

APPENDIX A

Draft U.S. Fish and Wildlife Service Coordination Act Report



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
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IN REPLY REFER TO:
HC-COE

March 29, 2002

District Engineer
Corps of Engineers, Sacramento District
ATTN: Chief, Planning Division
1325 J Street
Sacramento, California 95814-2922

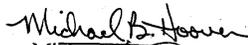
Dear Colonel Conrad:

Enclosed is the U.S. Fish and Wildlife Service's revised draft Fish and Wildlife Coordination Act (FWCA) report for the Corps of Engineer's Lower Cache Creek Flood Control Project, in Yolo County, California. This report was revised as requested because of a change in Alternative 3. This report has been prepared under the authority of, and in accordance with, the provisions of section 2(b) of the FWCA (48 stat.401, as amended; 16 U.S.C. 661 et seq.).

By copy of this letter, this report is being circulated to the agencies and offices listed below for review and comment. We would appreciate receipt of any comments on this draft report within 30 days of receipt of this report.

If you have any questions or comments regarding this report, please contact Jennifer Bain of my staff at (916) 414-6724.

Sincerely,


Michael B. Hoover
Acting Field Supervisor

Enclosure

cc:
AES, Portland, OR
CDFG, Region 2, Rancho Cordova, CA (Attn: Craig Stowers)
USCOE, Sacramento, CA (Attn: Patti Johnson)
DWR, Sacramento, CA (Attn: Karen Enstrom)
CDM, Sacramento, CA (Attn: John Wondolleck)

EXECUTIVE SUMMARY

The U.S. Fish and Wildlife Service (Service) is assisting the U.S. Army Corps of Engineers (Corps) in the preparation of a Feasibility Study and Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the Lower Cache Creek Flood Control Project, Yolo County, California. The California Department of Water Resources is the project's non-Federal sponsor and the City of Woodland is the local sponsor. The objective of the project is to reduce potential flood risk within the City of Woodland and the unincorporated areas of Yolo County.

Three alternatives are being evaluated including the no action alternative (Alternative 1). Alternative 2 involves constructing about 6 miles of new levee just north of the City of Woodland. The area between the new levee and Cache Creek would serve as a flood bypass. Alternative 3 involves constructing about 19 miles of flood control structures consisting of a combination of new setback levees and raising of existing levees. The setback levees would vary in distance from the creek, but would be up to 2,000 feet away from the channel.

- (3) This report identifies fish and wildlife resources within the project area, and impacts of the proposed flood control project on these resources. It provides recommendations to protect existing fish and wildlife resources and to minimize resource losses caused by project construction. Habitat Evaluation Procedures (HEP) was used to assess project impacts on terrestrial resources in the project area.
- (4) Under Alternative 2, about 0.28 acre of scrub shrub, 121.9 acres of agriculture/ruderal, and 1.5 acres of orchard habitats would be affected. An additional 0.52 acre of upland would be affected by placing riprap along the Interstate 5 (I-5) embankment. To mitigate for the loss of scrub shrub, the 0.28 acre of scrub shrub removed for the haul road would need to be replanted as well as development of an additional 0.03 acre for a total planting of 0.31 acre of scrub shrub. The loss of 0.52 acre of upland would be mitigated at a 1:1 ratio. In addition, the loss of 54 native tree species and 46 non-native tree species would be mitigated at a 5:1 and 1:1 ratio respectively and planted on 2.89 acres. The upland and tree mitigation should occur at a 3.41-acre site. The loss of agricultural land would be mitigated with the planting of native grasses and forbs on the new levee. The remaining effects to fish and wildlife resources in the area would occur from cutting off the water to an agricultural ditch, removing a training levee, and placing riprap along existing levees. These actions would effect the federally listed threatened giant garter snake and would be addressed during formal consultation, pursuant to section 7 of the Endangered Species Act of 1973, as amended (Act).
- (5) Under Alternative 3, about 9.01 acres of riparian forest, 0.69 acre of shaded riverine aquatic (SRA), 174 acres of agricultural/ruderal, and 49 acres of orchard habitats would be affected. Because the riparian and SRA cover-types are also potential endangered or threatened species habitat, project effects and development of conservation measures will be addressed in consultation under section 7 of the Act. As with Alternative 2, loss of agricultural/ruderal land

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would be mitigated with the creation and seeding with native grasses and forbs of the new levee. The loss of 1,176 trees would be mitigated at a ratio of 1.5:1 and result in the planting of 1,764 native riparian tree species on 16.2 acres. This mitigation should occur on lands currently in the agriculture/ruderal cover-type and border the current riparian corridor.

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TABLE OF CONTENTS

EXECUTIVE SUMMARY i

INTRODUCTION 1

AREA DESCRIPTION 2

PROJECT DESCRIPTION 2

 Alternative 1, No Action 2

 Alternative 2, Flood Barrier 2

 Alternative 3, Setback Levee 6

EXISTING BIOLOGICAL RESOURCES 9

 Vegetation 9

 Wildlife 10

 Fisheries 11

 Endangered Species 11

FUTURE CONDITIONS WITHOUT THE PROJECT 12

 Vegetation 12

 Wildlife 12

 Fisheries 12

FUTURE CONDITIONS WITH THE PROJECT 13

 Alternative 2, Lower Cache Creek Flood Barrier 13

 Vegetation 13

 Wildlife 14

 Fisheries 14

 Endangered and Threatened Species 14

 Alternative 3, Setback Levee 15

 Vegetation 15

 Wildlife 16

 Fisheries 17

 Endangered and Threatened Species 17

DISCUSSION 18

 Fish and Wildlife Service's Mitigation Policy 18

 Resource Categories 19

 General Methodology 21

 Mitigation Approaches 21

REVISED DRAFT - SUBJECT TO REVISION

RECOMMENDATIONS 22

LITERATURE CITED 23

LIST OF APPENDICES

Appendix A Federal Agencies' Responsibilities Under Sections 7(a) and (c) of the
Endangered Species Act

LIST OF FIGURES

Figure 1. Vicinity map for the Lower Cache Creek Flood Control Project 3

Figure 2. Alternative 2 Flood Barrier for the Lower Cache Creek Flood Control Project - 4

Figure 3. Alternative 3 Setback Levee for the Lower Cache Creek Flood Control Project 7

LIST OF TABLES

Table 1. Summary of cover-types and acreages that would be effected under
Alternative 2 of the Lower Cache Creek Flood Control Project, California . . 13

Table 2. Summary of individual tree losses under Alternative 2, of the Lower Cache
Creek Flood Control Project, California 13

Table 3. Summary of cover-types and acreages that would be effected under
Alternative 3 of the Lower Cache Creek Flood Control Project, California . . 15

Table 4. Summary of individual tree losses under Alternative 3 of the Lower Cache
Creek Flood Control Project, California 16

Table 5. Evaluation species, resource categories, and mitigation planning goals for the
cover-types found within the Lower Cache Creek Flood Control Project 20

REVISED DRAFT - SUBJECT TO REVISION

INTRODUCTION

This is the U.S. Fish and Wildlife Service's (Service) revised draft Fish and Wildlife Coordination Act (FWCA) report for the Lower Cache Creek, Yolo County, Woodland Area Feasibility Study. This report is prepared under the authority of, and in accordance with the FWCA, as amended. This study was authorized by the Flood Control Act of 1962 (Public Law 87-874). The California Department of Water Resources is the project's non-Federal sponsor and the City of Woodland is the project's local sponsor. A reconnaissance study was completed in June 1994.

The information presented is based primarily upon project planning information made available by the Corps of Engineers (Corps), various reports pertinent to the project area, and application of the Habitat Evaluation Procedures (HEP) methodology. Coordination with the National Marine Fisheries Service, California Department of Fish and Game, and the City of Woodland will be accomplished by providing a copy of this report for comments. Comments and responses will be included in the final report.

Design capacity for Cache Creek is 30,000 cubic feet per second (cfs). In 1958, 1983, and 1995 Cache Creek rose to the top of both levees and overflowed toward the cities of Woodland and Davis. The peak flow in 1983 at the Yolo gage was about 33,000 cubic feet per second (cfs) with an exceedence frequency of about a 20-year event. There was at least one levee break downstream of Road 102. The peak flow in 1986 was about 26,000 cfs with an exceedence frequency of about a 5-year event. During both the 1983 and 1986 events, local agencies patched levee boils to prevent potential levee breaks. The peak flow in 1995 was about 36,500 cfs. Future floods of greater magnitude and duration could result in levee failure and channel overbank flooding.

The Corps assumes that the existing levees only provide flood protection for a peak flow of 30,000 cfs, or a 10-year event. Specific problems with the levees include aging, subsidence, surface erosion, internal erosion, seepage, and slides within the levee embankment or foundation soils.

This revised draft FWCA report presents the current views of the Service on this project. Our analysis is based on engineering and other project information provided by the Corps. Our appraisal of resources is based on literature reviews; personal communications with other recognized experts; field investigations and surveys; best professional judgement of Service biologists; and a projection of future conditions using current land-use information and analyses provided by the Corps. Our analyses will not remain valid if the project, the resource base, or anticipated future conditions change significantly.

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AREA DESCRIPTION

Cache Creek originates at Clear Lake in the mountains west of the Sacramento Valley, and is fed by Clear Lake and tributaries downstream of the lake, with a total drainage of about 1,150 square miles. The creek has deposited rich alluvial soils along its course, which today is irrigated farmland using water diverted from Cache Creek or pumped from groundwater. Significant structures on Cache Creek include Indian Valley Dam, Clear Lake Dam, and an irrigation diversion dam at Capay. Gravel mining has occurred on a 14.5-mile reach of Cache Creek between Capay and Yolo since at least the 1930s. The project area is just north of the City of Woodland. It includes the section of Cache Creek from Road 94B and extends downstream to the Cache Creek Settling Basin in Yolo County (Figure 1). The primary communities in the area include the cities of Woodland and Yolo.

PROJECT DESCRIPTION

A no-action alternative and two flood reduction alternatives are being evaluated. A description of each alternative is provided below.

Alternative 1, No Action

Under the no-action alternative, no action would be taken by the Corps to reduce flood problems on along Cache Creek in the vicinity of Woodland. Levels of protection provided by the existing levees would remain the same.

Alternative 2, Flood Barrier

Alternative 2 would construct a levee just north of the Woodland city limits, starting 6 miles from County Road (CR) 96B to the Cache Creek Settling Basin (Figure 2). During storm events with flows 30,000 to 36,000 cfs and greater, the area between the new levee and Cache Creek, which is a portion of the existing flood plain, would serve as a flood bypass. On the west side of Interstate 5 (I-5), water would sheet flow over the banks; on the east side of I-5, a breach in the levee would occur. Provisions would be made to flood proof structures in the floodplain. Highway closure and floodgate structures would also be provided at road and railroad crossings. A flood warning system would also be incorporated to initiate evacuation of the floodplain and closure of crossings.

The flood barrier would vary from in height 1 to 18 feet. A 450 cfs canal would be constructed on the flood side of the flood barrier to serve internal drainage requirements of normal rainfall events and agricultural field runoff. A weir would be constructed into the west levee of the settling basin to allow water to spill from the flood bypass into the settling basin.

The flood barrier would begin east of the intersection of CR 96B and CR 19B where it would be 1 foot above ground level and 17 feet wide. It extends east 2,600 feet on the south side of CR

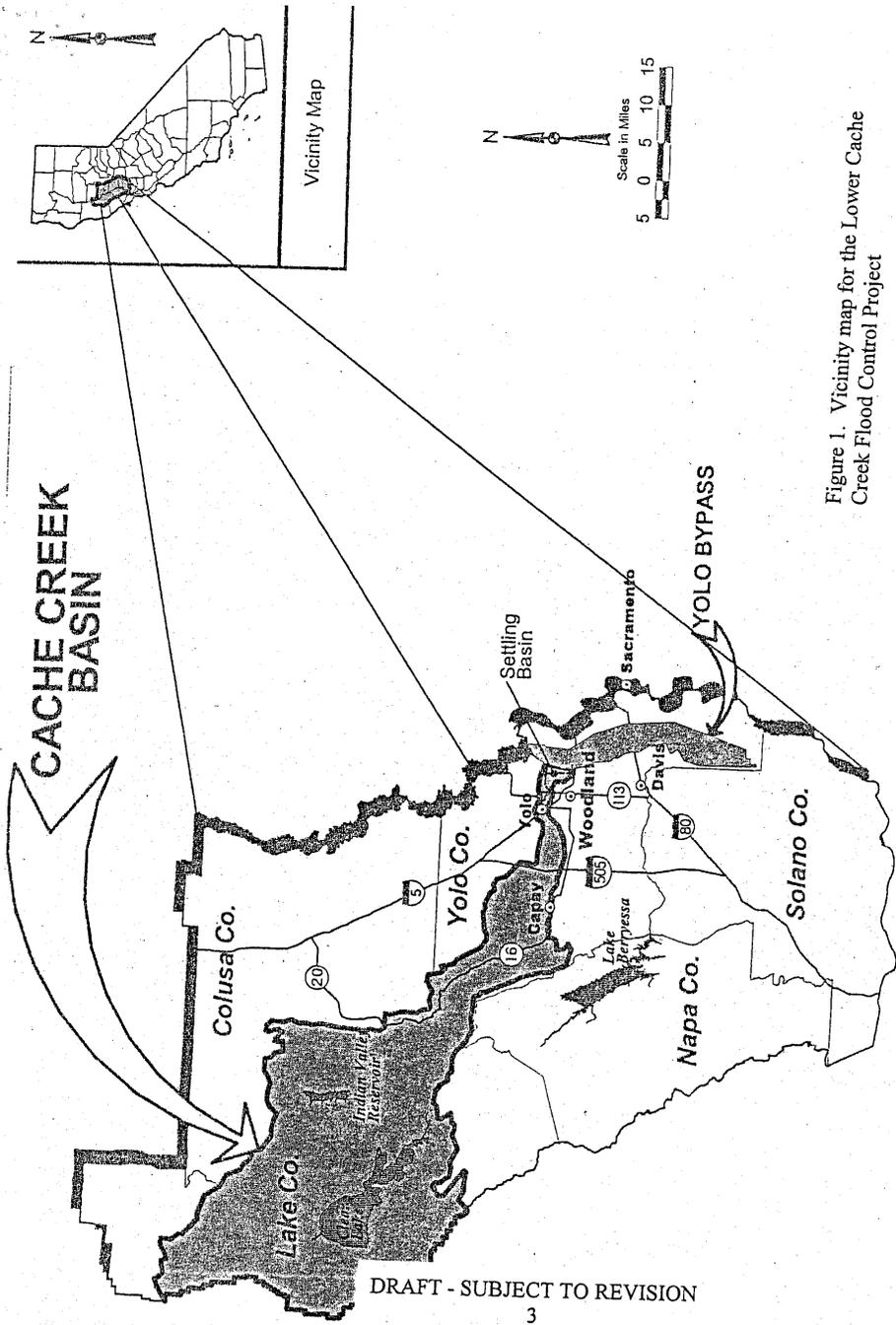
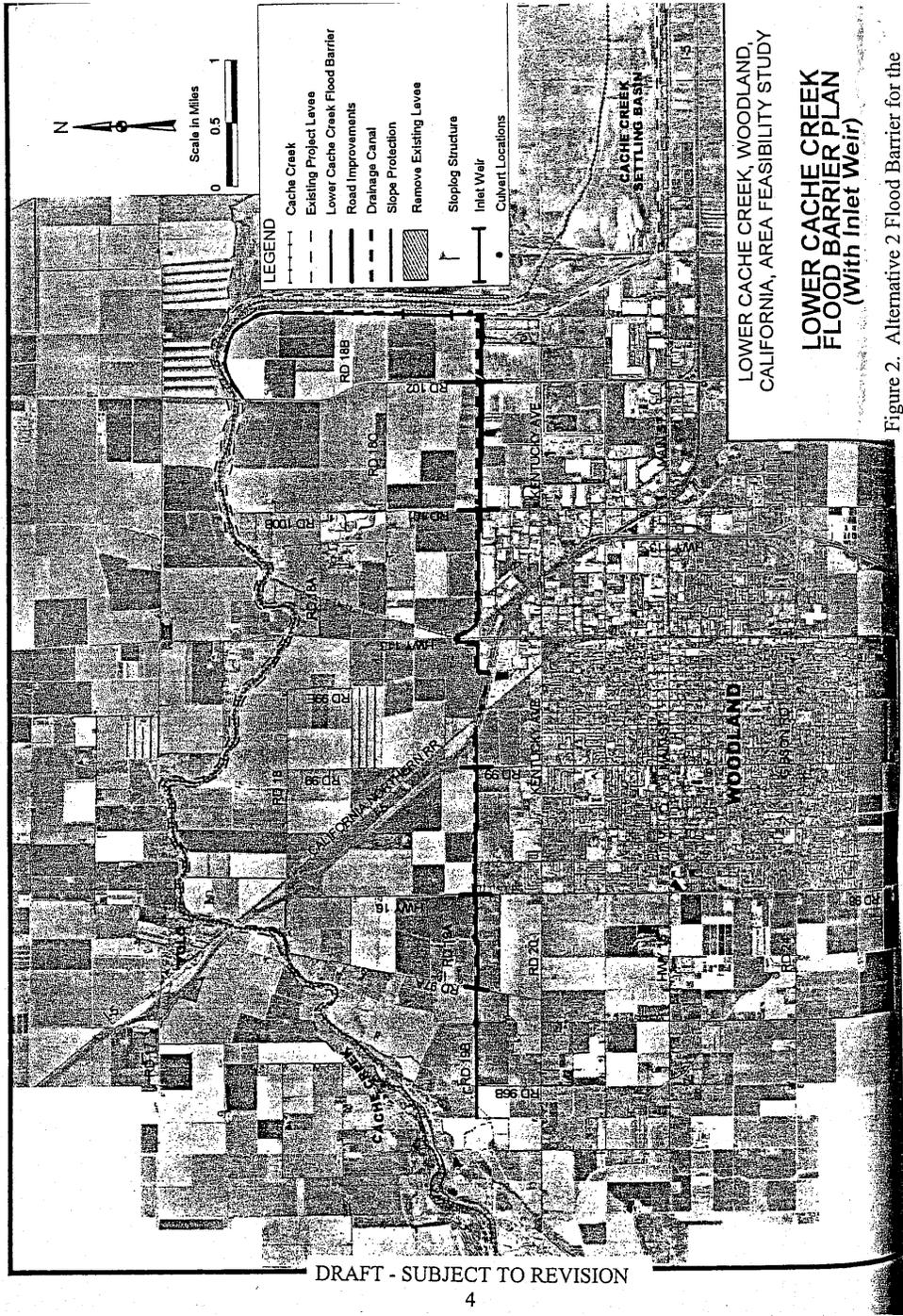


Figure 1. Vicinity map for the Lower Cache Creek Flood Control Project



**LOWER CACHE CREEK
FLOOD BARRIER PLAN
(With Inlet Weir)**

LOWER CACHE CREEK, WOODLAND,
CALIFORNIA, AREA FEASIBILITY STUDY

Figure 2. Alternative 2 Flood Barrier for the
Lower Cache Creek Flood Control Project

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19B. The flood barrier then would continue on the north side of CR 19B for 1,500 feet where it crosses CR 97A. CR 97A would be raised to match the crown elevation of the levee which is now 3 feet.

East of CR 97A it would continue about 1,900 feet east until it makes a slight bend to the northeast and then continues east for 1,800 feet. At the intersection with State Highway (SH) 16 the flood barrier would be 6 feet high and 42 feet wide. SH 16 would be raised to match the elevation of the flood barrier. The flood barrier would then continue east 5,000 feet until it meets CR 99. The road crossing would be elevated 4.5 feet and a 5 foot stop-log structure would be included where CR 99 crosses the flood barrier to match the 9.5 foot crown of the flood barrier. The flood barrier would continue east 1,200 feet until it ties into the west embankment of I-5. Riprap would be placed from the toe to the top of the I-5 embankment beginning from the flood barrier and continuing north 1,100 feet. Riprap would also be placed to the top of the east embankment of I-5 and extend 1,100 feet north from the railroad undercrossing. To prevent ponding on the west of I-5, three 60-inch diameter culverts would be installed under the road.

East of I-5, a 6.5-foot stop-log structure would be required where the Union Pacific Railroad (UPRR) crosses beneath I-5 to prevent water from flooding land to the south. Riprap would be placed on the east side of the UPRR extending northwest about 1,500 feet to prevent the railroad from being washed out.

The flood barrier ties into the existing embankment associated with I-5 and continues north 400 feet to the northwest corner of the Dubach Field baseball park. It then makes a sharp turn east and continues 1,200 feet towards the frontage road where it makes another sharp turn north and parallels the frontage road until it crosses SH 113. A 6.5-foot stop-log structure would be installed at the intersection of SH 113, the Spreckels Union Pacific Railroad spur, and the flood barrier to prevent flooding of the land to the south.

The flood barrier would extend 1,100 feet to the southeast of where it crosses SH 113 until it reaches the north side of Churchill Downs. It continues east for 4,700 feet until it intersects CR 101. The barrier at this point would be 10 feet tall and 61.5 feet wide. Churchill Downs and CR 101 would be ramped up 4 feet to tie into the intersection of the barrier. The road crossing would be elevated 6 feet and a 2.5-foot stop-log structure would be included where CR 101 crosses the flood barrier to match the crown of the flood barrier. The barrier would continue 5,200 feet east until it intersects CR 102 where the barrier would have a height of 14.5 feet and width of 83 feet.

Where CR 102 crosses the flood barrier, the road would be ramped up and elevated 10 feet. A 5-foot stop-log structure would be included where CR 102 crosses the flood barrier to match the crown of the flood barrier. East of CR 102, the flood barrier would extend 2,700 feet east until it intersects the west levee of the Cache Creek Settling Basin. At this location the flood barrier would have a height of 18.5 feet and a width of 94.5 feet. The existing levee and channel just south of the flood barrier would not be removed.

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One thousand feet north of where the flood barrier intersects the existing west levee of the Cache Creek Settling Basin, a 2,500-foot section of the west levee would be degraded to ground level and a concrete inlet weir would be installed to allow flood flows to drain by gravity from the flood plain into the settling basin. Gated culverts would be placed in the west levee of the settling basin south of the weir to allow ponded water to drain into the settling basin. Gated culverts would also be placed in the flood barrier to allow local runoff to drain to the city of Woodland's stormwater drain south of the flood barrier. Riprap would be placed along the west side of the settling basin west levee up around to where the levee becomes the right bank of Cache Creek to CR 102. Riprap would also be placed along the north side of the flood barrier extending from the west levee of the settling basin to CR 101 for protection against wave damage. A 5,250-foot long section of the training levee within the settling basin would be removed. The excavated material from the west levee and the training levee would be used as borrow material for the construction of the flood barrier.

A haul route would be constructed from the training levee to the flood barrier. A 40-foot-wide section between the training levee and the west levee would be used for the haul route. Fill would be placed in the training canal to allow truck traffic to travel back and forth. Culverts would be placed under the road so flows coming down the training canal can continue south to the settling basin. Five turn out areas along the training levee were selected to allow the haul trucks room to turn around. These turn outs would be placed in areas of ruderal grassland and would be reseeded with native species after construction is complete.

Construction Methods

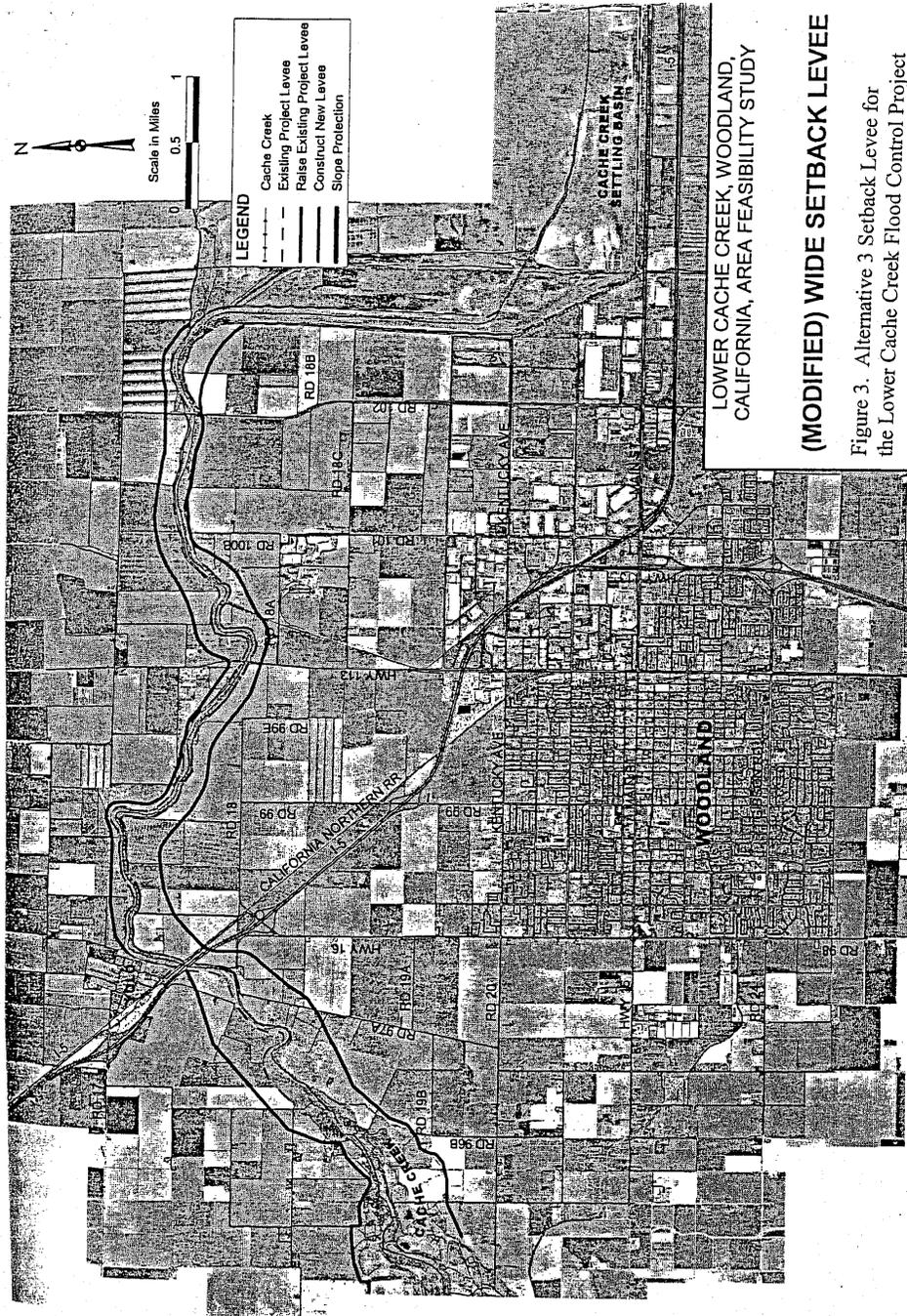
Construction would occur over the period of 1 year. Standard earth moving equipment would be used for all construction work. This could include excavators, haul trucks, and scrapers.

Alternative 3, Setback Levee

This alternative would consist of creating new levees along Lower Cache Creek to provide 100-year level of flood protection (Figures 3, 4, and 5). The project would construct about 19 miles of new setback levees and raise existing levees. The setback levees would have a 12-foot-wide levee crown with a 2:1 slope (2 horizontal units to 1 vertical unit) on the landside and a 3:1 slope on the waterside. Seeding of native grass and forb species would occur on both the waterside and landside slopes. Levee height varies from 6 to 15 feet. Setback levees would originate near CR 95B and continue eastward to the Cache Creek Settling Basin. Both the right and left setback levees would include a toe drain on the waterside of the levee. For the purpose of describing this alternative the levees along the creek have been divided into four sections.

Section A

The left levee would be setback and extend about 13,300 feet where it would meet I-5. CR 96B would have to be demolished and realigned. The entire existing levee would be demolished and



(MODIFIED) WIDE SETBACK LEVEE

Figure 3. Alternative 3 Setback Levee for the Lower Cache Creek Flood Control Project

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possibly used for borrow material for the new setback levee. Two staging areas in this section would be located on row cropped agriculture and a gravel mine.

The right levee would use similar construction methods. A new continuous setback levee would extend 13,800 feet to the I-5 embankment. The existing levee would be demolished and possibly used for borrow material for the new setback levee.

Northbound I-5, southbound I-5, CR 99W, and the Union Pacific California Northern Railroad are four bridges that make up the first road crossing in the project area. The left setback levee would tie into the I-5 bridge embankment. A viaduct would be constructed beginning at the existing right bank abutment and continue 1,000 feet where a new raised embankment would tie into the right levees upstream and downstream of the bridges. Two unused bridge abutments in the creek bed west of I-5 would be demolished and removed. The creek bed under the bridge crossings would be lined with concrete and extend 50 feet upstream and downstream of the four bridges.

Section B

Section B extends from the I-5 bridge to the SH 113 bridge. No work is required for the first 2,200 feet on the left bank. After this point a new levee would be constructed having a height of 4 feet and a width of 30 feet. It would continue until it ties into the existing embankment associated with SH 113. At this point the levee would have a height of 14 feet and a width of 72 feet. The existing levee would have sections removed from it totaling 7,000 feet. These would allow high flows to reach the area added with the new setback levees.

About 2,200 feet downstream from the four bridge crossings, 1,000 linear feet of riprap (3.3 acres) would be installed along an outside bend of the creek. Another 6,000 feet downstream, hard points would be installed within the creek bank. The six hard point structures would consist of riprap or gabions in a 40-foot-wide by 200-foot-long by 30-foot-deep trench. Soil would be placed over the rock and the area would be revegetated. About 0.2 acre of rock would be exposed in the channel from all six hard point structures. Finally, a 500 linear foot section (1.1 acres) of riprap would be installed about 4,000 feet upstream of SH 113 bridge. Staging areas would occur on 0.1 acre of row crop and 0.2 acre of existing roadway.

The right levee in section B would be one new continuous setback levee extending 14,100 feet between the four bridge crossings and the SH 113 bridge. The right levee at the beginning of Section B would be 9 feet tall and 59 feet wide. At SH 113 where it ties into the new raised embankment for the viaduct it would be 13 feet tall and 77 feet wide. The existing levee would be removed in sections for a total of 10,200 linear feet. A staging area of 0.5 acre of row crops would be used.

At SH 113, the existing bridge would be extended from the existing abutments on both sides by constructing a 500-foot-long viaduct on each side of the bridge. The creek bed under the bridge would be lined with concrete 50 feet up- and downstream of the bridge.

Section C

The left levee along section C would consist of one continuous setback levee extending 11,200 feet where it joins the embankment associated with the new CR 102 viaduct. Staging areas would cover 0.5 acre of row crops. The existing levee would be demolished in sections totaling 9,700 feet. The right levee would consist of two parts. The first would extend 6,800 feet east where it meets the existing levee. Then the remaining 5,100 feet of existing levee would be raised to a height of 9 feet.

A 1,000-foot-long viaduct would be constructed on the north side of CR 102 bridge. The creek bed under the bridge crossing would be lined with concrete 50 feet up- and downstream of the bridge.

Section D

In section D, a new left levee would be constructed that would extend 4,900 feet east until it joins the existing levee system associated with the Cache Creek Settling Basin. The right levee would be one continuous new setback levee stretching 4,100 feet east until it meets the existing levee system associated with the Cache Creek Settling Basin. Both levees would be constructed with standard earth moving equipment and the entire existing levees would be removed and possibly used for borrow material for the new levees.

Construction Methods

Construction would occur over the period of 3 years. Standard earth moving equipment would be used for all construction work. This could include equipment such as excavators, haul trucks, and scrapers.

EXISTING BIOLOGICAL RESOURCES

Vegetation

Five cover-types can currently be found in the project area: riparian forest, scrub shrub, shaded aquatic riverine (SRA) cover, and agriculture/ruderal, and orchard.

Riparian forest cover-type along Cache Creek exists in a fairly narrow band (35 to 75 feet). The riparian habitat occurs along both banks of Cache Creek throughout most of the proposed project area, a distance of about 10 miles. Native trees of the Cache Creek riparian forest include

cottonwood, willows, and valley oak. Understory plants include California wild grape, blackberry, poison oak, willows, and elderberry. There are also patches of non-native vegetation including giant reed, tamarisk, and locust.

Scrub shrub cover-type consists of woody trees or shrubs averaging less than 20-feet tall. This cover-type is dominant along the training canal leading into the Cache Creek Settling Basin. The band of scrub shrub varies from 10 to 120 feet wide, growing wider further downstream. Species within this cover-type are dominated by cottonwood and willow species.

Shaded riverine aquatic (SRA) cover is found along the interface between the creek and adjacent woody riparian habitat. Except immediately under bridges, this cover-type is composed of natural, eroding substrates supporting riparian vegetation that either overhangs or protrudes into the water and variable amounts of instream woody debris, variable water velocities, and water depths. In the project reach of Cache Creek the SRA cover is typically a narrow band composed of vegetation including small willows, cottonwoods, tamarisk, and giant reed, with some instream woody debris, undercut banks and few boulders.

Agricultural/ruderal land is the dominant habitat landside of the levees. Typical crops in the area include tomatoes and winter wheat. Ruderal upland habitat can be found on levees and margins of agricultural land. Typically ruderal vegetation occurs as a strip bordering levees and agricultural fields with a width ranging from about 20 to 100 feet or more. Vegetation includes annual grasses interspersed with yellow star-thistle, milk thistle, and teasel.

Orchard habitat is also found commonly landside of the levees. Typical orchard crops in the area include walnuts, plum, olive, and pistachio. Herbaceous ground cover between the rows typically consists of annual grasses, forbs, or bare soil.

Wildlife

Riparian forest and scrub shrub are especially valuable for wildlife. Riparian trees provide nesting habitat for many birds, notably cavity-nesting species and a large assemblage of raptors, including the State-listed Swainson's hawk. Birds which glean insects off of bark, leaves, and leaf tangles such as bushtits, woodpeckers, and nuthatches, also use riparian habitats. Song birds such as the yellow warbler use the scrub shrub cover-type for nesting. Typical mammal species that can be found in riparian and scrub shrub areas include deer, raccoons, beavers, coyotes, and foxes. The multilayered vegetation provides an abundance of insect prey that feed on fresh foliage and stems during the growing season.

SRA cover provides habitat for many native species such as belted kingfisher, wood duck, black-crowned night heron, bank swallow, beaver, river otter, and salmonids. It also provides a food source for instream invertebrates.

Fallow agricultural fields support rodent populations, which in turn provide prey for many raptor species in the area. The ruderal areas on the levees and margins of agricultural fields provide habitat for granivorous birds such as western meadowlarks, California quail, sparrows, and finches, and for voles and pocket gophers. These areas also provide foraging habitat for raptors. Orchards provide perching, cover, and some nesting area for birds as well as some cover for small mammals.

Fisheries

Surveys for fish species in Lower Cache Creek were done in June and July, 1997, by the Cache Creek Conservancy (Pederson 1997). A total of 18 fishes were captured, 5 of which were natives. The non-native red shiner was the most predominately found fish. Native fish include the hitch, Sacramento sucker, Sacramento pikeminnow, speckled dace, and Sacramento blackfish. These fish accounted for 11% of the total number of fish sampled. Lack of deep pools and complex cover likely limits the native fish species.

Chinook salmon, steelhead, and Sacramento splittail once migrated up the creek (USFWS 1978; YCCDA 1995). The limited records that exist do not indicate if the creek supported self-sustaining salmon or steelhead populations, or if the fish observed in the creek originated from other watersheds. Today, impediments to migrating fish species include: construction of upstream migration barriers at the Cache Creek Settling Basin weir, reduced flows due to upstream storage and diversions, mining impacts to riparian and instream habitat, and entrainment losses of fish into unscreened diversions.

Endangered Species

Appendix A, provides a list, dated March 26, 2002, of federally listed threatened and endangered species, and a summary of a Federal agency's responsibilities under section 7(a) and (c) of the Endangered Species Act (Act) of 1973, as amended. According to this list there are 20 threatened and endangered species or critical habitats that may occur in the project area and one species proposed as threatened. Endangered species are the winter-run chinook salmon, Conservancy fairy shrimp, vernal pool tadpole shrimp, Solano grass, and palmate-bracted bird's-beak. Threatened species are the bald eagle, northern spotted owl, giant garter snake, California red-legged frog, delta smelt, Central Valley steelhead, Central Valley spring-run chinook salmon, Sacramento splittail, vernal pool fairy shrimp, valley elderberry longhorn beetle, and Colusa grass. Also listed is the critical habitat for the winter-run chinook salmon, delta smelt, Central Valley steelhead, and Central Valley spring-run chinook. The mountain plover is proposed threatened.

There are also 4 candidate species and 50 species of concern. Although candidate species are not protected under the Act, the 1988 amendments require the Service or the National Marine Fisheries Service (NMFS) to monitor their status. If any of these species decline precipitously during the planning of this project, they could be listed on an emergency basis. The NMFS has

responsibility for most marine fish and wildlife, including anadromous salmonids, and should be consulted on activities which may affect any such listed or proposed species in the project area. The Service has consultation responsibility for the remaining species.

The California Department of Fish and Game (CDFG) has responsibility for State listed species and species of concern. A summary report from the CDFG's RareFind DataBase (October 2001) was retrieved for the project area, specifically for Yolo County (Appendix C). State listed endangered species are the western yellow-billed cuckoo, Colusa grass, Solano grass, and palmate-bracted bird's-beak. Threatened species are the bank swallow, giant garter snake, and Swainson's hawk. The CDFG should be contacted regarding any State listed species or species of concern that may be impacted by project activities.

FUTURE CONDITIONS WITHOUT THE PROJECT

Vegetation

No change in land use or management is assumed under the no action alternative. Vegetation removal and spread of exotic species may lead to some minor changes in the existing vegetation.

Both the Department of Water Resources and the Yolo County Flood Control and Water Conservation District conduct vegetation clearing on the levees and within the stream channel when vegetation is deemed a hindrance to water flow. As these current policies would continue into the future, riparian and SRA vegetation would be expected to continue in the present condition. Scrub shrub habitat along the training canal would continue to grow providing increasingly better cover and habitat.

Introduced species such as tamarisk and giant reed would continue to be dominant in parts of the riparian zone. These two species thrive in riparian areas which are disturbed, whether by natural events (e.g., flood scouring, channel migration, and sedimentation) or by human activities (e.g., earth-moving or other construction along channels, and vegetation removal) (Rieger and Kreager 1989).

Wildlife

Since little change is expected to occur to the vegetation within the project area, present trends of use by wildlife species would continue. Normal year-to-year population fluctuations of individual species would continue to occur as now.

Fisheries

The aquatic resources of the project area are not expected to change significantly from existing conditions. Resident fishes would continue to use the area as they do today.

FUTURE CONDITIONS WITH THE PROJECT

Alternative 2, Lower Cache Creek Flood Barrier

Vegetation

A summary of the acreages of affected cover-types and proposed compensation can be found in Table 1. Table 2 summarizes the number of native and non-native trees affected by the project. The footprint of the flood barrier would affect primarily row crop agricultural land. This impact would be minimized by seeding the new levee with native grasses and forbs. A small amount of orchard habitat (plum orchard) would be affected from raising the roads to around the flood barrier. Native and non-native trees along the flood barrier and along the I-5 embankment that would be rocky were individually counted. Impacts to native trees would be mitigated at a 5:1 ratio and non-natives at a 1:1 ratio. Therefore, a total of 316 trees would be necessary to mitigate the loss of 54 native and 46 non-native trees. With a planting density of 109 trees per acre, 2.89 acres would be required to mitigate the loss of individual trees.

Table 1. Summary of cover-types and acreages that would be effected under Alternative 2 of the Lower Cache Creek Flood Control Project, California.

Cover-Type	Acrees Effected	Compensation Acreage	Net Change in Acres
Scrub shrub	0.28	0.31	0
Agricultural/ruderal	121.9 Agricultural 0.52 Ruderal	121.9 (seed flood barrier) 0.52	0

Table 2. Summary of individual tree losses under Alternative 2, of the Lower Cache Creek Flood Control Project, California.

Tree type	Trees removed	Compensation numbers	Compensation Acreage
Native	54	270	2.47
Non-native	46	46	0.42
Total	100	316	2.89

Habitat along the I-5 embankment consists of ruderal grassland with scattered trees. About 0.52 acre would be covered in riprap under this alternative. The loss of 0.52 acre of ruderal grassland would be mitigated at a 1:1 ratio and should be planted in conjunction with the 2.89 acres of woodland mitigation for the loss of individual trees.

About 0.28 acre of scrub shrub would be adversely affected by construction of a haul road from the training levee, through the training canal, and over the west levee. HEP was used to determine the mitigation for scrub shrub. The results of the HEP showed that replanting the affected area and planting an additional 0.03 acre of scrub shrub would mitigate for the temporal loss of scrub shrub at that site. A total of 0.31 acre of scrub shrub would be replanted at a density of 200 plants per acre. Because this was the only HEP analysis used to determine mitigation for either alternative, a complete HEP report was not prepared. However, the Sacramento Fish and Wildlife Office of the Service has the HEP data and analysis on file, and can be contacted for any questions regarding the HEP.

Turn out areas along the training canal were selected to avoid any additional effects to scrub shrub in the settling basin. Therefore, no additional mitigation would be required other than the seeding of these turn-around areas with native grasses and forbs after construction.

Because some of the construction would occur in either aquatic or upland giant garter snake habitat, project effects and conservation measures for these areas would be developed during the section 7 process of the Act.

Wildlife

Loss of 0.28 acre of scrub shrub could adversely affect birds, amphibian, reptile, and small mammal species which use this habitat for cover, nesting, and/or foraging. Construction activities could cause direct mortalities of ground dwelling reptiles, and/or mammals through vehicle or equipment strikes or crushing of burrows, and removal of habitat for escape cover, foraging, and breeding. Animals that survive construction would be displaced; those that are able to move to adjacent areas may increase competition for limited resources in adjoining areas, with subsequent overall loss of individuals.

Fisheries

The only in-water construction work that would occur under this alternative is in the settling basin training canal. A haul route is planned through the canal and culverts would be placed underneath to allow water to continue to flow through. After one construction season the haul route would be removed and the canal would be returned to its original condition. This alternative also has the potential to change the current hydrology of the settling basin. Potential loss of the low flow channel and its eventual connection to the Tule Canal in the Yolo Bypass could adversely affect fish within Lower Cache Creek by filling in the low flow channel to the point that it no longer provides passage from Cache Creek to the Yolo Bypass. A higher degree of fish stranding would also be possible with this alternative. The Corps should determine what the effects this alternative would have on the settling basin in relation to fish passage.

Endangered and Threatened Species

Potential giant garter snake habitat exists on the eastern side of the project area. Upland and aquatic habitat would be affected by riprapping 12,000 feet of the west levee of the Cache Creek Settling Basin, construction of a 2,500-foot-long concrete weir in the west levee, relocation of the

agricultural ditch along the weir, use of the training canal as a haul route, and degradation of 5,250-foot-long section of the training levee. Should the Corps determine that the settling basin and Cache Creek contain potential habitat for Sacramento splittail and listed salmonids, the Corps would have to initiate consultation on the Sacramento splittail and salmonids as well (see Fisheries Section above). The State listed Swainson's hawk has been sighted nesting in the riparian habitat along Cache Creek. The Corps should coordinate with the Service, NMFS and CDFG to determine the effects of this project on Federal and State listed species, and initiate section 7 consultation, as appropriate.

Alternative 3, Setback Levee

Vegetation

A summary of acreages of affected cover-types and proposed compensation can be found in Table 3. Riparian forest and SRA cover-types would be removed in the areas where: (1) levees turn back into the bridge abutments; (2) roads would be raised; and (3) riprap would be placed in the creek channel. A small amount of agriculture and orchard habitat would also be affected by these construction activities. The majority of the agriculture and orchard habitat would be affected by construction of the setback levee footprint. Virtually, a complete loss of habitat was assumed for all cover-types impacted.

Table 3. Summary of cover-types and acreages that would be effected under Alternative 3 of the Lower Cache Creek Flood Control Project, California.

Cover-Type	Acrees Effected	Compensation Acreage	Net Change in Acres
Riparian forest	9.01	To be addressed during section 7 consultation	Unknown
SRA	0.69	To be addressed during section 7 consultation	Unknown
Agricultural/Ruderal	172.9	172.9 (reseed new levee)	0

A HEP was completed for the riparian forest and SRA cover-types. However, because Cache Creek is considered potential giant garter snake and Sacramento splittail habitat, project effects and development of conservation measures for these species would be handled during section 7 consultation. This would be done in coordination with the Service's Flood and Waterway Planning Branch to assure that the measures include the loss of riparian and SRA cover-types values, as well as providing beneficial habitat for threatened and endangered species.

Because the agricultural land is heavily managed when in production (planting, pesticide use, and harvest) and left fallow during part of the year, the new levee slopes were considered adequate compensation for agricultural lands. The new levees should be seeded with native grasses and

forbs to provide for erosion control and habitat for reptiles, ground foraging birds, and small mammals. Removal of the existing levees would be evaluated during section 7 consultation for the giant garter snake. Any conservation measures needed would be developed in that process.

Typically non-native tree species are replaced with native trees at a 1:1 ratio. The orchard trees within the project area are comprised of English walnut, plum, and pistachio. All of the orchard trees experience management from the use of pesticides, harvest, and pruning. The plum orchards in the project area consist of small trees which provide very little cover. Therefore, the HEP team determined mitigation would not be required for the loss of plum trees. The pistachio and walnut trees, however are very large and provide cover and nesting for wildlife species. In addition, they act as an extension of the riparian forest cover-type because the majority of them are located immediately landside of the levee. For these reasons, the HEP team decided that a mitigation ratio of 1.5:1 was better suited for the loss of these large orchard trees bordering the native riparian vegetation. Therefore, for the 1,176 (24.5 acres) walnut and pistachio trees that would be removed, 1,764 native trees would need to be planted. It is assumed that a mix of native riparian tree species would be planted at a density of 109 trees per acre for a total of 16.1 acres (refer to Table 4).

Table 4. Summary of individual tree losses under Alternative 3 of the Lower Cache Creek Flood Control Project, California.

	Trees removed	Acres removed	Trees planted	Compensation Acres
Orchard (walnut and pistachio)	1,176	24.5	1,764	16.2

About 2,134.7 acres of land would be confined between the new levees. Some of this land would be used for mitigation and the majority of it could continue to be used for agricultural purposes. However, by enlarging the floodplain with the new setback levees in place, an opportunity would be created for future restoration projects along Cache Creek.

Wildlife

Construction activities could cause direct mortalities of ground dwelling amphibians, reptiles, and/or mammals through crushing of burrows, being struck by equipment, and removal of habitat. Other effects of construction on wildlife in the area include disturbance from construction activity and noise. Wildlife, such as birds and mammals, typically respond to this type of activity by leaving the construction area. Those that are able to move to adjacent areas may increase competition for limited resources in adjoining areas, with subsequent loss of individuals. Species dependent on riparian and SRA habitat can be expected to be negatively affected by any decrease in area and quality of these cover-types.

Construction during the nesting season has the potential to adversely affect hawks and migratory birds that use the Cache Creek riparian corridor in the spring and summer. Increased noise and the presence of construction workers could cause nesting birds to leave the nest for long periods of time, stressing eggs or hatchlings and potentially leading to nest failure or abandonment.

A large amount of land would be enclosed by the new setback levees. If restored, this area could become a wide riparian corridor and provide habitat for many riparian wildlife species. However, the project does not include any restoration measures for this area at this time.

Fisheries

This alternative would place riprap along 1,620 linear feet of the creek between the I-5 and SH 113 bridges along the left bank. A complete loss of the SRA and riparian forest cover-type would occur in those areas. In addition six hard point structures would be installed into the creek bank. About 2.6 acres of SRA and riparian would be temporarily affected and 0.2 acre of SRA would be permanently affected. Loss of overhead cover could cause an increase in the water temperature which can affect both reproductive success of adult fish as well as survival of juvenile fish. Loss of instream cover such as woody debris, aquatic vegetation and undercut banks, would mean a loss of cover for young fish, decrease in invertebrate production, and increase in water velocities. All of which would be detrimental to the fish species of Cache Creek. In addition the placement of riprap tends to cause accelerated erosion at the downstream interface between the riprap and adjacent earthen section (USFWS 2000). This could reduce the likelihood for the growth of native riparian species and cause the near shore habitat to deepen, decreasing the usefulness to fish species.

Endangered and Threatened Species

Elderberry shrubs have been located along the proposed setback levee alignment. At this time, a survey of stems that would be directly and indirectly effected has not been completed. If impacts to elderberry shrubs are unavoidable, compensation guidelines for loss of beetle habitat should be made according to the most recent Service guidelines for the valley elderberry longhorn beetle. Cache Creek is potential giant garter snake habitat. In addition to any effects to the aquatic habitat, all habitat located within 200 feet of the creek should be considered giant garter snake habitat. Cache Creek may also be considered habitat for the Sacramento splittail, steelhead, and chinook salmon. The Corps and non-Federal sponsor are responsible for determining the likelihood and frequency of any of these species being present in Cache Creek. Two State listed birds have been observed along Cache Creek and could be affected by this alternative. The Swainson's hawk is known to nest in the riparian habitat along Cache Creek. The bank swallow has been observed along Cache Creek, but it is uncertain if the bank swallow nests within the project area. The Corps should coordinate with the Service, NMFS and CDFG to determine the effects of this project on Federal and State listed species, and initiate section 7 consultation, as appropriate.

DISCUSSION

Fish and Wildlife Service's Mitigation Policy

The recommendations provided herein for the protection of fish and wildlife resources are in accordance with the Fish and Wildlife Service's Mitigation Policy as published in the Federal Register (46:15 January 23, 1981).

The Mitigation Policy provides Service personnel with guidance in making recommendations to protect or conserve fish and wildlife resources. The policy helps ensure consistent and effective Service recommendations, while allowing agencies and developers to anticipate Service recommendations and plan early for mitigation needs. The intent of the policy is to ensure protection and conservation of the most important and valuable fish and wildlife resources, while allowing reasonable and balanced use of the Nation's national resources.

Under the Mitigation Policy, resources are assigned to one of four distinct Resource Categories, each having a mitigation planning goal which is consistent with the fish and wildlife values involved. The Resource Categories cover a range of habitat values from those considered to be unique and irreplaceable to those believed to be much more common and of relatively lesser value to fish and wildlife. The Mitigation Policy does not apply to threatened and endangered species, Service recommendations for completed Federal projects or projects permitted or licensed prior to enactment of Service authorities, or Service recommendations related to the enhancement of fish and wildlife resources, however.

In applying the Mitigation policy during an impact assessment, the Service first identifies each specific habitat or cover-type that may be impacted by the project. Evaluation species which utilize each habitat or cover-type are then selected for Resource Category analysis. Selection of evaluation species can be based on several rationale, as follows: (1) species known to be sensitive to specific land- and water-use actions; (2) species that play a key role in nutrient cycling or energy flow; (3) species that utilize a common environmental resource; or (4) species that are associated with Important Resource Problems, such as anadromous fish and migratory birds, as designated by the Director or Regional Directors of the Fish and Wildlife Service. (Note: Evaluation species used for Resource Category determinations may or may not be the same evaluation species used in a HEP application, if one is conducted). Based on the relative importance of each specific habitat to its selected evaluation specie, and the habitat's relative abundance, the appropriate Resource Category and associated mitigation planning goal are determined.

Mitigation planning goals range from "no loss of existing habitat value" (i.e., Resource Category 1) to "minimize loss of habitat value" (i.e., Resource Category 4). The planning goal of Resource Category 2 is "no net loss of in-kind habitat value;" to achieve this goal, any unavoidable losses would need to be replaced in-kind. "In-kind replacement" means providing

or managing substitute resources to replace the habitat value of the resources lost, where such substitute resources are physically and biologically the same or closely approximate those lost.

In addition to mitigation planning goals based on habitat values, Region 1 of the Service, which includes California, has a mitigation goal of no net loss of acreage for wetland habitat. This goal is applied in all impact analyses.

In recommending mitigation for adverse impacts to any of these habitats, the Service uses the same sequential mitigation steps recommended in the Council on Environmental Quality's regulations. These mitigation steps (in order of preference) are: avoidance, minimizing, rectification measures, measures to reduce or eliminate impacts over time, and compensation measures.

Resource Categories

Riparian

The riparian forest cover-type occurs along Cache Creek in a narrow band of deciduous trees and shrubs on terraces and slopes above the lower stream channel. The evaluation species selected for riparian habitat are woodpecker guild and raptor guild. Woody riparian vegetation of the project area provides valuable foraging substrate for woodpeckers, as well as for many passerine bird species. Red-shouldered, Swainson's and red-tailed hawks may nest in the project area or vicinity, building stick-nests in large riparian trees. Riparian forest is of generally high value to the evaluation species, and are very scarce habitat types in the project area. Therefore, the Service finds that any riparian forest habitat that would be effected by the project should have a mitigation goal of "no net loss of in-kind habitat value or acreage," Resource Category 2.

Scrub Shrub

The riparian scrub shrub cover-type identified in this project is defined as mixed trees and shrubs averaging less than 16 feet tall. Tree and shrub species are comprised predominately of cottonwoods and willows. Migratory songbirds, such as the northern oriole and yellow warbler, were selected to represent the values of the scrub shrub cover-type because of their value as indicator species for many other birds which use the riparian scrub shrub cover-type, their importance in non-consumptive human uses (e.g., bird-watching), and Service responsibilities for their management under the Migratory Bird Treaty Act. The extent of this cover-type has been severely reduced due to agricultural and urban development and it is now relatively scarce in the project area and surrounding lands. Therefore, the Service finds that scrub shrub habitat that would be impacted by the project should have a mitigation planning goal of "no net loss of in-kind habitat value or acreage," Resource Category 2.

SRA

For SRA cover-type in the project area, the evaluation species selected for Resource Category determination are 1) belted kingfisher, representing fish-eating birds, and 2) muskrat, because of their need for natural stream banks for use as denning and feeding areas. Much of the SRA cover

has been eliminated in some patches and degraded in other areas. The cumulative effects of SRA cover destruction and degradation by excessive human disturbance, and the introduction of non-native species have resulted in its loss and, subsequently, loss of native fish and wildlife species. The Service finds SRA cover is of high-value to these evaluation species and is scarce or becoming scarce in the project area. As a result, the SRA cover affected by the project should have a mitigation planning goal of no net loss of in-kind habitat value or acreage (Resource Category 2).

Agriculture/Ruderal

Agricultural/ruderal cover-type is common over much of the project area. Evaluation species selected for these cover-types the raptor guild (including Swainson’s hawks, red-tailed hawks, ferruginous hawks, American kestrel, white-tailed kite, and great horned owl) and passerine ground-foraging birds (including western meadowlark and white-crowned sparrow). The value of these habitats vary according with season and crop, much of the agricultural and ruderal habitat adjacent to Cache Creek provides medium value foraging habitat for diverse assemblages of birds of prey adjacent to Cache Creek. Therefore, the Service finds that agricultural and ruderal lands to be affected by the project, should have a mitigation planning goal of “minimize loss of habitat value,” Resource Category 4.

Orchard

Orchard cover-type consists of highly managed areas of plum, walnut, pistachio, and olive orchards. The evaluation species for this cover-type include raptors and mourning doves. Orchards provide raptors and mourning doves perching sites and cover. This cover-type in the project area is of low to moderate quality and value. The Service designates the orchard habitat as Resource Category 4. Our associated mitigation planning goal of “minimize loss of habitat value.”

Table 5. Evaluation species, resource categories, and mitigation planning goals for the cover-types found within the Lower Cache Creek Flood Control Project.

COVER TYPE	EVALUATION SPECIES	RESOURCE CATEGORY	MITIGATION GOAL
Riparian	Woodpecker guild and raptors	2	No net loss of in-kind habitat value or acreage
Scrub shrub	Migratory songbirds	2	No net loss of in-kind habitat value or acreage
SRA cover	Kingfisher and muskrat	2	No net loss of in-kind habitat value or acreage
Agriculture/Ruderal	Raptors and ground foraging birds	4	Minimize loss of habitat value
Orchard	Raptors and mourning dove	4	Minimize loss of habitat value

Habitat Evaluation Procedures (HEP)

The habitat values resulting from the various action alternatives were determined using HEP. This methodology was developed by the Service and other resource and water development agencies for documenting the quality of available habitat for selected fish and wildlife. HEP facilitates two types of habitat comparisons: (1) the relative values of different locations at the same point in time; and (2) the relative values of the same locations at different points in time. Combining these two analyses allows the impacts of proposed habitat changes to be quantified. HEP was not applied to aquatic species because expected impacts would likely be immeasurable or nonexistent.

General Methodology

Acreage associated with each alternative was provided to the Service by the Corps. The HSI models were chosen because they were readily available, their variables included characteristics of the cover-types that would change with the project, and their relative simplicity facilitated completing the HEPs in a timely manner.

For consistency with HEP, we used the standard 0.0 to 1.0 range for each Suitability Index (SI). The impact areas and SIs were estimated using the HEP teams best professional biological judgement of the physical changes and resource responses anticipated due to the project. These were based on review of available information about the site and its characteristics.

Mitigation Approaches

Alternative 2

Mitigation for scrub shrub should occur within the affected area plus an additional 0.03 acre. For loss of individual trees and ruderal habitat, 3.41 acres would need to be located and planted with native grasses and forbs as well as 319 native upland tree species. Any other conservation measures would be determined during the section 7 process.

Alternative 3

Currently, the only mitigation required is for the loss of orchard trees. The planting of 1,764 trees on 16.2 acres should occur adjacent to existing riparian habitat on land currently without any riparian habitat value (agricultural land or grassland). Any remaining conservation measures would be determined during the section 7 process.

Mitigation Monitoring

A detailed monitoring and remedial action plan should be developed for whichever alternative is selected. This should include a description of the irrigation system, which should be used until plantings are self-sustaining, a plan for remedial action in the event of planting failure, a description of maintenance such as non-native removal, and an operation and maintenance manual. Success of a revegetation mitigation project shall be measured as 80% or greater

replacement after 3 years. All phases of plan development should be coordinated with the Service and CDFG.

RECOMMENDATIONS

If the project is constructed, the Service recommends that the Corps implement the following:

General

1. Since the effects to endangered and threatened species have not yet been determined, a recommendation of the least biologically damaging alternative can not be made.
2. Determine the potential effects 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 CDFG.
3. Avoid impacts to woody vegetation at all construction sites, staging areas, borrow sites, and haul routes by fencing them with orange construction fencing.
4. 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.
5. Minimize impacts to ruderal grassland by reseeding all disturbed areas with appropriate native grass and forb species when construction is complete.
6. Develop a mitigation and remediation plan and operation and maintenance manual for each of the compensation sites developed for the project.
7. Conduct nesting surveys prior to the removal of any trees or scrub shrub to ensure migratory bird nests will not be lost during construction, pursuant to the Migratory Bird Treaty Act.

Alternative 2, Flood Barrier

8. Ensure culverts under the haul road in the settling basin are designed to facilitate fish passage.
9. Compensate for effects to scrub shrub by replanting the affected area plus an additional 0.03 acre.
10. Compensate for loss of individual trees and ruderal grassland by acquiring suitable lands and developing 3.41 acres in a combination of woodland and grassland habitats.

REVISED DRAFT - SUBJECT TO REVISION

11. Revegetate borrow, staging, turn-arounds, and any other disturbed areas with native grasses and forbs.
12. Determine effects this alternative would have on the hydrology of the settling basin.

Alternative 3, Setback Levee

13. Avoid the use of riprap along the creek channel as much as possible.
14. Avoid effects to Cache Creek's water quality by taking appropriate measures to prevent construction materials (e.g., fuels, oils, lubricants) from spilling or otherwise entering the creek.
15. Compensate for the loss of 1,176 orchard trees by replanting 1,764 native riparian tree species on 16.2 acres. These planting should be located immediately adjacent to the existing riparian vegetation.
16. 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.

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APPENDIX A

ATTACHMENT A
Endangered and Threatened Species that May Occur in or be Affected by
PROJECTS IN YOLO COUNTY
March 26, 2002

Listed Species

Birds

- bald eagle, *Haliaeetus leucocephalus* (T)
- northern spotted owl, *Strix occidentalis caurina* (T)

Reptiles

- giant garter snake, *Thamnophis gigas* (T)

Amphibians

- California red-legged frog, *Rana aurora draytonii* (T)

Fish

- Critical habitat, winter-run chinook salmon, *Oncorhynchus tshawytscha* (E) NMFS
- winter-run chinook salmon, *Oncorhynchus tshawytscha* (E) NMFS
- Critical habitat, delta smelt, *Hypomesus transpacificus* (T)
- delta smelt, *Hypomesus transpacificus* (T)
- Central Valley steelhead, *Oncorhynchus mykiss* (T) NMFS
- Critical habitat, Central Valley steelhead, *Oncorhynchus mykiss* (T) NMFS
- Central Valley spring-run chinook salmon, *Oncorhynchus tshawytscha* (T) NMFS
- Critical Habitat, Central Valley spring-run chinook, *Oncorhynchus tshawytscha* (T) NMFS
- Sacramento splittail, *Pogonichthys macrolepidotus* (T)

Invertebrates

- Conservancy fairy shrimp, *Branchinecta conservatio* (E)
- vernal pool tadpole shrimp, *Lepidurus packardi* (E)
- vernal pool fairy shrimp, *Branchinecta lynchi* (T)
- valley elderberry longhorn beetle, *Desmocerus californicus dimorphus* (T)

Plants

- palmate-bracted bird's-beak, *Cordylanthus palmatus* (E)
- Solano grass (=Crampton's tuctoria), *Tuctoria mucronata* (E)

Colusa grass, *Neostapfia colusana* (T)

Proposed Species

Birds

mountain plover, *Charadrius montanus* (PT)

Candidate Species

Birds

Western yellow-billed cuckoo, *Coccyzus americanus occidentalis* (C)

Amphibians

California tiger salamander, *Ambystoma californiense* (C)

Fish

Central Valley fall/late fall-run chinook salmon, *Oncorhynchus tshawytscha* (C) NMFS

Critical habitat, Central Valley fall/late fall-run chinook, *Oncorhynchus tshawytscha* (C) NMFS

Species of Concern

Mammals

Pacific western big-eared bat, *Corynorhinus (=Plecotus) townsendii townsendii* (SC)

greater western mastiff-bat, *Eumops perotis californicus* (SC)

small-footed myotis bat, *Myotis ciliolabrum* (SC)

long-eared myotis bat, *Myotis evotis* (SC)

fringed myotis bat, *Myotis thysanodes* (SC)

long-legged myotis bat, *Myotis volans* (SC)

Yuma myotis bat, *Myotis yumanensis* (SC)

San Joaquin pocket mouse, *Perognathus inornatus* (SC)

Birds

little willow flycatcher, *Empidonax traillii brewsteri* (CA)

greater sandhill crane, *Grus canadensis tabida* (CA)

bank swallow, *Riparia riparia* (CA)

Aleutian Canada goose, *Branta canadensis leucopareia* (D)

American peregrine falcon, *Falco peregrinus anatum* (D)

Snowy Egret, *Egretta thula* (MB)
grasshopper sparrow, *Ammodramus savannarum* (SC)
short-eared owl, *Asio flammeus* (SC)
western burrowing owl, *Athene cunicularia hypugaea* (SC)
American bittern, *Botaurus lentiginosus* (SC)
ferruginous hawk, *Buteo regalis* (SC)
Lawrence's goldfinch, *Carduelis lawrencei* (SC)
Vaux's swift, *Chaetura vauxi* (SC)
black tern, *Chlidonias niger* (SC)
olive-sided flycatcher, *Contopus cooperi* (SC)
white-tailed (=black shouldered) kite, *Elanus leucurus* (SC)
common loon, *Gavia immer* (SC)
least bittern, western, *Ixobrychus exilis hesperis* (SC)
loggerhead shrike, *Lanius ludovicianus* (SC)
Lewis' woodpecker, *Melanerpes lewis* (SC)
long-billed curlew, *Numenius americanus* (SC)
white-faced ibis, *Plegadis chihi* (SC)
rufous hummingbird, *Selasphorus rufus* (SC)
California thrasher, *Toxostoma redivivum* (SC)
oak titmouse, *Baeolophus inornatus* (SLC)
Nuttall's woodpecker, *Picoides nuttallii* (SLC)

Reptiles

northwestern pond turtle, *Clemmys marmorata marmorata* (SC)
southwestern pond turtle, *Clemmys marmorata pallida* (SC)
San Joaquin coachwhip (=whipsnake), *Masticophis flagellum ruddocki* (SC)
California horned lizard, *Phrynosoma coronatum frontale* (SC)

Amphibians

foothill yellow-legged frog, *Rana boylei* (SC)

western spadefoot toad, *Spea hammondi* (SC)

Fish

green sturgeon, *Acipenser medirostris* (SC)

river lamprey, *Lampetra ayresi* (SC)

Pacific lamprey, *Lampetra tridentata* (SC)

longfin smelt, *Spirinchus thaleichthys* (SC)

Invertebrates

Antioch Dunes anthicid beetle, *Anthicus antiochensis* (SC)

Sacramento anthicid beetle, *Anthicus sacramento* (SC)

Midvalley fairy shrimp, *Branchinecta mesovalleensis* (SC)

brownish dubiraphian riffle beetle, *Dubiraphia brunnescens* (SC)

California linderiella fairy shrimp, *Linderiella occidentalis* (SC)

Plants

alkali milk-vetch, *Astragalus tener* var. *tener* (SC)

brittlescale, *Atriplex depressa* (SC)

San Joaquin spearscale (=saltbush), *Atriplex joaquiniana* (SC)

Snow Mountain buckwheat, *Eriogonum nervulosum* (SC)

adobe lily, *Fritillaria pluriflora* (SC)

drymaria dwarf-flax (=western flax), *Hesperolinon drymarioides* (SC)

Hall's madia (=Hall's harmonia), *Madia hallii* (=Harmonia hallii) (SC)

Jepson's milk-vetch, *Astragalus rattanii* var. *jepsonianus* (SLC)

Colusa layia (=Colusa tidytips), *Layia septentrionalis* (SLC)

Heckard's pepper-grass (Heckard's pepperweed), *Lepidium latipes* var. *heckardii* (SLC)

Ferris's milk-vetch, *Astragalus tener* var. *ferrisiae* (SC) *

heartscale, *Atriplex cordulata* (SC) *

Northern California black walnut, *Juglans californica* var. *hindsii* (SC) *

KEY:

(E)	<i>Endangered</i>	Listed (in the Federal Register) as being in danger of extinction.
(T)	<i>Threatened</i>	Listed as likely to become endangered within the foreseeable future.
(P)	<i>Proposed</i>	Officially proposed (in the Federal Register) for listing as endangered or threatened.
(PX)	<i>Proposed Critical Habitat</i>	Proposed as an area essential to the conservation of the species.
(C)	<i>Candidate</i>	Candidate to become a <i>proposed</i> species.
(SC)	<i>Species of Concern</i>	Other species of concern to the Service.
(SLC)	<i>Species of Local Concern</i>	Species of local or regional concern or conservation significance.
(D)	<i>Delisted</i>	Delisted. Status to be monitored for 5 years.
(CA)	<i>State-Listed</i>	Listed as threatened or endangered by the State of California.
NMFS	NMFS species	Under the jurisdiction of the National Marine Fisheries Service. Contact them directly.
*	<i>Extirpated</i>	Possibly extirpated from the area.
**	<i>Extinct</i>	Possibly extinct
	<i>Critical Habitat</i>	Area essential to the conservation of a species.

California Department of Fish and Game
Natural Diversity Data Base

List of Elements and Status by Element Code
Lower Cache Creek Flood Control Project

Elm. Code	Scientific/Common Name	Federal/ State Status	Global/ State Rank	CNPS/ R-E-D	CDFG Status
AAAAA01147	AMBYSTOMA CALIFORNIENSE CALIFORNIA TIGER SALAMANDER	Endangered/ None	G2G3/ S2S3		SC
AAABF01030	SCAPHIOPUS HAMMONDII WESTERN SPADEFOOT	None/ None	G3? S3?		SC
AAABH01050	RANA BOYLII FOOTHILL YELLOW-LEGGED FROG	None/ None	G3/ S2S3		SC
ABNGA04010	ARDEA HERODIAS GREAT BLUE HERON	None/ None	G5/ S4		
ABNGA05010	ARDEA ALBA GREAT EGRET	None/ None	G5/ S4		
ABNGE02020	PLEGADIS CHIHI WHITE-FACED IBIS	None/ None	G5/ S1		SC
ABNKC06010	ELANUS LEUCURUS WHITE-TAILED KITE	None/ None	G5/ S3		
ABNKC19070	BUTEO SWAINSONI SWAINSON'S HAWK	None/ Threatened	G4/ S2		
ABNKD06090	FALCO MEXICANUS PRAIRIE FALCON	None/ None	G5/ S3		SC
ABNNB03031	CHARADRIUS ALEXANDRINUS NIVOSUS WESTERN SNOWY PLOVER	Threatened/ None	G4T2/ S2		SC
ABNNB03100	CHARADRIUS MONTANUS MOUNTAIN PLOVER	Proposed Threatened/ None	G3/ S2?		SC
ABNRB02022	COCCYZUS AMERICANUS OCCIDENTALIS WESTERN YELLOW-BILLED CUCKOO	None/ Endangered	G5T2T3 / S1		
ABNSB10010	ATHENE CUNICULARIA BURROWING OWL	None/ None	G4/ S2		SC

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ABPAU08010	RIPARIA RIPARIA BANK SWALLOW	None/ Threatened	G5/ S2S3	
ABPBXB0020	AGELAIUS TRICOLOR TRICOLORED BLACKBIRD	None/ None	G3/ S3	SC
AFCJB34020	POGONICHTHYS MACROLEPIDOTUS SACRAMENTO SPLITTAIL	Threatened/ None	G2/ S2	SC
AMACC08015	CORYNORHINUS TOWNSENDII TOWNSENDII TOWNSEND'S WESTERN BIG-EARED BAT	None/ None	G5T3T4 / S2S3	SC
ARAAD02031	CLEMMYS MARMORATA MARMORATA NORTHWESTERN POND TURTLE	None/ None	G4T4/ S3	SC
ARADB36150	THAMNOPHIS GIGAS GIANT GARTER SNAKE	Threatened/ Threatened	G2G3/ S2S3	
CTT61410CA	GREAT VALLEY COTTONWOOD RIPARIAN FOREST	None/ None	G2/ S2.1	
CTT61420CA	GREAT VALLEY MIXED RIPARIAN FOREST	None/ None	G2/ S2.2	
CTT63440CA	ELDERBERRY SAVANNA	None/ None	G2/ S2.1	
CTT71130CA	VALLEY OAK WOODLAND	None/ None	G3/ S2.1	
ICBRA10010	LEPIDURUS PACKARDI VERNAL POOL TADPOLE SHRIMP	Endangered/ None	G2G3/ S2S3	
IICOL48011	DESMOCERUS CALIFORNICUS DIMORPHUS VALLEY ELDERBERRY LONGHORN BEETLE	Threatened/ None	G3T2/ S2	

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PDAST5N0F0	LAYIA SEPTENTRIONALIS COLUSA LAYIA	None/ None	G2/ S2.2	1B/ 2-2-3	
PDAST650A0	HARMONIA HALLII HALL'S HARMONIA	None/ None	G2/ S2.2	1B/ 2-2-3	
PDBRA1M0K1	LEPIDIUM LATIPES VAR HECKARDII HECKARD'S PEPPER-GRASS	None/ None	G4T1/ S1.2	1B/ 3-2-3	
PDBRA2G0S0	STREPTANTHUS MORRISONII SEE INDIVIDUAL SUBSPECIES!	None/ None	G2Q/ S2	/	
PDCHE040B0	ATRIPLEX CORDULATA HEARTSCALE	None/ None	G2?/ S2.2?	1B/ 2-2-3	
PDCHE041F3	ATRIPLEX JOAQUINIANA SAN JOAQUIN SALT BUSH	None/ None	G2/ S2.1	1B/ 2-2-3	
PDCHE042L0	ATRIPLEX DEPRESSA BRITTLES CALE	None/ None	G2Q/ S2.2	1B/ 2-2-3	
PDFAB0F7E1	ASTRAGALUS RATTANII VAR JEPSONIANUS JEPSON'S MILK-VETCH	None/ None	G4T2/ S2.2	1B/ 2-2-3	
PDFAB0F8R1	ASTRAGALUS TENER VAR TENER ALKALI MILK-VETCH	None/ None	G1T1/ S1.1	1B/ 3-2-3	
PDFAB0F8R3	ASTRAGALUS TENER VAR FERRISIAE FERRIS'S MILK-VETCH	None/ None	G1T1/ S1.1	1B/ 3-3-3	
PDJUG02040	JUGLANS HINDSII NORTHERN CALIFORNIA BLACK WALNUT	None/ None	G1/ S1.1	1B/ 3-3-3	
PDLIN01090	HESPEROLINON DRYMARIOIDES DRYMARIA-LIKE WESTERN FLAX	None/ None	G1/ S1.2	1B/ 3-2-3	
PDMAL0H0Q0	HIBISCUS LASIOCARPUS ROSE-MALLOW	None/ None	G4/ S2.2	2/ 2-2-1	