completion of the EIS/EIR has led to the identification of the LCCFB as the least environmentally damaging plan.

- Determine the potential impacts of the project on listed and proposed species, and/or critical habitat, pursuant to section 7 of the Endangered Species Act. Consultation should be completed with the Service, NMFS, and California DFG.

  A preliminary determination of the potential effects of the project was completed for the EIS/EIR. The Corps will submit a biological assessment along with the Draft EIS/EIR and Feasibility Report requesting the USFWS and NMFS to initiate formal consultation.

- Avoid impacts to woody vegetation at all construction sites, staging areas, borrow sites, and haul routes by fencing them with orange construction fencing.

  The Corps would avoid construction effects to woody vegetation as much as feasible by having the construction contractor fence the vegetation with orange construction fence. Woody vegetation that would be removed due to levee construction or removal would be mitigated.

- Minimize impacts to trees along the construction area by having all trimming performed by a qualified arborist. This measure should be taken to ensure tree survival after the project.

  The Corps would have a qualified arborist perform all tree trimming activities to ensure tree survival after the project.

- Minimize impacts to ruderal grassland by reseeding all disturbed areas with appropriate native grass and forb species when construction is complete.

The Corps would ensure that the construction contractor mitigates for all disturbed ruderal grassland areas by reseeding with native grasses and forbs after the completion of construction activities.

- Develop a mitigation and remediation plan for each of the compensation sites developed for the project.

  The Corps would develop a plan that addresses mitigation and remediation for each of the compensation sites for this project. This plan would be developed in the PED phase of this project.

- Conduct nest surveys prior to the removal of any trees or scrub shrub to ensure migratory birds would not be lost during construction, pursuant to the Migratory Bird Treaty Act.

  The Corps would have a qualified biologist conduct nest surveys before the removal of any trees or scrub shrub in order to comply with the Migratory Bird Treaty Act.

Alternative 2, Flood Barrier Plan

- Ensure culverts under the haul road in the settling basin are designed to facilitate fish passage.

  The Corps would use the "Guidelines for Salmonid Passage at Stream Crossings," (September, 2001) *to ensure that any haul road culverts facilitate fish passage in accordance with NMFS guidelines.*

- Compensate for impacts to scrub shrub by replanting the affected area plus an additional 0.03 acre.

  The Corps proposes to develop 0.03 acre of scrub shrub as mitigation for project-related effects.

- Compensate for the loss of individual trees and ruderal grassland by acquiring suitable lands and developing 3.41 acres in a combination of woodland and grassland habitats.

  The Corps proposes to develop 2.89 acres of woodland as mitigation for project-related effects. The Corps proposes to mitigate for the loss of 0.52 acre of grassland by covering riprap with soil and reseeding the affected area.

- Revegetate borrow, staging, turn-arounds, and any other disturbed areas with native grasses and forbs.

  The Corps would have its construction contractors revegetate all disturbed areas with native grasses and forbs after the completion of construction.

- Determine impacts this alternative would have on the hydrology of the settling basin.

  During the feasibility phase, preliminary studies were conducted to determine both the hydrologic and hydraulic effects of the proposed flood barrier on the settling basin. Results of these studies are included in the text and appendixes of the main feasibility report. Additional detailed studies are planned during the design phase of the study to further refine the results.

Alternative 3, Setback Levee Plan

- Avoid the use of riprap along the creek channel as much as possible.

  The Corps has altered its setback levee plan design such that riprap within the creek channel is kept to a minimum. Future design modifications would continue to avoid riprap within the creek channel as much as possible.

- Avoid impacts to Cache Creek's water quality by taking appropriate measures to prevent construction materials (fuels, oils, and lubricants) from spilling or otherwise entering the creek.

  The Corps would comply with all water quality permit conditions including the development of a stormwater pollution prevention plan, an erosion control plan, and a Hazardous Substance Control and Emergency Response Plan.

- Compensate for the loss of 1,176 orchard trees by replanting 1,764 native riparian tree species on 16.2 acres. These plantings should be located immediately adjacent to the existing riparian vegetation.

  The Corps is working with the USFWS to address this concern. Applicability of this recommendation to the project would be based upon the outcome of the discussions between the Corps and USFWS.

- Fish and wildlife benefits with this alternative could be realized with additional projects and other agencies if coordination is established early. The Corps should coordinate with agencies such as the Cache Creek Conservancy or Calfed with the hope that they could add benefits to the fish and wildlife resources by restoring the newly enlarged channel. Restoration could include removal of exotic plant species, contouring the stream channel to provide a mosaic of cover types, and revegetation with native riparian species.

  The Corps acknowledges this recommendation and would further consider it should the setback levee plan be chosen for construction.

5.7.2 Mitigation

Table 5-1 summarizes specific actions to be taken to implement each mitigation measure, information on monitoring requirements, and the timing of the implementation.

The following plans would be incorporated into mitigation and are described in detail in Section 5.7.3: traffic management plan, dust suppression plan, stormwater pollution prevention plan, and hazardous substance control and emergency response plan.

Table 5-1. Summary of Mitigation and Monitoring Requirements

Effect	Mitigation Measure	Implementation Actions/ Responsible Party	Monitoring Requirements	Timing of Action
Social and Economic Resources				
Flood-induced affected lands.	Flowage easements would be acquired for lands that would receive significant project-induced effects.	Lead agencies to determine if flowage easements are necessary and if so, what compensation is required.	Local agencies.	Before construction.
Flood-induced affected structures.	Flood proofing measures would be taken such as raising structures or building ring levees to prevent significant project-induced effects.	Lead agencies to instruct contractor as to which structures require flood proofing.	Local agencies.	During construction.
Transportation				
Temporary effects due to construction.	All personnel would be trained prior to starting work on best management practices and would conduct work consistent with the BMP's.	Lead agencies to provide a traffic management plan outlining BMP's and training of project personnel.	Lead agencies would review and approve traffic management plan; lead agencies to perform site visit to review compliance.	Before and during construction.
Noise				
Temporary effects due to construction.	All personnel would be trained prior to starting work on best management practices and would conduct work consistent with the BMP's.	Lead agencies to provide BMP's.	Local agencies.	Before and during construction.
Air Quality				
Temporary effects due to construction.	All personnel would be trained prior to starting work on best management practices and would conduct work consistent with the BMP's.	Lead agencies to provide dust suppression plan to YSAQMD and incorporate NO_x reduction measures into construction plans.	Local agencies.	Before and during construction.

Table 5-1. Summary of Mitigation and Monitoring Requirements

Effect	Mitigation Measure	Implementation Actions/ Responsible Party	Monitoring Requirements	Timing of Action
Water Quality				
Effects due to construction.	All personnel would be trained prior to starting work on best management practices and would conduct work consistent with the BMP's.	Lead agencies to provide BMP's.	RWQCB	Prior to and during construction.
Vegetation and Wildlife				
Temporary Effects due to construction.	Recommended BMP's are listed in Section 5.7.3.	Lead and Resource agencies to provide construction guidelines and BMP's.	A biological resources specialist would be available.	Prior to and during construction.
Project-related effects.	Mitigation for habitat loss has been outlined by the USFWS in its Draft Coordination Act Report (CAR). Recommended mitigation is listed in Section 5.7.3.	A finalized CAR would be provided by the USFWS.	USFWS.	Prior to, during, and post-construction.
Special-Status Species				
Temporary effects due to construction.	Section 5.7.3 outlines conservation measures. Additional incidental take conditions for effects to special-status species would be determined through Section 7 consultation with the USFWS and NMFS and outlined in their Biological Opinions.	Consultation would be initiated with the USFWS.	A biological resources specialist would be available.	Prior to and during construction.
Project-related effects.	Section 5.7.3 outlines conservation measures. Additional incidental take conditions for effects to special-status species would be determined through Section 7 consultation with the USFWS and NMFS and outlined in their Biological Opinions.	Consultation would be initiated with the USFWS.	USFWS.	Prior to, during, and post-construction.
Cultural Resources				
Temporary effects due to construction.	All personnel would be trained prior to starting work on best management practices and would conduct work consistent with the BMP's.	Lead agencies to provide BMP's.	A cultural resource specialist would be available.	Before and during construction.

Table 5-1. Summary of Mitigation and Monitoring Requirements

Effect	Mitigation Measure	Implementation Actions/ Responsible Party	Monitoring Requirements	Timing of Action
Esthetic and Visual Resources				
Effects due to construction.	Mitigation measures would include reseeding new levees.	Reseeding of levees would be required as mitigation under water quality and vegetation and wildlife as well. Implementation would be the responsibility of the lead agencies.	Local agencies.	Before construction.

5.7.3 Best Management Practices

The practices listed as best management practices (BMP's) for each category below have been found to be representative of the types of practices that can be applied successfully to reduce effects to the greatest extent.

Transportation

- Lead agency to provide traffic management plan.
- Contractors would avoid public roads as much as possible when hauling materials to the construction site.
- Traffic would be rerouted when necessary to avoid construction areas.
- Flaggers would be stationed to slow or stop approaching vehicles to avoid conflicts with construction vehicles or equipment.

Noise

- Construction equipment would be outfitted and maintained with noise-reduction devices such as mufflers.
- Construction would be limited to daytime hours.

Air quality

- Lead agency to provide dust suppression plan. Plan would likely include the measures listed below.

- All construction areas, unpaved access roads, and staging areas would be watered as needed when soil is dry.

- All trucks hauling soil or other loose material would be covered or have at least 2 feet of freeboard. Construction vehicles would use paved roads to access the construction site wherever possible.

- Vehicle speeds would be limited to 15 mph on unpaved roads and construction areas, or as required to control dust.

- Streets would be cleaned daily if visible soil material is carried onto adjacent public streets.

- Exposed stockpiles of soil and other excavated materials would be enclosed, covered, and watered twice daily as needed.

- Vegetation would be replanted in disturbed areas as quickly as possible following the completion of construction.

Water Quality

- The lead agency would prepare a stormwater pollution prevention plan. A portion of this plan would specifically address erosion and sediment control.

- Construction crews would install erosion controls such as hay bales, water bars, covers, sediment fences, and sensitive-area access restrictions where necessary and appropriate before initiating extensive clearing and grading.

- The lead agency would prepare a Hazardous Substance Control and Emergency Response Plan.

- The lead agency would comply with all Section 404 requirements.

Vegetation and Wildlife

- Limiting construction crews to the right-of-way and confinement of disturbance to as small an area as possible;

- Requiring construction crews to maintain a 15-m.p.h. speed limit on all unpaved roads to reduce the chance of wildlife being mortally wounded if struck by construction equipment;

- Avoidance of effects to Cache Creek's water quality by taking appropriate measures to prevent construction materials (fuels, oils, and lubricants) from spilling or otherwise entering the creek;

- Avoidance of effects to woody vegetation at all construction sites, staging areas, borrow sites, and haul routes by fencing them with orange construction fencing;

- Minimization of effects to trees along the construction area by having all trimming performed by a qualified arborist to ensure tree survival after the project;

- Conducting of nest surveys prior to the removal of any trees or scrub shrub to ensure migratory birds would not be lost during construction, pursuant to the Migratory Bird Treaty Act; and

- Revegetation of borrow, staging, turn-arounds, and any other disturbed areas with native grasses and forbs.

- Development of a mitigation and remediation plan for the project by the lead agency.

Special-Status Species

The conservation measures for the giant garter snake include those taken from the "Programmatic Formal Consultation for U.S. Army Corps of Engineers 404 Permitted Projects with Relatively Small Effects on the Giant Garter Snake within Butte, Colusa, Glenn, Fresno, Merced, Sacramento, San Joaquin, Solano, Stanislaus, and Yolo Counties, California," (November 13, 1997). Measures include:

- Seasonal restrictions (construction from May 1 to October 1 only) to avoid overwintering giant garter snakes;

- Ensuring that dewatered habitat remains dry for at least 15 consecutive days after April 15 and prior to excavation or filling;

- An environmental awareness program for construction workers;

- Avoidance of giant garter snake identified during completion of pre-construction surveys 24 hours prior to commencement of construction by a qualified biologist, who would remain available thereafter to provide additional services should a snake be encountered during construction;

- Halting of all construction activities within the area should a giant garter snake be encountered during construction until the snake has had time to move away from the area;

- Confinement of construction activities to the minimal area necessary to facilitate construction;

- Flagging and avoidance of areas that would not be affected by construction and are designated Environmentally Sensitive to the giant garter snake;

- Restoration of all riprap areas to upland habitat by placing at least an 18- to 24-inch layer of soil over the rock and reseeding the area with native grasses and forbs; and

- Compensation of lost habitat according to ratios agreed upon by the Corps and the USFWS.

Conservation measures for chinook salmon and steelhead are based on the recommendations outlined in the "Guidelines for Salmonid Passage at Stream Crossings," (September, 2001). In addition to guidance specific to culverts, the following general conservation measures would be observed (the final determination of specific conservation measures would be determined during consultation with NMFS):

- Minimization of erosion and sediment delivery through the use of erosion control devices such as hay bales, water bars, covers, and sediment fences where necessary and appropriate;

- Restriction of access to sensitive-areas to minimize streamside habitat effects;

- Installation of culverts in a de-watered site with a sediment control and flow routing plan;

- Use of pumps with fish screens to dewater the site; and

- Restoration of the affected area to pre-project conditions including reseeding using locally native riparian and other vegetation.

Conservation measures for Swainson's hawks would include:

- Replacement of non-native trees at a 1:1 ratio and native trees at a 5:1 ratio.

- Avoidance of hawks identified during pre-construction surveys conducted according to Swainson's Hawk Technical Advisory Committee guidelines (2000); and

- Prohibition of construction activities within one-half mile of a nesting hawk until young fledge.

The following conservation measures for the valley elderberry longhorn beetle include those taken from the "Conservation Guidelines for the Valley Elderberry Longhorn Beetle," (July 9, 1999). Measures include:

- All areas to be avoided during construction activities would be fenced at 100-feet from the dripline of each elderberry plant;

- Signs would be erected along the edge of the avoidance area designating the area as environmentally sensitive for the valley elderberry longhorn beetle;

- An environmental awareness program for construction workers; and

- Compensation of lost habitat according to ratios agreed upon by the Corps and the USFWS.

These conservation measures for the giant garter snake would provide sufficient conservation measures for the northwestern pond turtle.

Cultural Resources

- If previously unidentified cultural materials and/or features are discovered during construction, all work in the immediate area would cease, and a cultural resources specialist would be immediately contacted for identification and evaluation.

- If the materials and/or features are determined to be significant and cannot be avoided, a site-specific mitigation plan would be prepared in consultation with interested parties and the SHPO.

- If human remains were encountered, a cultural resources specialist and county coroner would be contacted in compliance with State law.

5.7.4 Monitoring

CEQA guidelines require the public agency to produce a monitoring plan to ensure that the mitigation measures are accomplished (Public Resources Code Section 21081.6, AB 3180 [1988]). The monitoring plan for the selected alternative would include recommendations from resource agencies.

5.8 Compliance with Applicable Laws, Policies, and Plans

The relationship of the selected plan to applicable Federal, State and local environmental requirements is outlined below. The status of compliance of the flood damage reduction study for each law and Executive Order is outlined in Table 5-2 at the end of Section 5.8.

5.8.1 Federal Requirements

National Environmental Policy Act (42 U.S.C. 4321 et seq.)

This Draft EIS/EIR was prepared pursuant to regulations implementing NEPA (42 U.S.C. 4321 *et seq.)*. NEPA ensures that Federal agencies would consider the environmental effects of their actions. It also requires that an EIS be included in every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment. This Draft EIS/EIR

provides detailed information regarding the No-Action Plan, the Lower Cache Creek Flood Barrier Plan, and the Modified Wide Setback Levee Plan. The analysis describes the environmental effects of each alternative plan, potential mitigation measures, and adverse environmental effects that cannot be avoided. The final EIS/EIR provides responses to public comments on the Draft EIS/EIR. A Record of Decision would complete the environmental documentation required by the act.

National Historic Preservation Act of 1966, as amended (16 U.S.C. 470 et seq.), Historic and Archeological Resources Protection Act (16 U.S.C. 470AA et seq.), Protection of Historic Properties (36 CFR 800), Abandoned Shipwreck Act (43 U.S.C. 2101 et seq.)

These acts and regulations require Federal agencies to take into account the effects of Federal undertakings on historical and archeological resources. Under these requirements, the APE of the selected project must be inventoried and evaluated to identify historical and archeological properties that have been placed on the NRHP and those that the agency and the SHPO agree are eligible for listing on the National Register. If the project is determined to have an effect on such properties, the agency must consult with the SHPO and the Advisory Council on Historic Preservation to develop alternatives or mitigation measures.

No archeological surveys of the APE have been conducted. Prior to the initiation of construction, an updated records check and field surveys would be conducted as stipulated in an executed PA. If additional cultural resources be identified during field surveys, evaluations and effect determinations would be made in accordance with the Section 106 review process.

Clean Air Act (42 U.S.C. 1857 et seq. (1990), as amended and recodified, 42 U.S.C. 7401 et seq. *SUPP II 1978)

Section 4 of this Draft EIS/EIR discusses the project's effects on local and regional air quality. The section discusses the issues relative to the project's compliance with YSAQMD significance criteria and U.S. EPA's adopted *de minimis* thresholds in its general conformity rule. Since the project would not exceed conformity thresholds, a conformity determination would not be required.

Water Resources Development Act of 1986, Section 906, Fish and Wildlife Mitigation (33 U.S.C 2201 et seq.)

After consultation with appropriate Federal and non-Federal agencies, the Secretary of the Army is authorized to mitigate damages to fish and wildlife resulting from any water resources project under his jurisdiction, whether completed, under construction, or to be constructed. Projects must include a recommendation with a specific plan for mitigating fish and wildlife losses created by the project, or a determination by the Secretary that such projects have no negligible adverse effects on fish and wildlife.

Mitigation is a component of both the LCCFB and Modified Wide Setback Levee Plans to compensate for any damages the project would cause. A detailed mitigation plan would be developed once Section 7 consultation with the USFWS and NMFS has been completed and conservation requirements have been finalized.

Clean Water Act (33 U.S.C. 1251 et seq. (1976 & Supp II 1978))

The purpose of this statute is to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters" through prevention, reduction, and elimination of pollution. The project must comply with the Federal Clean Water Act, including Section 404, when project construction requires the placement of fill material into the Waters of the United States.

The project proposes to place fill within the Waters of the U.S.; therefore, a 404(b)(1) evaluation is required. This evaluation has been completed and provided as an appendix to this document. All work within the Water of the U.S. would comply with Nationwide Permits 13, 14, 31, and 33 where applicable. Where not applicable additional Section 404 requirement would be met.

Endangered Species Act (16 U.S.C. 1531 et seq.)

Section 7 of the ESA requires Federal agencies, in consultation with the Secretary of the Interior, to ensure that their actions do not jeopardize the continued existence of endangered or threatened species, or result in the destruction or adverse modification of the critical habitat of these species. A list of threatened and endangered species relating to this project was obtained from USFWS on August 13, 2001. An updated species list (March 26, 2002) was provided by the USFWS as an appendix to its draft CAR. A biological assessment was prepared, indicating that special-status species potentially affected by the proposed project are the following species: (1) giant garter snake (*Thamnophis gigas)*, (2) valley elderberry longhorn beetle (*Desmocerus californicus dimorphus)* (3) palmate-bracted bird's beak (*Cordylanthus palmatus)*, (4) Central Valley chinook salmon, and (4) Central Valley steelhead. This biological assessment will be transmitted to the USFWS concurrent with the release of the DEIS/EIR to the public and agencies for review. Informal consultation with USFWS has been initiated. Formal consultation will be requested through the biological assessment. Conservation measures for special status species are described in Section 4.12.4 and Section 5.7.3.

Federal Water Project Recreation Act (16 U.S.C. 460L-5, 460L-12 et seq., and 662)

This act requires Federal projects to consider features that would lead to enhancement of recreational opportunities. Existing recreational opportunities are discussed in Section 3.2.4. To date, the non-Federal sponsor has not expressed interest in developing recreational facilities as part of this project.

Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.)

This act requires Federal agencies to consult with the USFWS and State fish and game agencies before undertaking projects that control or modify surface water (water projects). This consultation is intended to promote the conservation of wildlife resources by preventing loss of or damage to fish and wildlife resources and to provide for the development and improvement of fish and wildlife resources in connection with water projects. The USFWS and DFG are authorized to conduct necessary surveys and investigations to determine the possible damage to resources and to determine measures to prevent such losses. Representatives of the Corps participated in these studies. The USFWS has prepared a draft Coordination Act Report, which is included in Appendix A. The results of the USFWS HEP analysis are contained within the draft Coordination Act Report.

Migratory Bird Treaty Act (16 U.S.C. 703 et seq.)

The Migratory Bird Treaty Act of 1918 is the domestic law that affirms, or implements, the U.S.'s commitment to four international conventions (with Canada, Japan, Mexico, and Russia) for the protection of a shared migratory bird resource. Each of the conventions protects selected species of birds that are common to both the U.S. and one or more of the countries. (They occur in both countries at some point during their annual life cycle.)

Conservation measures to aid in project compliance with the Migratory Bird Treaty Act are described in Section 4.10.4 and Section 5.7.3.

Federal Agriculture Improvement and Reform Act of 1996 and 1985 Food Security Act (7 U.S.C 7201 et seq.; 7 U.S.C 1631 et seq.)

The Federal Agriculture Improvement and Reform Act of 1996, also known as the 1996 Farm Bill, includes conservation provisions designed to provide landowners with a variety of incentive programs and technical assistance for incorporating sound conservation practices into farming, grazing, and livestock operations. The 1996 Farm Bill replaces and incorporates portions of previous farm bills including the Food Security Act of 1985 and the 1990 Farm Bill.

Under Title III, the Wetlands Reserve Program and the Conservation Reserve Program of the Food Security Act of 1985 are extended through 2002. Changes in the program provide landowners with more options for protecting wetlands and highly erodible lands. Also addressed under Title III is a new Wildlife Habitat Incentive Program to help landowners improve wildlife habitat on private land. A flood Risk Reduction Program was established to provide incentives to move farming operations from frequently flooded lands.

Executive Order 11988, Flood Plain Management

This Executive Order requires the Corps to provide leadership and take action to (1) avoid development in the base (1 in 100 annual event) flood plain (unless such

development is the only practicable alternative); (2) reduce the hazards and risk associated with floods; (3) minimize the effect of floods on human safety, health, and welfare; and (4) restore and preserve the natural and beneficial values of the base flood plain.

To comply with this Executive Order, the policy of the Corps is to formulate projects which, to the extent possible, avoid or minimize adverse effects associated with use of the base flood plain and avoid inducing development in the base flood plain unless there is no practicable alternative. The Lower Cache Creek Flood Damage Reduction Draft EIS/EIR is in compliance with this Executive Order.

The project provides various levels of flood protection to the project area. The proposed flood barrier is consistent with existing City and County policies regarding land use and flood protection. The project area would be developed in accordance with existing adopted land use designations. Current growth projections for the project area were determined to be the same for with- and without-project conditions. Therefore, the project would not induce any development in the base flood plain.

Executive Order 11990, Protection of Wetlands

This order directs the Corps to provide leadership and take action to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands in implementing civil works projects. Any agency considering a proposal that might affect wetlands must evaluate factors affecting wetland quality and survival. These factors should include the proposal's effects on the public health, safety, and welfare due to modifications in water supply and water quality, maintenance of natural ecosystems, and conservation of flora and fauna; and other recreational scientific and cultural uses. The project complies with this Executive Order because there are no wetlands in the project area.

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations

This order directs all Federal agencies to identify and address adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations. Specifically, agencies must collect, maintain, and analyze demographic and economic information when the proposed project would have a substantial environmental, human health, or economic effect on surrounding populations. This project is in compliance with this Executive Order for several reasons.

- The proposed action would have no substantial environmental justice effects on the project area.
- Flood control alternative plans were formulated according to Corps policies and regulations, as well as other Federal guidelines and laws, and were not designed to provide flood protection or to benefit any specific ethnic or socioeconomic group in the community.

- Public involvement for this study included several meetings open to the public. All public comments via telephone, letter, e-mail, and meetings were considered in the formulation of alternative plans and evaluation of effects.

Farmland Protection Policy Act (7 U.S.C. 4201 et seq.)

This act requires a Federal agency to consider the effects of its action and programs on the Nation's farmlands. The act charges the U.S. Department of Agriculture with implementing programs that develop criteria for identifying the effects of Federal programs on the conversion of farmlands into nonagricultural uses. Federal agencies must consider alternative actions, as appropriate, to reduce such adverse effects and ensure that their programs, to the extent practicable, are compatible with State, local, and private programs. The act also authorizes local governments to identify farmland of local importance and exempts land already committed to urban development.

The designation of prime farmland grew out of a program by the Natural Resource Conservation Service to map the Nation's important farmlands. The Corps in collaboration with the Natural Resources Conservation Service developed a Farmland Conversion Impact Rating.

Executive Order 13148, The Greening of Government Through Leadership in Environmental Management

The Executive Order holds each Federal agency and Federal agency contractors responsible for ensuring that all necessary actions are taken to integrate environmental accountability into day-to-day decisionmaking and long-term planning processes. Environmental management considerations must be fundamental in all environmental leadership programs, policies, and procedures. Each agency is responsible for complying with all environmental regulations by establishing compliance audit programs and policies that emphasize pollution prevention and reduction.

Executive Order 13007, Indian Sacred Sites

This Executive Order requires that all Federal agencies either statutorily or administratively responsible for Federal land management provide, to the extent practicable and as permitted by law, access to and ceremonial use of Native American sacred sites by Native American religious practitioners and avoid adversely affecting the physical integrity of such sacred sites. If sites are identified, then the Corps would comply with Executive Order 13007.

5.8.2 State Laws, Regulations, and Policies

State Reclamation Board of California

As the representative non-Federal sponsor of the Lower Cache Creek Potential Flood Damage Reduction Project, the Board has primary responsibility for the CEQA review process and project review.

State Water Resources Control Board, Division of Water Quality, and the California Regional Water Quality Control Board, Central Valley Region

The State Water Resources Control Board and the California Regional Water Quality Board for the Central Valley region review activities that affect water quality in the Central Valley. The boards administer the requirements mandated by the State and Federal law (Clean Water Act). The Regional Water Quality Control Board establishes water quality standards and reviews individual projects for compliance with the standards.

Permits or Approvals Required

An NPDES general permit for construction activities would be acquired from the Central Valley RWQCB, and a stormwater pollution prevention plan would be developed in accordance with the guidelines of the general permit. The NPDES permit would be acquired before construction activities begin. Appropriate water quality certification would be acquired from the Central Valley RWQCB. BMP's to be implemented as part of the project are outlined in Section 5.7.3.

California Department of Fish and Game, Region 2

Generally, the DFG administers State laws providing for protection of fish and wildlife resources. The DFG administers the California Endangered Species Act (CESA) of 1984. This act requires the non-Federal agencies to prepare biological assessments if a project may adversely affect one or more State-listed endangered species.

Permits or Approvals Required.

The Board as the non-Federal sponsor is responsible for initiating coordination with the DFG as required under the CESA. The DFG would issue a biological opinion for the State-listed species affected by the project. Conservation measures to avoid effects to State special-status species are listed in Section 5.7.3. Also, all incidental take conditions in the biological opinion would be implemented as part of the proposed project.

State Historic Preservation Officer

The State Historic Preservation Officer (SHPO) administers the national historic preservation program at the State level, reviews National Register of Historic Places nominations, maintains data on historic properties that have been identified but not yet nominated, and consults with Federal agencies during Section 106 review.

Federal agencies seek the views of the appropriate SHPO when identifying historic properties and assessing effects of an undertaking on historic properties. Agencies also consult with the SHPO when developing Memoranda of Agreement.

Under Section 106 and the 36 CFR 800 regulations, consultation with the SHPO and others would be initiated during the next planning phase of the project. The PA would be reviewed by all parties concerned and finalized after comments had been

addressed. The Section 106 consultation process would be concluded after the PA is signed. Implementation of the steps outlined in the PA would take place as appropriate, beginning with a more complete inventory and evaluation of the resources. The draft PA has been included in the DEIS/EIR as Appendix C

Permits or Approvals Required.

Actions ensuring compliance with Section 106 of the National Historic Preservation Act of 1966 (see above section).

State Mining and Geology Board

The State Mining and Geology Board oversees the implementation of pertinent State laws and regulations. One of the laws within its jurisdiction is the Surface Mining and Reclamation Act of 1975 (Public Resources code, Div. 2, Chapter 9, Section 2710, et seq.)

Permits and Approvals Required.

The Surface Mining and Reclamation Act (SMARA) requires that an entity seeking to conduct a surface mining operation obtain a permit from, and submit a reclamation plan to, the SMARA lead agency overseeing that operation. To be adequate, the reclamation plan must contain all categories of information specified in the SMARA. A lead agency's finding can be appealed to the State Mining and Geology Board. The Lower Cache Creek Potential Flood Damage Reduction Project would not require a permit under this Act because the use of borrow material is not classified as a surface mining operation.

California Environmental Quality Act

CEQA charges public agencies with avoiding or substantially reducing significant environmental damage, where feasible. In discharging this duty, the public agency has an obligation to balance a variety of public objectives, taking into account economic, environmental, and social issues. The EIR is an informational document that informs public agency decisionmakers and the general public of the significant environmental effects of a proposed project. This document has been drafted to comply with CEQA requirements.

Public Resources Code Section 21080

This California code requires public agencies to adopt a reporting or monitoring program to mitigate or avoid significant effects on the environment. The reporting or monitoring program must be designed to ensure compliance during project construction. Responsible agencies are also required to either submit to the lead agency detailed performance objectives for mitigation measures or refer the agency to available guidelines or reference documents.

Porter-Cologne Act

In 1967, the Porter-Cologne Act established the State Water Resources Control Board and nine regional boards as the State agencies with primary authority over the regulation of water quality and allocation of appropriative surface-water rights in California. The Porter-Cologne Act is the primary State water quality legislation administered by the State Board and provides the authority to establish water quality control plans that are reviewed and revised, as well as statewide plans. Water quality control plans, also known as basin plans, designate beneficial uses for specific surface-water and groundwater resources and establish water quality objectives to protect those uses. In acting on water rights applications, the State Board may establish terms and conditions in a permit to carry out water quality control plans.

The Central Valley Regional Water Quality Control Board's Draft Staff Report on Recommended Changes to California's Clean Water Act Section 303(d) List (September 2001) identifies Cache Creek as a high priority water body that does not attain water quality standards. Water Quality Objectives are defined as limits or levels of water quality constituents and characteristics established for reasonable protection of beneficial uses or prevention of nuisance. Under the Porter-Cologne Act, discharges of subsurface agricultural drainage, tailwater, and stormwater from agricultural lands to surface water do not require NPDES permits.

In addition to implementing the NPDES permitting program, the Porter-Cologne Act authorizes the RWQCBs to issue Waste Discharge Requirements (WDR's). Generally, WDR's are issued for discharges that are exempt from the Clean Water Act NPDES permitting program, discharges that may affect groundwater quality, and/or wastes that may be discharged in a diffused manner. WDR's are established and implemented to achieve environmental quality objectives for receiving water as established in the basin plans.

The LCCFB and Modified Wide Setback Levee Plans comply with water quality objectives and the implementation schedule.

California Endangered Species Act

The CESA provides for the protection and conservation of threatened and endangered species and their habitats. It is very similar to the ESA. In general, CESA:

- Authorizes determination and listing of species as endangered or threatened.
- Prohibits the take, possession, purchase, or sale of endangered, threatened, or candidate species.
- Provides authority for State agencies to purchase habitat for endangered and threatened species.

- Directs the DFG to work closely with the USFWS and NMFS to participate to the greatest extent practicable in Federal consultations, and to adopt the Federal biological opinion whenever possible.

The Natural Community Conservation Planning Act

This act (DFG Code Section 2800 *et seq.*) provides for the preparation and implementation of large scale natural resources conservation plans. A natural community conservation plan must identify and provide for "the regional or area wide protection and perpetuation of natural wildlife diversity, while allowing compatible and appropriate development and growth." Natural community conservation plans are intended to provide comprehensive management and conservation of multiple wildlife species including, but not limited to, species listed pursuant to CESA, Section 2050 *et seq*.

Surface Mining and Reclamation Act

The State Mining and Geology Board oversees implementation of pertinent State laws and regulations. One of the laws within its jurisdiction is the Surface Mining and Reclamation Act of 1975 (Public Resources Code, Section 2710, et seq).

Permits and Approvals Required.

The Surface Mining and Reclamation Act requires that an entity seeking to conduct a surface mining operation obtain a permit from and submit a reclamation plan to the lead agency overseeing that operation. An adequate reclamation plan must contain all categories of information specified in this act. The use of borrow material is not considered surface mining; therefore no permits would be required.

5.8.3 Regional Laws, Regulations, and Policies

Yolo County Habitat Conservation Plan

Two goals of the Yolo County HCP are:

(1) to support the issuance of a Section 10(a)(1)(B) "incidental take permit" under the Endangered Species Act and Section 2081(b) take permit under the California Endangered Species Act and the DFG Code of California. (These permits authorize take of a covered species during urban development and other activities in Yolo County.)

(2) equally important, to maintain existing agricultural values on those lands in Yolo County where conservation activities may occur under the HCP. Agricultural values are defined as agricultural yields and productivity, or the aggregate dollar value of Yolo County farm-gate production (Yolo County, 2001).

5.8.4 County Laws, Regulations, and Policies

Evaluating the level of compliance with locally adopted plans can be complicated and must consider the following: (1) broad and unspecific goals articulated in local

general plans; (2) potential project influence on the location, density, and rate of development in ways that may differ with existing local plans and policies; and (3) the currency of local plans.

The project area is located within the jurisdictions of the City of Woodland and Yolo County General Plans. The proposed project is expected to comply with regulations and guidance contained within applicable general plans.

Air Pollution Control Districts

Project construction falls under the jurisdiction of the YSAQMD. The district determines whether project emission sources and levels significantly affect air quality, based on standards established by EPA and the California Air Resources Board.

Public Works and Transportation Departments

All proposed activity involving encroachments within, under, or over county or city road rights-of-way must be covered by an encroachment permit. Appropriate local agencies would be consulted by the non-Federal sponsor as necessary to obtain enroachment permits.

Yolo County General Plan, 1983

Goals of the General Plan include (1) protect and conserve prime and other agricultural land from urban development, (2) conserve and manage water resources (groundwater, stream, and the Delta), (3) make land use compatible with cultural and rural setting, (4) discourage urban sprawl, (5) discourage segregation in neighborhoods, (6) preserve county history and historical sites, (7) control erosion and practice soil management, and (8) control flooding and avoid the effects of flooding.

LU-9 directs Yolo County to apply agricultural preserve zoning to all agricultural lands which qualify for an agricultural preserve contract. The County may also apply agricultural preserve zoning to other lands which the Planning Commission finds are critically situated, relative to existing Agricultural Preserves. LU-18 directs Yolo County to consider placement of certain agricultural land uses in agricultural areas by means of conditional use permits. Findings for approval must include sites that have some hazard or nuisance aspect which precludes them from being placed in an urban area.

Safety and Seismic Safety Policies 5 through 8 (S5-8) describe policies regarding flood plain zones that include mitigating the effects of flooding, flood proofing in "acceptable low risk flooding" areas, and residential development in designated floodways.

Yolo County Final Off-Channel Mining Plan for Lower Cache Creek, July 30, 1996

The Board of Supervisors adopted this plan recognizing the importance of mining, as well as the significance of the creek for its integral contribution to drainage/flood

protection, water supply and conveyance, wildlife, habitat, recreation, and agricultural productivity. A key assumption is that the creek as an integrated system plays a significant role on the environment and social resources of the county, causing the County to emphasize its importance in resource management.

Grading Ordinance

Yolo County has adopted the Uniform Building Code, as amended, which includes Chapter 33 Entitled Excavation and Grading. Consequently, projects are subject to the Uniform Building Code as adopted by Yolo County.

Yolo County EIR for Cache Creek Resources Management Plan and EIR for Cache Creek Improvement Program, April 8, 1996

The Cache Creek Resources Management Plan contains seven elements covering floodway and channel stability, water resources, biological resources, open space and recreation, aggregate resources, and agriculture. The CRMP contains goals, objectives, actions, and performance standards for each area.

5.8.5 City Laws, Regulations, and Policies

City of Woodland General Plan Wastewater Collection, Treatment, Disposal, and Reuse

Policy 4.D.7 subsequent to Goal 4 D mandates that the City (1) investigate potential hazards and nuisances associated with operations at the wastewater treatment plant and (2) identify any necessary buffering requirements or operational changes at the plant that may be necessary (City of Woodland, 1996).

Stormwater Drainage

Policy 4.E.2. subsequent to Goal 4E encourages project designs that minimize drainage concentrations and impervious coverage. Policy 4E4 requires projects that have significant effects on the quantity and quality of surface water runoff to incorporate mitigation measures for effects related to urban runoff. Woodland General Plan Policy Document, February 1996, p. 4-9 (City of Woodland, 1998).

City of Woodland Urban Limit Line

The City of Woodland General Plan defines an urban limit line that encompasses all land designated for urban development within the time frame of the General Plan (by 2020). The Policy Document directs most new residential growth to the south between College Street and County Road 102. On the south, land use adds approximately 1,750 acres to the Urban Limit Line, including Yuba College and County jail facilities (City of Woodland, 1996).

City of Woodland's General Plan Agricultural Policy

The City of Woodland recognizes that the city was built on prime agricultural land and that the land with prime soils is also land most attractive for urban development. In response to this awareness, the City's General Plan developed a policy that protects Woodland's agricultural surroundings because these surroundings play a central role in the city's history, character, and economy. The agricultural policy in the City's General Plan seeks to maintain agricultural uses as long as possible and to protect adjacent agricultural lands from adverse effects of urban development (City of Woodland, 1996).

City of Woodland's General Plan Open Space Policy

The City of Woodland recognizes the value of open space resources, both manmade and natural. Woodland's open space resources include parks, mature trees, agricultural lands, and the natural environment. The City has promulgated an open space policy that serves to preserve and enhance open space lands to maintain the natural resources of the Woodland area (City of Woodland, 1996).

Table 5-2. Status of Compliance

Federal Statute	Status of Compliance
National Environmental Policy Act of 1969	Ongoing
National Historic Preservation Act of 1966	Ongoing
Clean Air Act	Ongoing
Water Resources Development Act of 1986	Ongoing
Clean Water Act	Ongoing. A 404(b)(1) evaluation has been completed.
Endangered Species Act	Ongoing. Informal consultation has been initiated.
Federal Water Project Recreation Act	In compliance
Fish and Wildlife Coordination Act	Ongoing. A draft CAR has been furnished by the USFWS.
Migratory Bird Treaty Act	Ongoing. Conservation measures have been identified to aid in compliance.
Federal Agriculture Improvement and Reform Act of 1996 and 1985 Food Security Act	No effect.
Executive Order 11988, Flood Plain Management	Ongoing
Executive Order 11990, Protection of Wetlands	Ongoing
Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations	In compliance
Farmland Protection Policy Act	In compliance
Executive Order 13148, The Greening of Government Through Leadership in Environmental Management	In compliance
Executive Order 13007, Indian Sacred Sites	In compliance
Note: Ongoing – Some requirements of the regulation remain to be met by subsequent installation actions before implementation of some of the actions associated with this project. Once the statutory requirement for each action has been met, compliance will be labeled "in compliance".	

5.9 Public Involvement

Early in the study, a public involvement strategy was developed to ensure that agencies, organizations, and individuals potentially affected by the project or with an interest in the project would be included in the process. The public was involved in the scoping process to aid in developing flood reduction measures and had opportunities to comment once preliminary measures were developed. Section 5.9.1 further details these meetings.

Throughout the study, the Corps has closely coordinated with the non-Federal cost-sharing sponsor, the State Reclamation Board of California. On September 13, 2000, the Lower Cache Creek Feasibility report team, consisting of representatives from the cost-sharing partners, began meeting weekly to discuss major management decisions in accordance with the Feasibility Cost Sharing Agreement.

On March 23, 1999, the City of Woodland Public Works staff recommended creating an advisory body to the City Council to assist in the evaluation of flood effects, protection alternatives, and methods of funding improvements to assist in dealing with the flood threats to Woodland. The Task Force is composed of members of the Woodland City Council, City Mayor and Deputy Mayor, an Association of General Construction member, a member of the Cache Creek Conservancy, two Woodland Chamber of Commerce members, and three citizens at large. The Woodland Floodplain Task Force helped identify measures for the initial screening process. On February 8, 2001, task force members were presented with the evaluation of the five preliminary alternatives.

The project team composed of representatives from The Board, USFWS, Corps, and the City of Woodland began meeting on February 9, 2000, and continued monthly meetings to discuss design and project feasibility. The Corps and the Board held various meetings to coordinate concerns of CALFED, the gravel mining industry, the RWQCB, the California Northern Railroad, Caltrans, National Marine Fisheries Service, Yolo County Farm Bureau, Sacramento Valley Farm Credit Bureau, and individual stakeholders.

5.9.1 Public Interest

The Corps published the Notice of Intent (NOI) to prepare an EIS in the Federal Register on May 5, 2000. The Board delivered the Notice of Preparation (NOP) to the California State Clearinghouse on June 11, 2000. Comments on the NOI and NOP were requested; none were received.

On May 30, 2000, the City of Woodland, the Board, and the Corps hosted a public workshop to solicit public input on flood control and environmental and cultural resources issues along lower Cache Creek. The same hosts organized another public workshop on May 31, 2001, to discuss FEMA flood maps and flood protection alternatives and to invite public insight into the flood control management process.

The Corps and Board met numerous times with public and private parties to identify and discuss concerns, tailor actions, and expand insight into the flood control

management process. Public and private entities included private landowners, a private gravel-mining company, and Sacramento and Yolo County Farm Bureaus.

This study was heard at public meetings before the Board on June 13, 2001 and December 21, 2001. Members of the public, as well as other public and private entities, were invited to express concerns during the proceedings.

Table 5-3 documents meetings on the Lower Cache Creek Potential Flood Damage Reduction Project including public workshops and agency meetings as well as submittal of the NOI and NOP. Copies of the NOI, NOP, and public notices for the workshops are included in Appendix J. Also included in Appendix J are tables documenting project and team meetings, as well as project-related newspaper articles.

In the March 5, 2002 election, three measures were included on the ballot in regards to the financing of the City share of the Lower Cache Creek Flood Damage Reduction Project. One was a local sales tax extension and the remaining two were advisory measures related to the sunsetting of the sales tax measure if the setback levee were the selected plan, or if the flood barrier were the selected plan. The funding measure was put on the ballot in advance of release of the Draft Feasibility Report and Draft EIS/EIR in order to facilitate seeking federal funding support in 2002. All three measures were voted down. Release and public review of the Draft Feasibility Report and Draft EIS/EIR are expected to clarify and address concerns raised during the March 2002 election process.

Table 5-3. Agency and Public Meetings on Scoping of the Lower Cache Creek Feasibility Report and Environmental Impact Statement/Environmental Impact Report

Meeting	Date	Place	Meeting Noticed	Brief Description	Agency & Public Involvement
Notice of Intent (NOI)	5/5/00		Published in the Federal Register		State Reclamation Board of California U.S. Army Corps of Engineers
F2 Public Workshop	5/30/00	Heidrick Ag Museum, 1962 Hays Lane, Woodland	Daily Democrat, Davis Enterprise 5/10/00	Explanation and public comment solicitation on FS alternatives	
Public Notification of Preparation for Draft EIS/EIR	6/11/00		Filed in the California Office of Planning and Research		State Reclamation Board of California U.S. Army Corps of Engineers
Coordination Meeting with Yolo County	12/28/00	Yolo County		Discussed key concerns: mercury, bridge replacement, preservation of ag land	Yolo County and CDM
Mercury Meetings with Regional Water Quality Control Board	1/27/01 2/15/01	RWQCB		Discussed mercury issues in settling basin	RWQCB, DWR, CDM
Meeting with Caltrans	3/28/01	CDM, Sacramento		Hydraulic report and I-5 closures	Blake Johnson, Lee Fredericksen, Caltrans
Meeting with the California Northern Railroad	5/11/01	CDM, Sacramento		Discussed cost to construct reinforced concrete ballast deck on the Sugarfield Branch	Blake Johnson and Lee Fredericksen

Table 5-3. Agency and Public Meetings on Scoping of the Lower Cache Creek Feasibility Report and Environmental Impact Statement/Environmental Impact Report

Meeting	Date	Place	Meeting Noticed	Brief Description	Agency & Public Involvement
Meetings with Private Landowners	5/22/01	Willow Oak Hall, 10/12/01		Discuss alignment of west end of the flood barrier	Landowners, City of Woodland, COE, and CDM, Yolo County
Cache Creek Flood Protection Public Workshop	5/31/01 7-9 p.m.	Heidrick Ag Museum, 1962 Hays Lane, Woodland		Overview of FEMA process, update on Feasibility Report, funding	118 people from City of Yolo, City of Woodland, City of Walnut Creek, City of Sacramento
Interagency Coordination Meetings	6/1/01 7/13/01 8/22/01	1416 9th St., Rm 1601, Sacramento (7/13/01 only)		Inlet weir into settling basin, Mercury, TMDL, coordination	State Reclamation Board of California, Yolo County, City of Woodland, CALFED
State Reclamation Board of California	6/13/01 12/21/01	Resources Building, Sacramento	Public meeting notice protocol per State Reclamation Board of California	CDM presented Lower Cache Creek study before State Reclamation Board of California	Members of public, State Reclamation Board of California, CDM
Meeting with Teichert Aggregate, Inc.	10/02/01 9 p.m.	CDM, Sacramento		Coordinate gravel mining next to Cache Creek	COE, Teichert Aggregate, CDM, MBK, DWR, City of Woodland
Public Meeting	10/18/01			CDM met with four members of the public to discuss their preferred alternative	Four members of the public and CDM
City of Woodland Convened Special Meeting	10/23/01	City Council Chambers		Public receives update on flood protection issues	

Table 5-3. Agency and Public Meetings on Scoping of the Lower Cache Creek Feasibility Report and Environmental Impact Statement/Environmental Impact Report

Meeting	Date	Place	Meeting Noticed	Brief Description	Agency & Public Involvement
Yolo County Farm Bureau	1/8/02 7 p.m.	Woodland, California		Present project to Yolo County Farm Bureau	Corps, Yolo County Farm Bureau, CDM
Sacramento Valley Farm Credit Bureau	1/11/02	Woodland, California		Informational presentation on flood barrier on effects to agricultural land to receive lenders' input	

5.9.2 Comments on the EIS/EIR

The NOI to prepare a Draft EIS/EIR for a Proposed Flood Reduction Investigation in Yolo County, California, was published in the Federal Register on May 5, 2000. The Notice of Preparation (NOP) of a Draft EIR was also submitted to the Office of Planning and Research State Clearinghouse by the Board on June 11, 2000. No comments were received on either the NOI or NOP.

A notice of availability of the Draft EIS/EIR was published in the Federal Register March 21, 2003. The draft was distributed for public review on March 21, 2003. A public workshop will be held during the 45-day review period to provide additional opportunities for comment on the Draft EIS/EIR. All comments received by May 5, 2003, will be incorporated into the final EIS/EIR, as appropriate. A comments and responses appendix will be included in the final EIS/EIR.

5.9.3 Intended Uses of the EIS/EIR

The EIS/EIR is an information document. Its purpose is to inform public agency decisionmakers and the general public of the significant effects of the project. The document also identifies ways to minimize significant effects and describes reasonable alternatives to the project (CEQA Guidelines, Section 15121 (a) and 40 CFR 1502.1). Under the CEQA Guidelines (Section 15151), the standard for adequacy is:

"An EIR should be prepared with sufficient degree of analysis to provide decision-makers with information which enables them to make a decision which intelligently takes account of environmental consequences. An evaluation of the environmental effects of a proposed project need not be exhaustive, but the sufficiency of an EIR is to be reviewed in the light of what is reasonably feasible. Disagreement among experts does not make an EIR inadequate, but the EIR should summarize the main points of disagreement among experts. The courts have looked not for perfection but for adequacy, completeness, and a good faith effort at full disclosure."

Upon completion of the review process, the final EIS/EIR would be submitted first to the Secretary of the Army, who would issue a Record of Decision regarding the adequacy of the document and the desirability of going forward with the project. If the Secretary reaches a decision in favor of construction, the EIS/EIR would go to Congress, who then decides whether or not to authorize the project. The analyses of the EPA would be considered in the authorization process.

On the State and local levels, the document must be approved first by the Board, which functions as a "responsible agency" (CEQA Guidelines, Section 15381) and represents the interests of the affected city and county governments. The Board would act as the project's "lead agency" (CEQA Guidelines, Section 15367) and submit the EIS/EIR to the State legislature for authorization. If authorization is received from both the State and Federal legislatures, the project can go to construction.

State and other local agencies may use the final EIS/EIR when they consider permits or approvals that may be associated with the project. Coordination with agencies

such as State Mining and Geology Board and the YSAQMD may be necessary to obtain permits or approvals.

5.9.4 Agencies, Organizations, and Persons Receiving Notification of Availability of the EIS/EIR

This section lists Federal, State, regional, and local public and private agencies and organizations that would either receive a copy of the Draft EIS/EIR or a notification of document availability. In addition to the regulatory agencies, agencies with special expertise or interest in evaluating environmental issues related to the project are included. Private agencies, organizations, and individuals who may be affected by the project or who have expressed an interest in the project through the public involvement process are also included.

Elected Officials

Governor of California
- Honorable Gray Davis

United States Senate
- Honorable Barbara Boxer
- Honorable Dianne Feinstein

House of Representatives
- Honorable Doug Ose
- Honorable Mike Thompson
- Honorable Wally Herger

California Senate
- Honorable Mike Machado

California Assembly
- Honorable Lois Wolk
- Honorable Richard Dickerson

United States Government Departments and Agencies

Fish and Wildlife Service
U.S. Geological Survey
Bureau of Land Management
Office of Environmental Project Review
Advisory Council on Historic Preservation
Natural Resources Conservation Service
Agricultural Stabilization and Conservation Service
Federal Highway Administration
Council on Environmental Quality
Environmental Protection Agency (Washington D.C. and San Francisco)
Federal Emergency Management Agency
National Marine Fisheries Service
National Park Service

State of California Governmental Agencies

Office of Historic Preservation
Senate Committee on Natural Resources
Assembly Committee on Water, Parks, and Wildlife
Department of Fish and Game
Department of Conservation
Department of Water Resources
    The Reclamation Board
    California Water Commission
State Water Resources Control Board
    Regional Water Quality Control Board
State Lands Commission
State Clearinghouse
Office of Transportation Planning
California Department of Transportation
California Air Resources Board
Native American Heritage Commission

Local Government

Yolo County Board of Supervisors
City of Woodland City Council
Woodland Chamber of Commerce
Yolo County Flood Control and Water Conservation District
Yolo County Department of Public Works
City of Woodland Community Development Department
City of Woodland Public Works
Yolo County Planning Department
Woodland Library

Organizations

Audubon Society
Cache Creek Nature Preserve
California Native Plant Society
California Northern Railroad/Rail America
California Wildlife Federation
Friends of Swainson's Hawk
Rumsey Indian Rancheria of Wintun Indians
Sierra Club

Persons

Bryce Birkman
Brenda Cedarblade
Mike Diepenbrock
Antonio Fernandez
Jean Harder
Mark Harrison
Pam Huston
Gary Johns
Kent Lang
Nancy Lea
Mark McComas
Jim Staker
Don Sharp
Bob Young

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Chapter 6

CHAPTER 6
LIST OF PREPARERS

Cache Creek upstream of I-5 near town of Yolo in 1995.

CHAPTER 6.0
LIST OF PREPARERS

Name/Expertise	Experience	Role in Preparation
Denise Ashley Word Processor CDM	7 years word processing experience with CDM, Leman Brothers, and KPMG	word processing, document editing
Courtney Black Environmental Engineer CDM	2 years experience in water quality/hydrologic engineering and wetlands studies with CDM, and the University of Florida	hydrology, engineering quantity estimates, & impact analysis
John Downs Biologist CDM	3 years experience biological & water resources consultation with CDM, the Lahontan Regional Water Quality Control Board, and Hydro Resources International	biological survey & impact analysis
Karen Enstrom Environmental Scientist California DWR	10 years experience wildlife biology	biological survey & impact analysis, document review
Patti Johnson Environmental Manager Corps	26 years experience cultural & environmental services	coordination, management & review, cultural resources
Sandra Lunceford Planner CDM	5 years experience environmental consulting with CDM, Montgomery Watson Harza, and Guitierrez-Palmberg, Inc.	cumulative effects and regulatory compliance
Paula Orlando Office Services Coordinator CDM	1.5 years experience environmental consulting coordination with CDM	production coordination
Patricia Reed Biologist CDM	3 years experience environmental consulting with CDM, Aspen Environmental Group, and Jones and Stokes Associates	biological survey & impact analysis
Auturo Smith Senior Drafter CDM	10 years experience engineering technician with CDM, U.S Air Force, and Spink Corporation.	drafting/graphics
Lynne Stevenson Technical Writer/Editor Corps	18 years experience in planning, environmental, and engineering studies/projects	review and technical editor
Michelle Wilen Planner CDM	2 years experience environmental consulting with CDM and Delta Environmental Consulting, Inc.	air quality, land use and planning, noise, and transportation
John Wondolleck Project Manager CDM	25 years experience environmental resource management with CDM	guidance, oversight, & review

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Levee break (right, middle) near County Road 102 (background) in 1983.

CHAPTER 7.0

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Levee boil in 1995.

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