

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

DRAFT FEASIBILITY REPORT
FOR POTENTIAL FLOOD DAMAGE
REDUCTION PROJECT

Executive Summary

EXECUTIVE SUMMARY

This Draft Feasibility Report addresses flooding problems and potential effects of alternative plans for flood damage reduction along the lower reach of Cache Creek, including the city of Woodland and vicinity. This report presents the results of a feasibility study performed jointly by the Federal sponsor, the U.S. Army Corps of Engineers, Sacramento District, and the non-Federal sponsors, the Reclamation Board of the State of California (Board) and the City of Woodland. The “Lower Cache Creek, Yolo County, CA, City of Woodland and Vicinity Draft Environmental Impact Statement/Environmental Impact Report for Potential Flood Damage Reduction Project” (Draft EIS/EIR) is available under a separate cover.

STUDY AREA

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

NEED FOR ACTION

Lower Cache Creek has a history of flooding. 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.

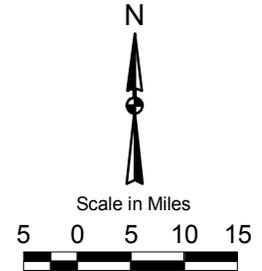
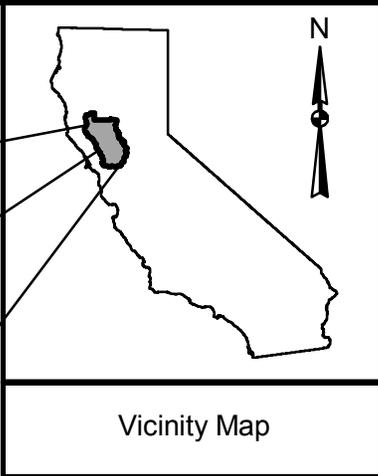
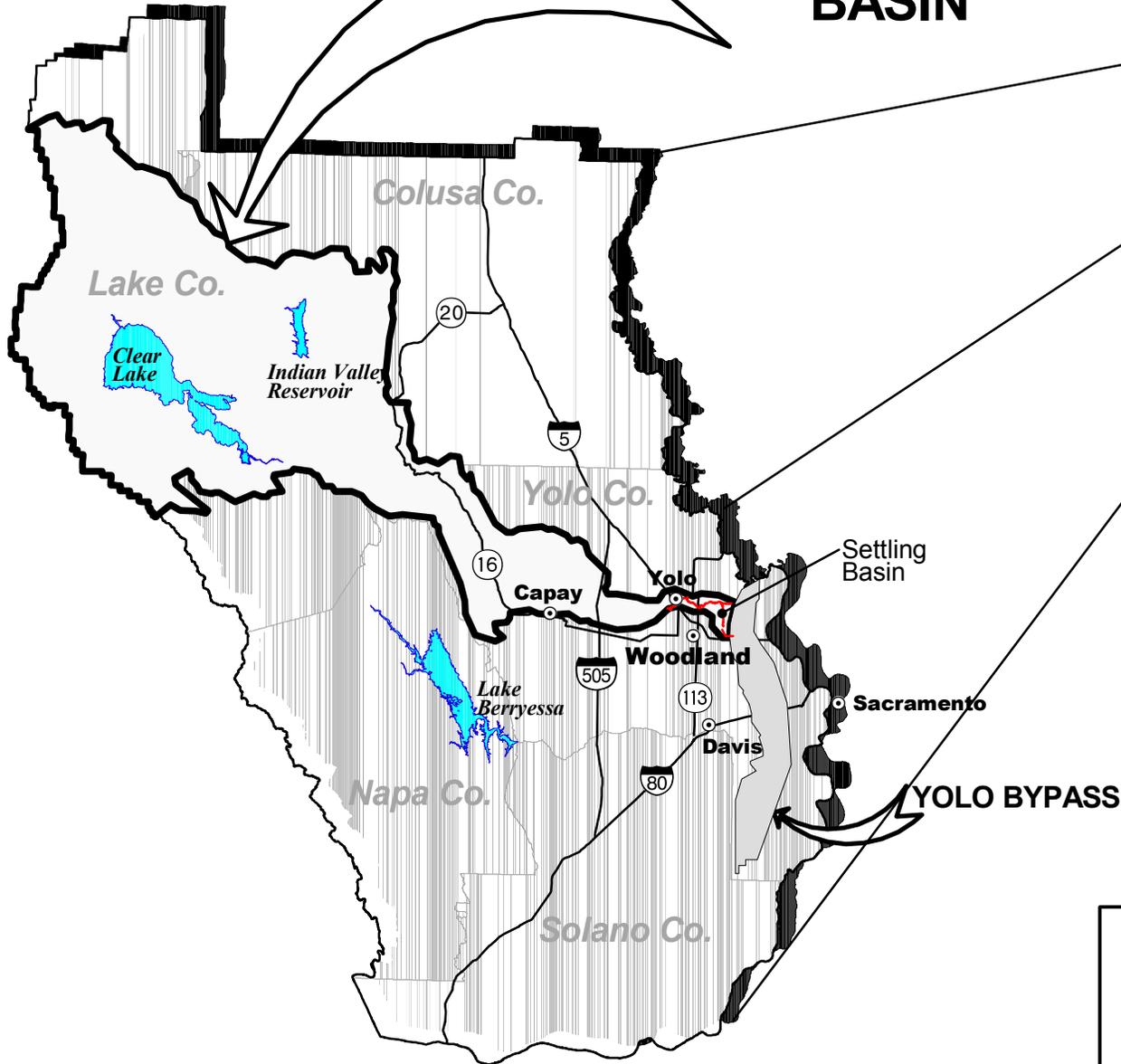
The flood hazard evaluation conducted for this study also determined that a significant portion of the project area is subject to floods having a 1 in 100 chance of occurring in any given year, as shown on Figure ES-2. The primary purpose of this study is to identify economically feasible and environmentally sensitive methods to reduce flood-related damages to Woodland and adjacent areas.

Without a flood damage reduction project, average annual flood damages to real property from overflows from Cache Creek are expected to be about \$12.4 million, most of which would be in Woodland. Other adverse effects and losses would include the potential for flood-related loss of life, contamination from sanitary sewage and hazardous materials, and the extended closure of the section of Interstate 5 (I-5) east of Woodland.

SIGNIFICANT ISSUES

The current flood protection system along the lower Cache Creek was designed to convey floodflows having a 1 in 10 chance of occurring in any given year with 3 feet of freeboard. Historically, the existing levee system has conveyed floodflows having an annual chance of occurrence of 1 in 20 by encroaching into the freeboard. Due to the

CACHE CREEK BASIN



LOWER CACHE CREEK, WOODLAND, CALIFORNIA
AREA FEASIBILITY STUDY

**GENERAL AND VICINITY MAP
CACHE CREEK BASIN**

SACRAMENTO DISTRICT, CORPS OF ENGINEERS
OCTOBER 2002

Figure ES-1

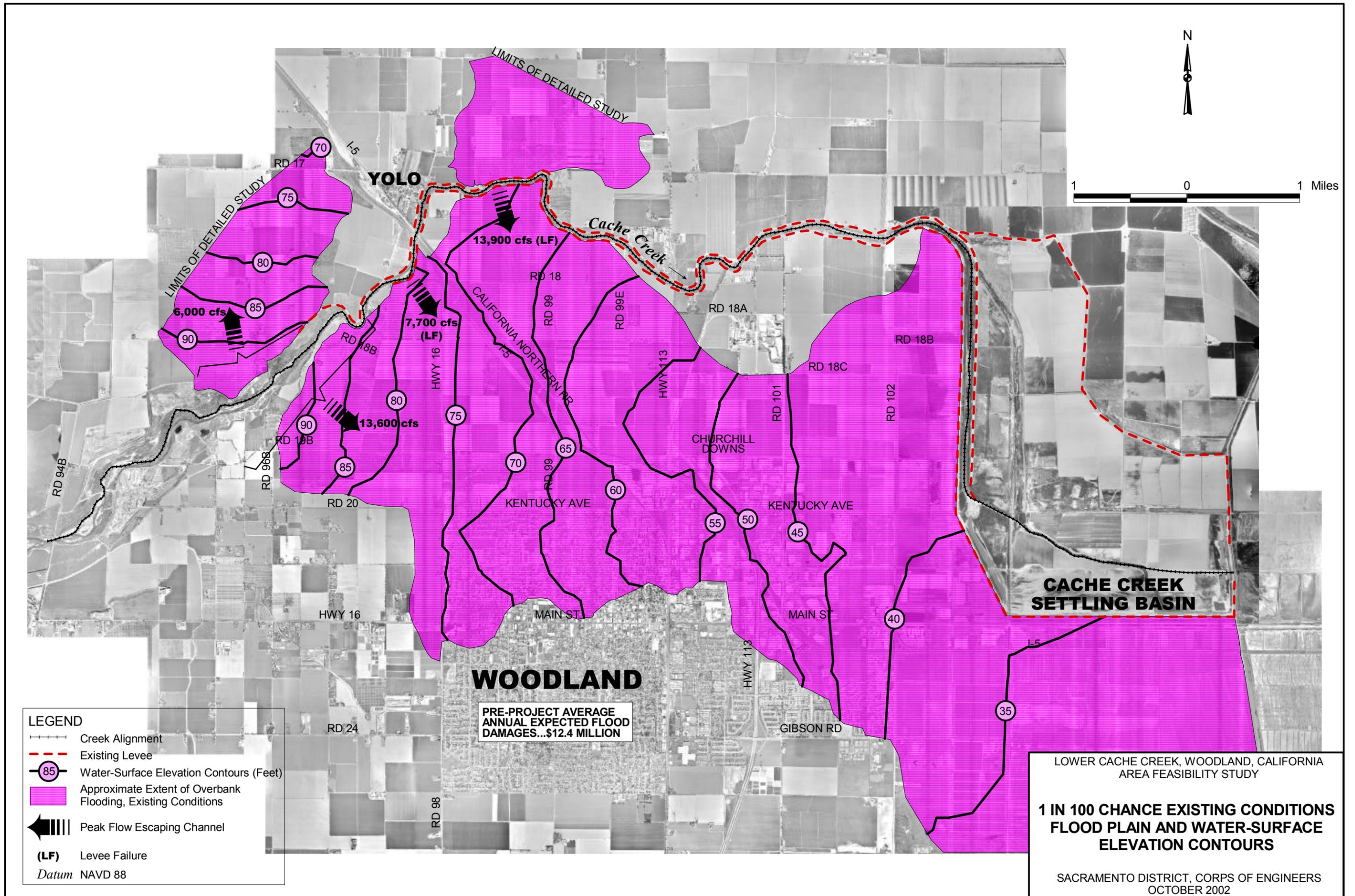


Figure ES-2

limited conveyance capacity of the lower reach of Cache Creek, the Federal Emergency Management Agency (FEMA) has issued new flood insurance rate maps that show significant areas of Yolo County and Woodland are subject to floods having a 1 in 100 chance of occurring in any given year.

Factors other than limited channel capacity also affect flooding in the area. These include the I-5 embankment and the west levee of the Cache Creek Settling Basin. These features tend to divert portions of the easterly overflow from Cache Creek toward Woodland.

Solving the flooding problems is not a simple matter of increasing the capacity of the existing system. Increasing the design flow of the channel and levee system without a corresponding increase in the flow area results in increased flow velocities. At some point, increased channel velocities require substantial rock slope protection measures (riprap) to protect banks and bridges against excessive scour. The rock slope protection measures are generally associated with significant environmental impacts.

Construction of new levees, raising existing levees, and rock slope protection require environmental mitigation. The shaded riverine aquatic habitat along the creek and the abundant number of elderberry bushes along the creek bank (the habitat of the endangered valley elderberry longhorn beetle) make the creek area an environmentally sensitive area. Other significant environmental considerations include the presence of habitat of the following special-status species: giant garter snake, Swainson's hawk, bank swallow, northwestern pond turtle, central valley steelhead, and chinook salmon.

FLOOD DAMAGE REDUCTION MEASURES AND PRELIMINARY PLANS

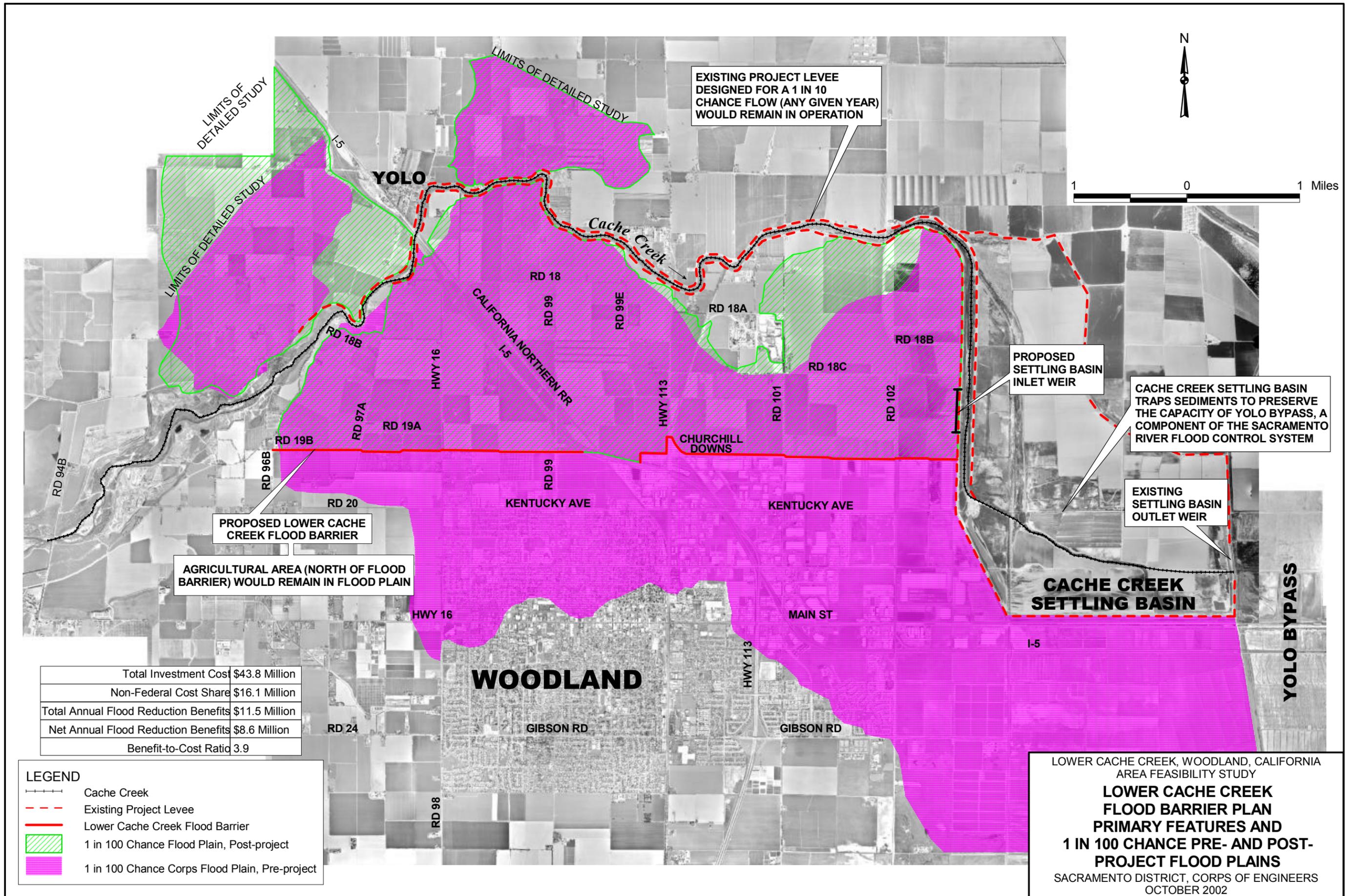
Structural and nonstructural measures were considered and evaluated based on their estimated costs, whether they met the planning objectives, and environmental feasibility. Preliminary plans that did not meet the project's objectives, had excessive costs, or had significant adverse environmental effects were eliminated from further study. Eliminated plans included flood storage on Cache Creek, channel clearing, raising the levees along approximately 8 miles of Cache Creek, and a combination of channelization and levees. Two plans, herein referred to as the Lower Cache Creek Flood Barrier (LCCFB) Plan and the Modified Wide Setback Levee (MWSL) Plan, were selected for further evaluation. Design details, costs, flood reduction benefits, potential environmental effects, and mitigation requirements were determined for these two plans.

The Draft Feasibility Report was prepared for a range of levee crown widths between 12 and 20 feet for the MWSL and the LCCFB Plans. Crown widths will be refined for the selected plan.

EVALUATION OF PLANS CONSIDERED IN DETAIL

LOWER CACHE CREEK FLOOD BARRIER PLAN

The LCCFB Plan would include constructing a levee along the northern urban limit line of Woodland, as shown on Figure ES-3. The LCCFB levee would be



EXISTING PROJECT LEVEE
DESIGNED FOR A 1 IN 10
CHANCE FLOW (ANY GIVEN YEAR)
WOULD REMAIN IN OPERATION

PROPOSED
SETTLING BASIN
INLET WEIR

CACHE CREEK SETTLING BASIN
TRAPS SEDIMENTS TO PRESERVE
THE CAPACITY OF YOLO BYPASS, A
COMPONENT OF THE SACRAMENTO
RIVER FLOOD CONTROL SYSTEM

EXISTING
SETTLING BASIN
OUTLET WEIR

PROPOSED LOWER CACHE
CREEK FLOOD BARRIER

AGRICULTURAL AREA (NORTH OF FLOOD
BARRIER) WOULD REMAIN IN FLOOD PLAIN

CACHE CREEK
SETTLING BASIN

Total Investment Cost	\$43.8 Million
Non-Federal Cost Share	\$16.1 Million
Total Annual Flood Reduction Benefits	\$11.5 Million
Net Annual Flood Reduction Benefits	\$8.6 Million
Benefit-to-Cost Ratio	3.9

LEGEND

- Cache Creek
- - - Existing Project Levee
- Lower Cache Creek Flood Barrier
- ▨ 1 in 100 Chance Flood Plain, Post-project
- 1 in 100 Chance Corps Flood Plain, Pre-project

LOWER CACHE CREEK, WOODLAND, CALIFORNIA
AREA FEASIBILITY STUDY
**LOWER CACHE CREEK
FLOOD BARRIER PLAN
PRIMARY FEATURES AND
1 IN 100 CHANCE PRE- AND
POST-PROJECT FLOOD PLAINS**
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
OCTOBER 2002

Figure ES-3

approximately 6 miles in length, originating near the intersection of CR 19B and CR 96B and extending to the Cache Creek Settling Basin, just north of Woodland. At the west end, the levee would be outflanked by floods having a peak flow greater than 70,000 cfs. The volume of these flows is small and would not result in flood damages in Woodland.

Where possible, existing roads would be raised to match the top-of-levee elevation of the LCCFB. In locations where the roads could not be raised sufficiently, stoplog structures would be constructed to close the gap in the levee. A stoplog structure would also be provided at the California Northern Railroad opening in the I-5 embankment.

A section of the west levee of the settling basin would be removed for the construction of a concrete inlet weir. Water levels above the weir crest elevation would drain into the settling basin and then into the Yolo Bypass. Water levels below the inlet weir crest elevation would drain into the settling basin through a low-level drainage structure with culverts. Flapgates would be installed on the culverts to prevent backflow from the settling basin into the area west of the settling basin. Gated culverts would also be installed through the LCCFB levee to convey water to Woodland's pumping station. The amount of water flowing through this culvert would be controlled by the City of Woodland.

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

The LCCFB would not reduce flood damages to the largely agricultural area north of the city or to the area north of Cache Creek. The plan would require occasional flowage easements on some areas north of the LCCFB where increases in the depth and duration of flooding would be substantial. The area where occasional flowage easements would be required is primarily between CR 101 and the west levee of the settling basin. Flood protection to the area between the LCCFB and Cache Creek would continue to rely on the existing Cache Creek levee system, which the State of California would continue to operate and maintain.

The estimated first cost is \$41.0 million and total investment cost (includes interest during construction) is \$43.8 million for the LCCFB Plan, with a non-Federal cost share of \$16.1 million. The total annual flood damage reduction benefits are estimated at \$11.5 million, resulting in a net annual benefit of \$8.6 million. The benefit-to-cost ratio is estimated to be 3.9.

Plan Accomplishments

- The LCCFB Plan would have a 97 percent conditional annual chance of not flooding for the 1 in 100 chance flood event.
- The LCCFB Plan would remove Woodland and an area of Yolo County south of the LCCFB from the FEMA 1 in 100 chance flood plain associated with Cache Creek.

- Although not a feature of the LCCFB Plan, the existing levee system would continue to be maintained to provide the existing level of flood protection to the areas adjacent to lower Cache Creek.
- The LCCFB Plan would involve significantly less direct effects to the Cache Creek biological environment than the Modified Wide Setback Levee Plan.
- The LCCFB Plan would involve the acquisition of significantly fewer residences and structures than the Modified Wide Setback Levee Plan and the conversion/loss of significantly less agricultural land.

MODIFIED WIDE SETBACK LEVEE PLAN

The MWSL Plan consists of constructing approximately 19 miles of levees along lower Cache Creek, as shown on Figure ES-4. Levee improvements begin at the west levee of the settling basin and terminate upstream near CR 94B.

The levee alignments were selected to reduce the environmental mitigation associated with the location of elderberry plants and also to reduce effects to homes and farm structures. All bridge approaches would be modified. 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 rock slope protection and subsequent environmental mitigation. Concrete linings would still be necessary under bridges and in the main channel for erosion and scour protection.

Although rock slope protection is reduced at the bridges, rock slope protection would be required on a small portion of the left bank downstream from I-5. Furthermore, hard points (stone fills) would be installed at the outer bend near the vicinity of the town of Yolo. Due to the geomorphology of Cache Creek in these locations, bank 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 overbank drainage. Additionally, approximately 70 percent of the existing levee system would be removed to allow water to flow back and forth from the channel and overbank area. The other 30 percent is expected to naturally degrade over time, minimizing disturbance to the nearby elderberry shrubs and substantially reducing environmental effects.

The MWSL Plan would, however, protect a larger area than the LCCFB Plan, including areas both north and south of the creek. The area between the levees of the MWSL would be inundated.

The estimated first cost is \$153 million, and the total investment cost (includes interest during construction) is \$163 million for the MWSL Plan, with a non-Federal cost share of \$128 million. The total annual flood damage reduction benefits are estimated at \$12.6 million, resulting in a net annual benefit of \$1.6 million. The benefit-to-cost ratio is estimated to be 1.1.

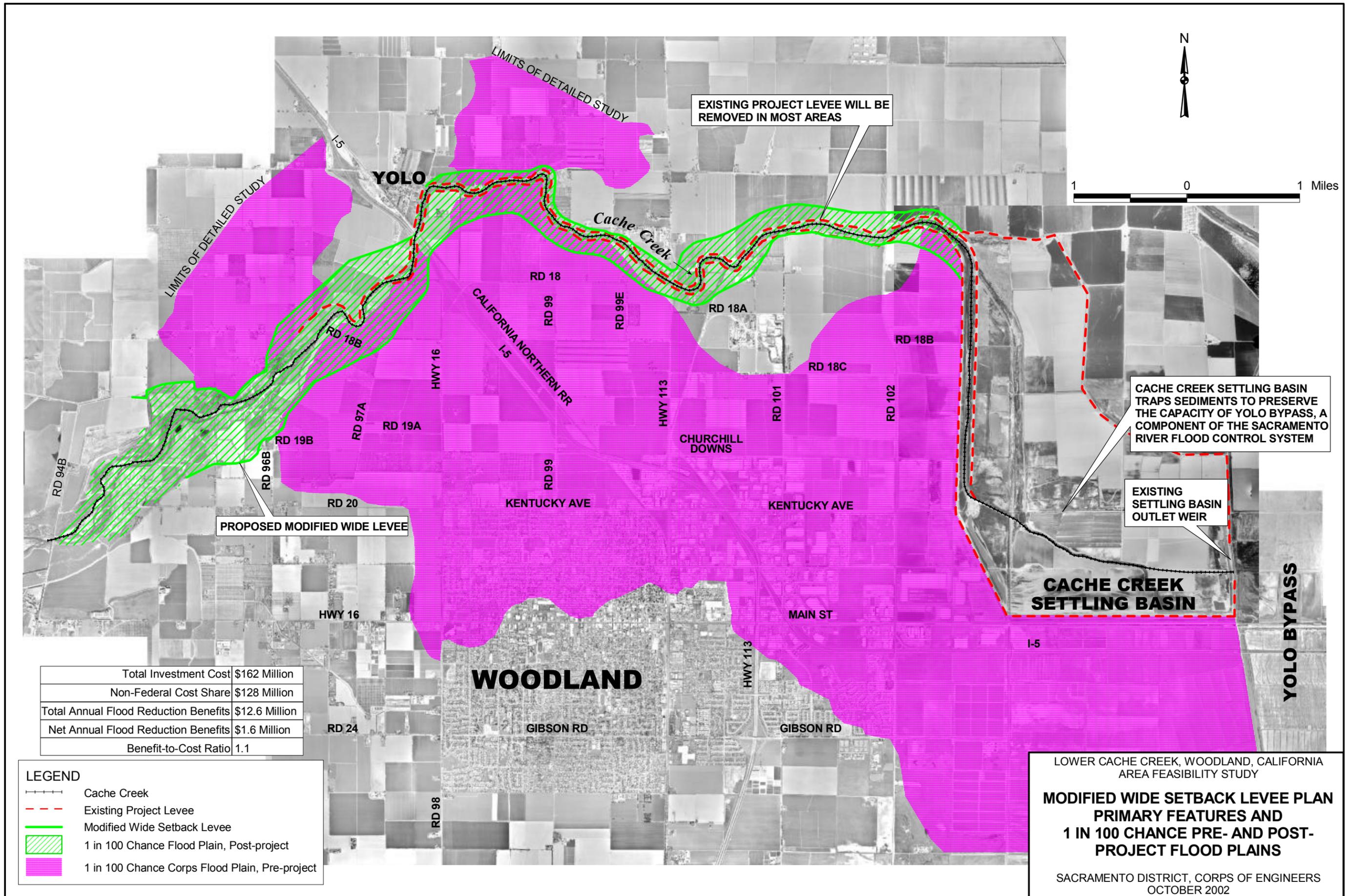


Figure ES-4

Plan Accomplishments

- The MWSL Plan would have an 89 percent conditional annual chance of not flooding for the 1 in 100 chance flood event.
- The MWSL Plan would remove Woodland and a large portion of the land north and south of lower Cache Creek from the FEMA 1 in 100 chance flood plain.
- The MWSL Plan would allow for future restoration of Cache Creek.
- The MWSL Plan would involve fewer transportation effects from flooding than the LCCFB Plan.

MAJOR CONCLUSIONS AND FINDINGS

The No-Action Plan would continue to provide reliable protection from floods in lower Cache Creek that have up to a 1 in 10 chance of occurring in any given year¹. Residences within the FEMA 1 in 100 chance flood plain that have federally insured mortgages and some businesses/facilities would be required to acquire flood insurance. Approximately one-third of Woodland would continue to remain subject to damages from future floods, and the flood hazard would continue to be significant. Socioeconomic effects of this would be significant. According to the planning objectives, this plan is unacceptable.

The LCCFB Plan would reduce flood damages to the city of Woodland and unincorporated areas south of the LCCFB. The plan would eliminate flood insurance requirements for residences and businesses within the city limits. Unincorporated areas to the north of the LCCFB and north of Cache Creek would remain within the FEMA 1 in 100 chance flood plain and continue to have reliable protection from floods with a 1 in 10 chance of occurrence in a given year. Continued flood fighting would be necessary; bank erosion and undercutting of the existing levee system would continue and repairs would be required. The LCCFB would be constructed along the northern urban limit line. This plan is consistent with the General Plans of the city and county. Environmental effects of the LCCFB on endangered species can be mitigated, and there appear to be no extraordinary construction requirements that would make this plan difficult to implement.

The MWSL Plan would provide Woodland and the unincorporated land to the north and south of the levee system with a minimum protection from floods from Cache Creek with a 1 in 100 chance of occurring in any given year. This plan would eliminate flood insurance requirements for residences and businesses in this area and would reduce the risk of flooding and closure of the transportation system, including I-5. Continued maintenance of the existing levee system would not be necessary, and, in general, the creek would be allowed to meander. This plan would have significantly greater effects to

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.

biological resources and special-status species compared to the LCCFB Plan, require extensive mitigation.

A summary comparison between the No-Action, the LCCFB, and the MWSL Plan is provided in Table ES-1, located at the end of this Executive Summary. Review of the table indicates that only the LCCFB and the MWSL Plan meet the planning and evaluation criteria. Of these two, the LCCFB Plan is the National Economic Development (NED) Plan, has the greatest net benefits, has the greatest benefit-to-cost ratio, and has the least environmental impacts.

The environmental effects, mitigation measures, and the level of significance with mitigation are evaluated in the Draft EIS/EIR. A summary of this information is presented in Table ES-2, located at the end of this Executive Summary, for the LCCFB Plan and Table ES-3 for the MWSL Plan.

UNRESOLVED ISSUES

Unresolved issues are defined as subject matter that requires further information or areas where a consensus is needed to make a final determination on a given issue. At the time of this report, certain studies and reports have either not been undertaken or have not been completed, and a resolution of where public support lies has not been attained. It is anticipated that resolution of the unresolved issues will not alter the major conclusions and findings of this report.

A quantitative analysis of the impacts that the LCCFB and MWSL Plans would have on the sedimentation characteristics of the settling basin has not been completed. A qualitative analysis of the sedimentation has been performed and it is clear that the LCCFB Plan would have a lower level of impacts than the MWSL Plan. A quantitative analysis is not necessary during the feasibility phase to determine that the impacts from the LCCFB Plan are less than the MWSL Plan. This conclusion was made based on the fact that design flows for the MWSL Plan would be contained in Cache Creek and directed into the settling basin, whereas, the LCCFB Plan would allow Cache Creek overflow to pond adjacent to the LCCFB and settling basin levees (allowing sediment to drop out) prior to discharging into the settling basin. Therefore, the sedimentation study for the LCCFB Plan will be conducted during the planning, engineering, and design (PED) phase to detail operational impacts and to describe modified operation and maintenance for sedimentation in the settling basin.

This proposed action has the potential to affect several special-status species. 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 of the Draft EIS/EIR). 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. 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 historic buildings within the project area. It may be determined in the PED phase that these buildings may require flood proofing. If action were 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 intensive cultural resources evaluation would need to be conducted.

The California Department of Water Resources (DWR) would pay its share of the non-Federal cost of the Lower Cache Creek Flood Damage Reduction Project from the general California State Fund. The City of Woodland is investigating ways to finance its share of the non-Federal cost of the project.

The acquisition of the lands and easements necessary to construct and operate the project is expected to be difficult, costly, and time consuming. Both plans are controversial with the affected property owners. A number of issues over compensation for lands and easements required for and affected by the LCCFB are expected to be raised during the public comment period. Some of the issues that have been raised to date include loss of value/development potential, loss of opportunity to plant higher value crops, compensation for flood damages, loss in financing capability, and loss of value for being in a formalized flood plain.

TENTATIVELY 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 Feasibility Report. The LCCFB Plan has also been identified by the study team as the least environmentally damaging plan. It is also the plan with the highest net benefits, consistent with the Federal objective for a project to contribute to National economic development while protecting the environment; it is the NED Plan.

Several additional regulatory requirements will need to be met as the project moves forward toward implementation. The Status of Compliance of the flood damage

reduction study for each law and executive order is outlined in Table ES-4, following this Executive Summary.

Table ES-1. Summary Comparison Between the No-Action, the LCCFB, and the MWSL Plans

	No Action	LCCFB Plan (NED)	MWSL Plan
1. PLAN DESCRIPTION			
Annual Performance (chance of being exceeded in any year)	1 in 10	1 in 500	1 in 500
Conditional Annual Percent Chance of not Flooding for 100-year event		97.3%	89.3%
2. IMPACT ASSESSMENT			
A. Economic			
(1) First Costs	\$0	\$40,973,000	\$152,594,000
(2) Total Investment Cost	\$0	\$43,761,000	\$162,975,000
(3) Annual Cost	\$0	\$2,923,000	\$10,936,000
(4) Total Annual Benefits	\$0	\$11,541,000	\$12,550,000
(5) Annual Net Benefits	\$0	\$8,618,000	\$1,614,000
(6) Benefit-to-Cost Ratio	NA	3.9	1.1
B. Environmental Quality (EQ)			
(1) Air/Noise	Normal air quality and noise levels created by traffic, business, and industrial activities.	Temporary increased air quality pollutant and noise levels during 2-year construction period.	Temporary increased air quality pollutant and noise levels during 3-year construction period.
(2) Vegetation & Wildlife	Existing vegetation typical for streams in northern California. Good habitat for woodland songbirds and urban wildlife.	Permanent loss of 137 acres to project features.	Permanent loss of 199 acres to project features.
(3) Land Use	No effect	Converts 104 acres of agricultural lands to flood control uses; loss of 100 acres of prime farmland.	Converts 216 acres of agricultural lands to flood control uses; loss of 158 acres of prime farmland and indirect effects to farm operations on 1,254 acres of prime farmland between the setback levees.
(4) Special Status Species	Loss of habitat associated with rehabilitation and maintenance of existing levee system (2,100 linear feet of riprap and 6 miles of new levee construction).	Loss of habitat (160 acres and 100 trees) affecting Swainson's hawk, giant garder snake, northwestern pond turtle, steelhead, and Chinook salmon.	Loss of habitat (199 acres and 1,176 trees) affecting: valley elderberry longhorn beetle (100 stems direct, 200 stems indirect), Swainson's hawk, giant garder snake, northwestern pond turtle, steelhead and chinook salmon.

Table ES-1. Summary Comparison Between the No-Action, the LCCFB, and the MWSL Plans

	No Action	LCCFB Plan (NED)	MWSL Plan
(5) Settling Basin	No effect	Possible effect on the distribution of sediments within basin. No decrease in project life of basin. Removal of 1 mile of training levee.	Possible effect on the distribution of sediments within basin. Substantial increase in peak floodflows into the settling basin. No decrease in project life of basin. Removal of 2 miles training levee.
(6) Cultural Resources & Historic Properties	Cultural resources and historic properties subject to flood damages from events greater than 1 in 20 chance.	Protects cultural resources and historic properties in Woodland (south of the LCCFB). Resources and historic properties between Cache Creek and the LCCFB would remain subject to flood damages.	Archeological and historic sites could be affected by levee construction, degradation of the present levee, and accelerated erosion. Once levee construction is complete, all archeological and historic sites on the landside of the MWSL would be protected.
C. Other Social Effects			
(1) Life, Health, and Safety	Significant flood threat to one-third of Woodland.	Reduces flood threat to Woodland.	Reduces flood threat to city of Woodland and to residents “behind” the setback levees.
(2) Community Cohesion (displacement of people & businesses)	Increased insurance costs to owners within the FEMA floodplain. Additional costs to develop properties within the FEMA floodplain.	Some displacement of residents north of flood barrier levee. Flood depths and durations increased in some areas north of flood barrier levee requiring the acquisition of occasional flowage easements (1,816 acres), the acquisition and relocation of one resident and structural measures to mitigate for induced flooding at six residential properties.	Increased displacement of residents and agricultural operations to residents between the new levees. Requires the acquisition of permanent flowage easements (1,679 acres) and the acquisition and relocation of 32 residential and business structures.
3. PLAN EVALUATION			
A. Contribution to Planning Objectives			
(1) Efficiently reduces flood damages to maximum practical extent	Average Annual Flood Damages (AAD) is \$12,429,000. Does not meet objective	Residual AAD = \$888,000 for a 93% reduction in AAD. Meets objective.	Residual AAD = \$794,000 for a 94% reduction in AAD. Meets objective.

Table ES-1. Summary Comparison Between the No-Action, the LCCFB, and the MWSL Plans

	No Action	LCCFB Plan (NED)	MWSL Plan
(2) Provide optimum level of flood protection	Damage outputs starting at the 20-year flood level. Does not meet objective	1 in 500 chance for Woodland, NED plan. Meets objectives.	1 in 500 chance for Woodland and most of the floodplain. Meets objectives
(3) Minimize environmental impacts	Existing vegetation typical for streams in northern California. Excellent habitat for woodland birds and urban wildlife. Meets objective.	Permanent loss of 104 acres to project features. Temporary disturbed areas to be restored. Meets objective.	Permanent loss of 216 acres to project features. Potential loss of 2,135 acres between the levees. Temporary disturbed areas to be restored. Meets objective.
B. Response to Planning Constraints			
(1) Financial capability of local partners to cost-share project construction	N/A	Local cost share of \$16,092,000 is within local capabilities.	Local cost share of \$127,702,000 is not within local capabilities.
(2) Institutional acceptability	Ongoing high level of flood damages not acceptable to local partners. Does not meet constraint.	1 in 500 chance protection acceptable to local partners and meets Federal criteria. Meets constraint.	1 in 500 chance protection acceptable to local partners and meets Federal criteria. Meets constraint.
(3) Public acceptability	Not acceptable. Does not meet constraint.	Not fully acceptable. Partially meets constraint.	Not fully acceptable. Partially meets constraint.
C. Response to Evaluation Criteria			
(1) Completeness	Does not meet objective.	Meets objective.	Meets objective.
(2) Effectiveness	Does not meet objective.	Meets objective.	Meets objective.
(3) Efficiency	Does not meet objective.	Meets objective.	Meets objective.
(4) Acceptability	Does not meet objective.	Meets objective. Public opposition to increased flood depths and durations north of flood barrier levee.	Meets objective. No public support for conversion of agricultural land to flood control uses.

Table ES-2. Summary of Environmental Effects and Mitigation – LCCFB Plan

Significant Effects	Mitigation and Best Management Practices	Level of Significance with Mitigation
<i>Social and Economic Resources</i>		
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.	Landowners and homeowners would be compensated for land/home value effects/takings.	LTS
<i>Land Use</i>		
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
<i>Agriculture, Prime and Unique Farmlands</i>		
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
<i>Transportation</i>		
Temporary direct transportation effects would include lane closure during road repair, roadway safety hazards, and an increase in traffic volume.	<ul style="list-style-type: none"> • 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
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.	<p>The mitigation listed below would reduce the effects, but not to a less-than-significant level.</p> <ul style="list-style-type: none"> • Detours would be available to circumvent flooded roadways. 	SU
<p>¹ LTS = Less than significant ² SU = Significant unavoidable</p>		

Table ES-2. Summary of Environmental Effects and Mitigation – LCCFB Plan

Significant Effects	Mitigation and Best Management Practices	Level of Significance with Mitigation
Noise		
Construction of the flood barrier would temporarily produce decibel levels above the significance threshold for some sensitive receptors during construction.	<p>The mitigation listed below would reduce the effects, but not to a less-than-significant level.</p> <ul style="list-style-type: none"> • 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.	<p>The mitigation listed below would reduce NO_x emissions, but not to a less-than-significant level.</p> <ul style="list-style-type: none"> • 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.	<p>The mitigation listed below would reduce PM₁₀ 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:</p> <ul style="list-style-type: none"> • 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. 	SU

Table ES-2. Summary of Environmental Effects and Mitigation – LCCFB Plan

Significant Effects	Mitigation and Best Management Practices	Level of Significance with Mitigation
<i>Air Quality (continued)</i>		
	<ul style="list-style-type: none"> Vegetation would be replanted in disturbed areas as quickly as possible following the completion of construction. 	
<i>Settling Basin</i>		
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
<i>Water Quality</i>		
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
<i>Vegetation and Wildlife</i>		
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 of Draft EIS/EIR).	LTS
Construction-related effects would include disturbance from equipment and crews and potential disturbance of species.	Mitigation measures include: <ul style="list-style-type: none"> 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 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-2. Summary of Environmental Effects and Mitigation – LCCFB Plan

Significant Effects	Mitigation and Best Management Practices	Level of Significance with Mitigation
<i>Special-Status Species</i>		
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 of Draft EIS/EIR.	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 of Draft EIS/EIR.	LTS
<i>Cultural Resources</i>		
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
<i>Esthetic and Visual Resources</i>		
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-3. Summary of Environmental Effects and Mitigation - MWSL Plan

Significant Effects	Mitigation and Best Management Practices	Level of Significance with Mitigation
<i>Social and Economic Resources</i>		
The proposed setback alignment would result in the relocation of 32 residences and up to 182 farm structures.	Landowners and homeowners would be compensated for land and home value effects/takings to the extent required by law.	LTS ¹
<i>Land Use</i>		
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
<i>Agriculture, Prime and Unique Farmlands</i>		
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
<i>Transportation</i>		
Temporary direct transportation effects would include lane closure during road repair, roadway safety hazards, and an increase in traffic volume.	<ul style="list-style-type: none"> • 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
<i>Noise</i>		
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. <ul style="list-style-type: none"> • Construction equipment would be outfitted and maintained with noise-reduction devices such as mufflers. • Construction would be limited to daytime hours. 	SU
¹ LTS = Less than significant ² SU = Significant unavoidable		

Table ES-3. Summary of Environmental Effects and Mitigation - MWSL Plan

Significant Effects	Mitigation and Best Management Practices	Level of Significance with Mitigation
<i>Air Quality</i>		
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.	<p>The following mitigation would reduce PM₁₀ emissions, but not to a less-than-significant level.</p> <p>The lead agency would provide a dust suppression plan that would likely include the following measures:</p> <ul style="list-style-type: none"> • 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. • 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
<i>Settling Basin</i>		
The removal of the training levee could alter the distribution of sedimentation in the settling basin.	Design of the MWSL Plan would incorporate the function of the settling basin.	LTS

Table ES-3. Summary of Environmental Effects and Mitigation - MWSL Plan

Significant Effects	Mitigation and Best Management Practices	Level of Significance with Mitigation
<i>Water Quality</i>		
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
<i>Vegetation and Wildlife</i>		
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 acre 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 of Draft EIS/EIR)	LTS
<i>Vegetation and Wildlife (continued.)</i>		
Construction-related effects would include disturbance from equipment and crews and potential disturbance of species.	Mitigation measures include: <ul style="list-style-type: none"> • 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 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
<i>Special-Status Species</i>		
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 in Draft EIS/EIR.	LTS

Table ES-3. Summary of Environmental Effects and Mitigation - MWSL Plan

Significant Effects	Mitigation and Best Management Practices	Level of Significance with Mitigation
<i>Special-Status Species (continued)</i>		
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 of Draft EIS/EIR.	LTS
<i>Cultural Resources</i>		
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
<i>Esthetic and Visual Resources</i>		
Effects would include the extension of bridges and the presence of a new viewblock to numerous rural residences.	Mitigation measures would include reseeded the new levees; however, this would not reduce the effect to a less-than-significant level.	SU

Table ES-4. 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.”	