

**Sacramento River Flood Control System Evaluation
Initial Appraisal Report - Lower Sacramento Area**

Attachment C

**Environmental Evaluation
August 1993**

October 1993

ENVIRONMENTAL EVALUATION
SACRAMENTO RIVER FLOOD CONTROL SYSTEM EVALUATION
INITIAL APPRAISAL REPORT
LOWER SACRAMENTO AREA

August 1993

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ENVIRONMENTAL EVALUATION

SACRAMENTO RIVER FLOOD CONTROL SYSTEM EVALUATION
INITIAL APPRAISAL REPORT

LOWER SACRAMENTO AREA, PHASE IV

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ENVIRONMENTAL EVALUATION

SACRAMENTO RIVER FLOOD CONTROL SYSTEM EVALUATION INITIAL APPRAISAL REPORT

LOWER SACRAMENTO AREA, PHASE IV

1.0 Introduction. The Sacramento District, Corps of Engineers is conducting a study of the Sacramento River Flood Control Project levees. The non-Federal project sponsor is The Reclamation Board of the State of California. The evaluation of the Sacramento River Flood Control Project levees has been divided into five phases. The first phase concentrated on the levees in the Sacramento Urban Area. The Initial Appraisal Report was completed for the Sacramento Urban Area in 1988, and construction of remedial repairs began in 1990. An environmental assessment was prepared for the first phase, and the finding of no significant impact was signed on July 9, 1990. A programmatic environmental impact statement (EIS)/environmental impact report (EIR) has been prepared for the remaining four phases to comply with the requirements of the National Environmental Policy Act and the California Environmental Quality Act. During the design process when site-specific information is available, a supplemental environmental document will be prepared for each of the phases (Phases III-V). An environmental assessment was completed for Phase II in November 1992.

During the 1986 flood, low freeboard, sloughing of the levee slope, levee failure, landside seepage, and boils occurred in the study area. Subsequent engineering evaluations indicate that many levees in the project area do not meet existing design requirements and do not provide the congressionally authorized design conditions.

2.0 Scope of Analysis. This environmental evaluation is intended to provide baseline information on resources in the project area. The environmental evaluation will also provide a general assessment of potential impacts of project alternatives and a discussion of associated mitigation and costs for project impacts for inclusion in the Initial Appraisal Report. Included in this analysis are a description of the environmental setting for the study area, fisheries, wildlife, vegetation, cultural resources, and identification of threatened or endangered species in the study area. Information included in this evaluation has also been used to prepare the programmatic EIS/EIR.

3.0 Authorization. The Sacramento River Flood Control Project was authorized by the Flood Control Act of 1917. The present

evaluation of the Sacramento River Flood Control System was authorized and funded as part of the Energy and Water Development Appropriation Act of 1987 (Public Law 99-591). Similar language is contained in both the House of Representatives and Senate versions of the report. The House of Representatives report states:

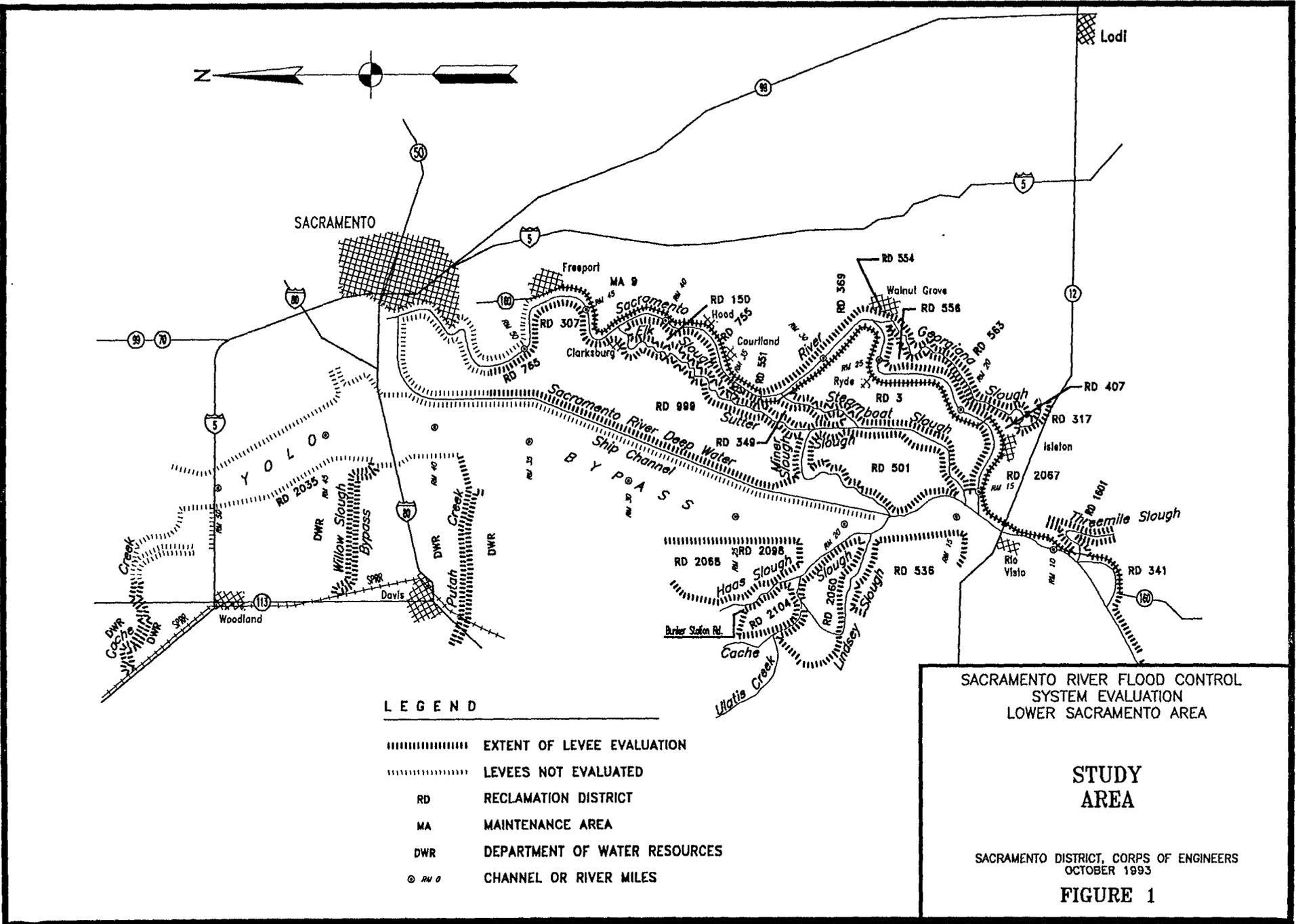
Inspection of Completed Works: Sacramento River Flood Control Project, California. - The Committee has included \$600,000 for a comprehensive analysis of the long-term integrity of the flood control system for the Sacramento River and its tributaries in collaboration with the State of California. The Committee is aware that even before the recent flooding, regional flood control officials felt the need for a thorough survey of the system. While it did serve well in the floods and prevented billions of dollars in damages, under stress it validated concerns that in many places remedial work is necessary as soon as possible, as may be enhanced levels of protection. The Corps is directed to report back to the Committee on protection enhancement requirements which it encounters in the review of the project.

The Senate report states:

Inspection of Completed Works: Sacramento River Flood Control Project, California. - The Committee is aware of the need for a comprehensive analysis of the integrity of the flood control system for the Sacramento River and its tributaries. Given the importance of this flood protection system, the Committee believes that such analysis is warranted.

4.0 Location. The Sacramento River Flood Control Project consists of about 1,000 miles of levees, overflow weirs, and flood bypass channels. The lower Sacramento study area is located along the Sacramento River and Delta sloughs in Sacramento, Yolo, and Solano Counties. Communities in the area include Freeport, Walnut Grove, Isleton, Davis, Woodland, Courtland, Hood, and Rio Vista. Project levees include those along the west and east banks of the Sacramento River from Freeport south to Collinsville. All project levees in the Delta are also considered in this phase (Figures 1 and 2).

5.0 Alternatives. The purpose of this study is to examine the existing flood control system as designed and to develop a levee reconstruction plan that restores, but does not increase, the design level of flood protection. Technical studies determined that the existing levee structures do not meet current design requirements due to geotechnical and freeboard deficiencies. Alternatives have been developed that address these inadequacies but do not increase the design level of protection. The alternatives being considered would generally consist of work on



LEGEND

- ||||| EXTENT OF LEVEE EVALUATION
- LEVEES NOT EVALUATED
- RD RECLAMATION DISTRICT
- MA MAINTENANCE AREA
- DWR DEPARTMENT OF WATER RESOURCES
- RM 0 CHANNEL OR RIVER MILES

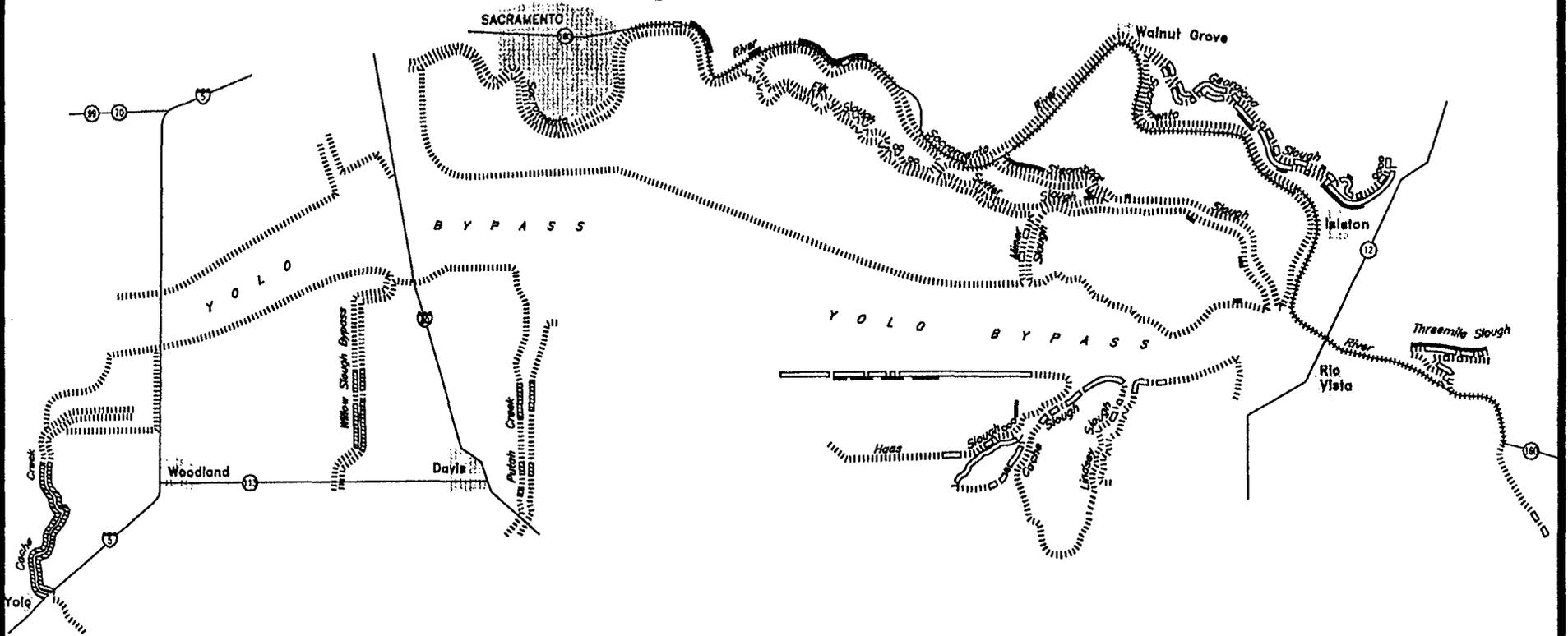
SACRAMENTO RIVER FLOOD CONTROL
SYSTEM EVALUATION
LOWER SACRAMENTO AREA

**STUDY
AREA**

SACRAMENTO DISTRICT, CORPS OF ENGINEERS
OCTOBER 1993

FIGURE 1

3



LEGEND

-  LEVEE RAISING
-  LANDSIDE BERM CONSTRUCTION
-  DITCH RELOCATION
-  DRAINAGE SYSTEM
-  LEVEE RAISING DUE TO POSSIBLE SUBSIDENCE BY GROUND WATER PUMPING (NO FEDERAL INTEREST)

SACRAMENTO RIVER FLOOD CONTROL
SYSTEM EVALUATION
LOWER SACRAMENTO AREA

**GENERAL LOCATON
LEVEE
RECONSTRUCTION**

SACRAMENTO DISTRICT, CORPS OF ENGINEERS
OCTOBER 1993

FIGURE 2

the levee crown, landside levee slope, and just landward of the levee toe, minimizing impacts to riverside riparian habitats. The alternatives are described below. A diagrammatic presentation is shown in Figure 3.

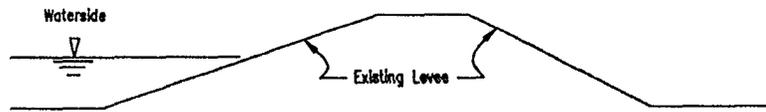
A. No action. The project levees would be maintained in their current condition. This alternative is likely to result in levee embankment problems and potential levee failure that could cause extensive flooding and significant economic damages and could include loss of life. The flooded area would be drained following flooding, and no significant long-term adverse impacts to environmental resources would be expected as a result of no action. Significant costs would be incurred and significant resources needed to repair or replace structures damaged by floodwaters.

B. Construction of a landside berm with sloping drain. The lower half of the landward levee slope would be cleared and grubbed, and drain rock would be placed over the lower slope. The drain material would be covered, and a berm approximately 10 to 25 feet wide and 5 to 15 feet high would then be constructed. The drain rock strengthens the levee by permitting the drainage of water, thereby retarding the loss of levee material. The combination of the berm and the drain rock strengthens the levee embankment and permits drainage of seepage waters without piping of soil materials. The berm also prevents levee sloughing. Any irrigation or drainage ditches adjacent to the landside levee toe would be relocated. Also, this alternative would require obtaining fill material from borrow areas.

C. Levee raising and ditch relocation. In those levee reaches that do not have the minimum required design freeboard, the existing levee crest would be raised above the design water-surface elevation. The levee would be raised primarily by widening the levee embankment on the landward side. The levee toe and ditch could be extended as much as 30 feet from the current landside levee toe. This alternative would require obtaining fill material from borrow areas and from excavation for drainage improvements.

D. Levee raising, landside berm, sloping drain, and ditch relocation. This alternative is a combination of alternatives B and C.

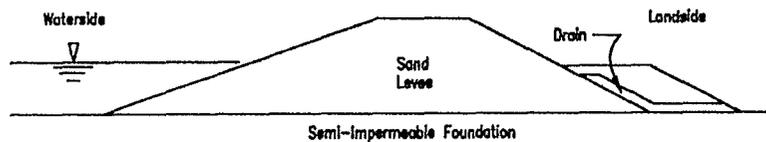
E. Cutoff wall. A trench would be excavated down to the foundation layer, near the middle of the existing levee embankment and filled with an impervious slurry material. This slurry cutoff wall would create a barrier to the movement of water through the levee and foundation, preventing piping of the levee or foundation material. When necessary, water for the slurry may be pumped from the Sacramento River or its tributaries. Excess levee material would have to be deposited in disposal areas and/or sanitary landfills.



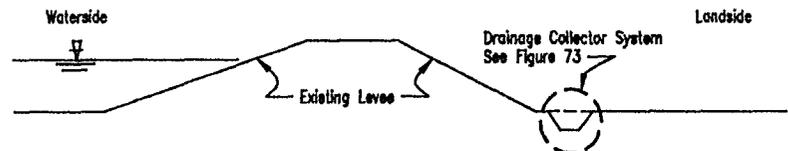
RECONSTRUCTION ALTERNATIVE "A"
NO ACTION



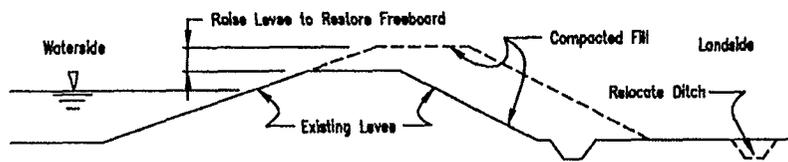
RECONSTRUCTION ALTERNATIVE "F"
LANDSIDE BERM WITH CUTOFF WALL



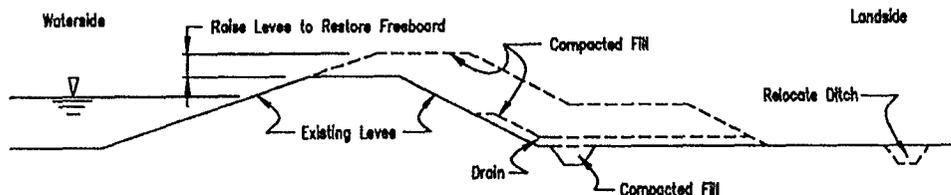
RECONSTRUCTION ALTERNATIVE "B"
LANDSIDE BERM WITH SLOPING DRAIN



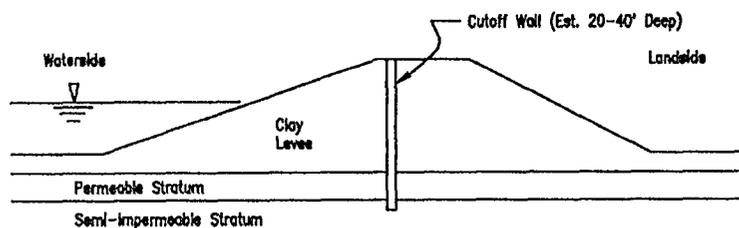
RECONSTRUCTION ALTERNATIVE "G"
DRAINAGE COLLECTOR SYSTEM



RECONSTRUCTION ALTERNATIVE "C"
LEVEE RAISING AND DITCH RELOCATION



RECONSTRUCTION ALTERNATIVE "D"
LEVEE RAISING, LANDSIDE BERM, SLOPING DRAIN, & DITCH RELOCATION



RECONSTRUCTION ALTERNATIVE "E"
CUTOFF WALL CONSTRUCTION

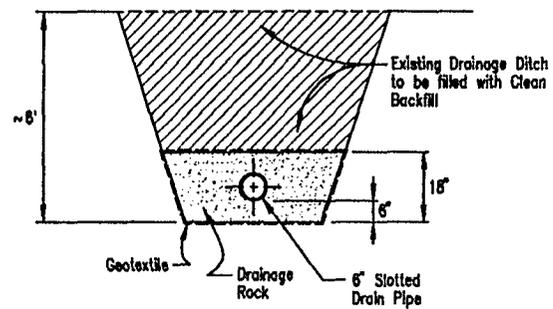


FIGURE 73 - DETAIL
DRAINAGE COLLECTOR SYSTEM

SACRAMENTO RIVER FLOOD CONTROL
SYSTEM EVALUATION
LOWER SACRAMENTO AREA

**LEVEE EMBANKMENT
RECONSTRUCTION
ALTERNATIVES**

SACRAMENTO DISTRICT, CORPS OF ENGINEERS
OCTOBER 1993

FIGURE 3

F. Landside berm with cutoff wall. A trench would be excavated through a landside berm, 10 to 25 feet wide and 5 to 15 feet high, at or near the middle of the landside levee toe and filled with slurry. The slurry cutoff wall would create a barrier to the movement of water through the levee and foundation, preventing piping of the levee or foundation material. When necessary, water for the slurry may be pumped from the Sacramento River or its tributaries. Excess levee material would have to be deposited in disposal areas and/or sanitary landfills.

G. Drainage collector system. A drainage collector system would be constructed at or near the landward toe of the existing levee embankment. This system would require clearing, excavating, and constructing drains within 10 feet of the landward toe of the existing levee embankment. Excess drainage water would be collected and pumped back into the river system or conveyed to existing drainage facilities. In addition, excess water could be allowed to flow overland to collector ditches.

6.0 Environmental Setting. The project area is in the lower portion of the Sacramento Valley of northern California and includes project levees along the Sacramento River from approximately Freeport to Collinsville. Also included are several sloughs adjacent to the Sacramento River and a portion of the Yolo Bypass and several adjacent sloughs. This area of the Sacramento Valley has a semiarid climate with warm, dry summers and moderate winters. The average annual rainfall is approximately 15 inches, generally between November and April.

7.0 Geology. Geologic formations underlying the Sacramento Valley include igneous, metamorphic, and sedimentary rock types. The project area is on alluvial deposits that have slowly accumulated over the last 100 million years. The materials have been derived from the surrounding uplands; transported by major streams; and deposited in successive clay, silt, sand, and gravel layers on the river flood plains, in local sinks, or within the shallow sea that periodically covered the valley floor. The surface sediments associated with the Sacramento River are primarily of three kinds: the older Victor formation, recent flood deposits, and recent basin deposits.

8.0 Soils. Soil types along the lower Sacramento River include soils characteristic of recent alluvial flood plains, basin areas, and reclaimed Delta islands. Recent alluvial soils are found in alluvial flood plain areas that are often transversed by channels and subject to overflow. These are poor to moderately drained soils suitable for a variety of agricultural uses. Basin soils, which are used to grow rice and cereal grains, are found farther inland than the flood plain soils and are poorly drained with a clay to clay-loam surface underlain by clay subsoils. Organic Delta soils average 10 feet in depth and were originally built up

from alluvial deposits and later covered by peat and other organic matter. These soils are excellent for agriculture because of their high organic content.

9.0 Air Quality. The project is located within the Sacramento Valley Air Basin. This air basin is a non-attainment area as defined by the Environmental Protection Agency. The topographic boundaries of the basin, coupled with light winds and atmospheric stability, make the basin susceptible to the accumulation of air pollutants. The typical summer circulation system allows transport of pollutants for long distances north and south along the valley.

The major air pollution in the basin is from high concentrations of oxidants and suspended particulate matter. Both pollutants frequently exceed air quality standards. The largest source of oxidants is motor vehicles, and the major sources of suspended particulates are the agricultural and lumber industries. Agricultural burning is a widely practiced procedure for cropland waste disposal.

Increases in dust from construction activities are expected to be minor and short term. This impact will not be significant since construction contractors are required to maintain all construction areas free from dust or other air emissions that would cause the local standards for air pollution to be exceeded or would cause a hazard or nuisance to others.

10.0 Water Quality. The overall water quality of the Sacramento River is generally good, but the quality varies at specific sites due to the effects of variable streamflows and the quantity of local waste discharges and irrigation return flows. Higher sediment loads and extensive irrigated agriculture returns tend to degrade water quality. During the spring and fall, excess irrigation waters are discharged into drainage canals that flow to the river. In the winter, the rainfall runoff flows over these same areas. In both instances, flows are highly turbid and introduce herbicides and pesticides into the drainage canals. Water quality in the distributary channels of the Delta is affected by intrusion of saline seawater. This intrusion is of increasing concern as consumptive uses of freshwater continue to increase statewide.

11.0 Land Use. Agriculture is the predominant land use in the Sacramento River basin and along the lower Sacramento River area. Orchards, corn, wheat, safflower, grapes, sugar beets, and rice are the primary crops produced in the area. Residential and commercial development is minor in or near Rio Vista, Isleton, Walnut Grove, Locke, Hood, Clarksburg, Courtland, Freeport, Woodland, and Davis. Residential areas are scattered along the Sacramento River and its associated sloughs. Marinas are also common along the lower Sacramento River, especially near Clarksburg.

12.0 Fisheries. The Sacramento River provides important habitat for a diverse array of fishes, including both anadromous and resident species. Anadromous fish include four races of chinook salmon, steelhead trout, striped bass, American shad, green and white sturgeon, and Pacific lamprey. Resident species include largemouth bass, black bass, catfish, white and black crappie, warmouth, Sacramento squawfish, and Sacramento sucker. These fish use the river as spawning and rearing habitat.

During flood periods, the Yolo Bypass contains the same fish species found in the Sacramento River. During most of the year, the bypass is dry and cultivated and does not provide fisheries habitat. Canals waterside of the project levees provide year-round habitat for warmwater fisheries such as carp and catfish.

13.0 Vegetation. Riparian forest vegetation along the lower Sacramento River and associated sloughs is restricted to scattered bands typically less than 30 feet wide on narrow banks, berms, and levee faces. Where levee maintenance has been neglected, wider and denser stands are present. Riparian forest may consist of a layered or single-story community. The overstory is generally composed of species such as cottonwood, box elder, valley oak, black walnut, and various willow species. The midstory is composed of elderberry, Oregon ash, black locust, and younger species of the overstory. The understory is dominated by blackberry, poison oak, wild grape, wild rose, grasses, and forbs. Riparian forest is usually sparse to nonexistent along the landside of project levees except at or near the scattered residential areas in the project area. This vegetation is sparse due to agricultural practices that promote the elimination of landside riparian areas in order to increase tillable land.

Riparian shrub/scrub is dominated by a mix of shrubs and young trees with an understory of grasses and forbs. Typical species in this area are elderberry, Himalaya berry, wild blackberry, poison oak, California rose, and wild grape. In addition, various species of willow and seedlings of box elder, cottonwood, and Oregon ash are found in this habitat. Riparian shrub/scrub is generally found in the same areas as riparian forest (residential sites and waterside levees). Scattered along the Sacramento River and its sloughs are many elderberry bushes, perhaps suggesting the presence of the valley elderberry longhorn beetle, a Federally listed endangered species.

A habitat type associated with the riparian community is the shaded riverine aquatic. This habitat is found along the river where vegetation is submerged in or overhangs the water and provides cooler shaded environment for a portion of the day to fish and other aquatic organisms seeking cover. Uneven bank edges or crevices within the bank may also provide habitat for fish. Higher food production may be found in these areas.

Freshwater emergent marsh is composed of dense stands of nonwoody aquatic vegetation species. Most common are cattails, giant bulrush, umbrella sedge, water smartweed, western verbena, and marsh pennywort. Freshwater marsh can be found along the Sacramento River in limited areas, in a larger quantity in associated sloughs, and in permanent irrigation drainage canals in the project area where water depths do not exceed 5 feet for prolonged periods.

The grassland plant community is dominated by a number of annual forbs and grasses such as wild oats, common foxtail, cheeseweed, and Italian rye grass. This community is the general vegetation type found on the landside of the levees and on the waterside in disturbed areas which are going through successional stages.

The agricultural plant community consists of economically important crops, including orchards and field crops such as pears, corn, wheat, safflower, and sugar beets. Most of this agricultural land was converted from native woodland, reclaimed freshwater marsh, and grassland communities. Agricultural communities are found landward of the levees.

14.0 Wildlife. Wildlife resources are generally associated with the type of vegetation available for food, cover, and nesting. (See Section 13.0.)

Riparian forest supports dense and diverse wildlife communities providing nesting habitat for large birds such as herons, hawks, owls, crows, and ravens. Habitat is also provided for cavity-nesting species such as woodpeckers, wood ducks, bats, western gray squirrels, raccoons, and ringtails. The understory supports such species as Anna's hummingbird, scrub jay, black-headed grosbeak, house finch, Virginia opossum, and gray fox.

Riparian shrub/scrub supports many of the same species found in riparian forest, but with smaller populations.

Freshwater emergent marsh provides habitat for species such as cormorants, herons, egrets, bitterns, red-winged blackbirds, marsh wrens, and muskrats. Marsh areas also provide breeding areas for reptiles and amphibians such as the Pacific tree frog.

Grassland habitats support species that feed on seeds, vegetation, and ground-dwelling insects. These species include the California ground squirrel, Botta's pocket gopher, starling, and Brewer's blackbird. Grassland areas also provide important foraging habitat for raptor species feeding on small mammals. Also suited to this type of habitat are the ring-necked pheasant, California quail, and mourning dove. These species frequent both the grassland and agricultural areas described below.

Wildlife species found in agricultural areas are similar to those found in the grassland areas. Waterfowl species frequently use agricultural fields, especially during winter migration. However, agricultural fields are more frequently disturbed and lack sufficient cover to support species as diverse as those in the grasslands.

15.0 Cultural Resources. A number of laws and regulations require Federal agencies to consider cultural resources during project planning and implementation. Principal among these is the National Historic Preservation Act of 1966, as amended (Public Law 95-515). In particular, the Section 106 review process of this Act and implementing regulations (36 CFR 800) guide the manner in which this law is carried out.

Cultural resources or historic properties include buildings, structures, objects, sites, districts, and archeological resources associated with historic or prehistoric human activity which are listed, or are eligible for listing, in the National Register of Historic Places. Such properties may be significant for their historic, architectural, scientific, or other cultural values and may be of national, State, or local significance.

The prehistory of the lower Sacramento Valley and Delta region has been of archeological interest since the late 1890's. More defined investigations were undertaken in the Cosumnes River and Deer Creek areas in the 1930's. This work, in combination with other studies, led to the development of a cultural succession model for the region. It revolutionized how archeologists understood how native cultures changed over time.

The earliest occupation of the lower Sacramento Valley and Delta is defined by the Windmill Pattern (3000 B.C. - 500 B.C.). Diverse subsistence resources and acquisition of materials from distant geographic areas through trade marked this era. The Berkeley Pattern (500 B.C. - A.D. 500) represented a gradual shift in subsistence patterns. Acorn use increased dramatically, and burial patterns differed from the Windmill era. The Augustine Pattern (A.D. 500 - A.D. 1880) showed an increased reliance on hunting, fishing, and gathering.

The study area is within the ethnographic boundaries of the Plains Miwok. The Plains Miwok were organized into autonomous triblets which functioned as independent units. Each village had a headman whose duty was to advise the members of the community. No other level of political organization existed above the village level. Ethnographic data are scarce because the Plains Miwok were relocated to the Spanish missions.

Using Bennyhoff's ethnogeography, five triblet centers were identified within 2.5 miles of the project area and an additional

four within 5 miles. The typical Plains Miwok settlement was on natural rises along the major rivers and streams.

Although the establishment of the mission system led to the rapid destruction of the Plains Miwok as a separate people, the Gold Rush saw the wholesale removal from their lands. As the Euro-American population increased, the need for service communities grew and resulted in the founding of Sacramento and Stockton. These cities depended on a river-based economy, with farms established along the waterways.

As demands for agricultural goods increased, the Delta's marshlands were reclaimed and farmed. River landings dotted the shores of the rivers and sloughs as farmers used ships to get their goods to market. The advent of the railroad, coupled with the siltation of the rivers and sloughs from hydraulic mining, led to the end of water transport in the Delta.

Prefield research consisted of a review of ethnographic and historic literature and maps, archeological base maps and site records, survey reports, and atlases of historic places on file at the North Central Information Center at California State University, Sacramento and the Northwest Information Center at Sonoma State University. No previously recorded sites were located within the project area. Five sites were located in the general vicinity of the project levees.

Following the prefield research, a pedestrian survey for all areas of potential effect identified and recorded one historic site consisting of two railroad berms separated by Georgiana Slough. The Corps did not evaluate the site for the National Register of Historic Places because the site will not be affected by project design.

16.0 Threatened or Endangered Species. A large number of species exist within the varied habitats of the study area. A diverse array of reptiles, amphibians, birds, and mammals inhabit the complex habitat created by the combination of grasslands, agricultural lands, riparian vegetation, and open water.

Coordination with the U.S. Fish and Wildlife Service shows that the only Federally listed endangered species that may be present in the study area is the Antioch dunes evening primrose. Federally listed threatened species that may be present are the valley elderberry longhorn beetle, the winter-run chinook salmon, and the delta smelt. The giant garter snake is proposed endangered.

Federal candidate species that may be present are the Sacramento perch (FC2), Sacramento splittail (FC2), green sturgeon (FC2R), northwestern pond turtle (FC2), Pacific western big-eared bat (FC2), Suisun aster (FC2), California hibiscus (FC2), Delta tule pea (FC2), and Mason's lilaeopsis (FC2).

Species listed as threatened or rare by the State of California and possibly present in the project area are Mason's lilaepsis (rare), giant garter snake (threatened), winter-run chinook salmon (endangered), and Swainson's hawk (threatened). The delta smelt has been proposed for listing as a threatened species.

17.0 Evaluation of Impacts. The primary direct environmental impact associated with the proposed reconstruction work is the removal of vegetation, which in turn would adversely affect wildlife species dependent on vegetative cover.

Construction of a slurry cutoff wall generally results in minimal environmental impacts. This repair is accomplished via the levee embankment. Access for construction is usually from the landside of the levee through grassland or agricultural area. This type of construction usually avoids impacts to riparian vegetation, emergent marsh, or irrigation drainage ditches. The source of water for construction of a slurry wall has not been identified. If the water is taken from the Sacramento River, studies will need to be done to determine any adverse impacts.

Levee raising on the landside levee slope might affect areas of grassland/agriculture and scattered areas of riparian forest, emergent marsh, and open water. A worst case scenario would result in the disturbance of 100 feet of vegetation along the landward side of the levee. Generally, a maximum of 40 feet from the landward side of the levee is disturbed.

Direct impacts were estimated from aerial photos of the project area. These preliminary estimates indicate 237 acres of wildlife habitat would be affected by project construction, including 3 acres of agriculture, 49 acres of wetlands, 8 acres of shrub/scrub, 20 acres of wetland/shrub/scrub complex, and 157 acres of grasslands. No shaded riverine aquatic habitat is expected to be disturbed unless a new alternative including waterside improvements is proposed. In this case, an estimate of impacts to that habitat will be necessary.

To minimize impacts to the State-listed threatened Swainson's hawk, construction near potential nesting areas would be scheduled in order to avoid the nesting period of the species. The nesting period for the Swainson's hawk is from March to August.

Short-term, construction-related increases in noise levels, traffic, and dust would be expected. No secondary impacts to the environment related to the development of agriculture or riparian areas will result from the project because the reconstruction will only restore the levees to congressionally authorized design conditions.

18.0 Mitigation. Mitigation requirements for project impacts would be analyzed by a habitat evaluation procedure (HEP) at the

affected sites. The mitigation recommendations discussed below are estimates based on previous Corps of Engineers mitigation determinations and the planning aid letter completed by the U.S. Fish and Wildlife Service (appendix A).

Mitigation for project impacts would be provided by reseeding all disturbed areas and newly constructed berms and by acquiring a parcel of suitable land that could be revegetated to replace habitat values lost during construction. Mitigation estimates are based on acres of habitat affected. An estimate of the potential mitigation required is shown in Table 1. The actual mitigation requirement will be determined using habitat based evaluations such as HEP during the next phase of the project.

Table 1: Project Impacts and Mitigation Estimates

Habitat Type	Direct Impacts (acres)	Mitigation (acres)
Wetland	49	128
Shrub/Scrub	8	18
Wetland/Shrub/scrub complex	20	53
Grassland	157	157 ¹
Agriculture	3	3 ²

¹ This mitigation would be partially accomplished by reseeding the levee slopes and borrow areas.

² The habitat values associated with agricultural/orchard lands will be replaced in the overall mitigation package.

Approximately 112 acres of grassland/agricultural type habitat will be disturbed by borrow and associated construction access. Borrow areas will have to be regraded at an even slope and reseeded with native grasses.

19.0 Future Studies. A programmatic EIS/EIR has been prepared that discusses the general impacts of Phases II-V of the Sacramento River Flood Control Systems Evaluation. Additional environmental documents will be prepared for each phase during advanced engineering and design studies as specific design information is available. If necessary, the environmental documentation will include a biological data report and formal consultation on potential impacts to the valley elderberry longhorn beetle. Preparation of a 404(b)(1) water quality evaluation will also be necessary if any irrigation drainage ditches are affected.

20.0 Section 1135. Section 1135, Water Resources Development Act of 1986, authorizes the Secretary of the Army to administer a

program to restore habitat. Habitat restorations must be modifications of previously completed Corps projects.

Fish and wildlife restoration consists of measures to return fish and wildlife habitat resources to a modern historic condition. The goal of fish and wildlife restoration is to reverse the adverse impacts of human activity and restore habitats to previous levels of productivity, but not to a higher level than would have existed under natural conditions in the absence of human activity or disturbance.

The proposed borrow area in Yolo County and near Delhi Road is a high-value fish and wildlife area (Figure 4). The area is presently intermixed with seasonal and permanent wetlands and therefore provides high wildlife diversity and abundance. Nesting birds using the area include ring-necked pheasants, various waterfowl, northern harriers, and shorebirds.

This area could be enhanced by using the surrounding agricultural lands as a borrow area instead of the proposed borrow area discussed above. Removal of the soil in a mosaic pattern with gentle side slopes would create suitable habitat for planting of emergent wetland and woody riparian vegetation. Borrow should be removed no deeper than 6 feet, and the side slopes should be greater than 4:1. "Islands" of various sizes should be left at the original elevation or raised 3 feet. Planting emergent wetland vegetation in the low areas and woody riparian vegetation in the upland areas would provide ideal conditions to increase the habitat value of the area. This Section 1135 habitat restoration project would allow borrow extraction and mitigation development to be done in concert.

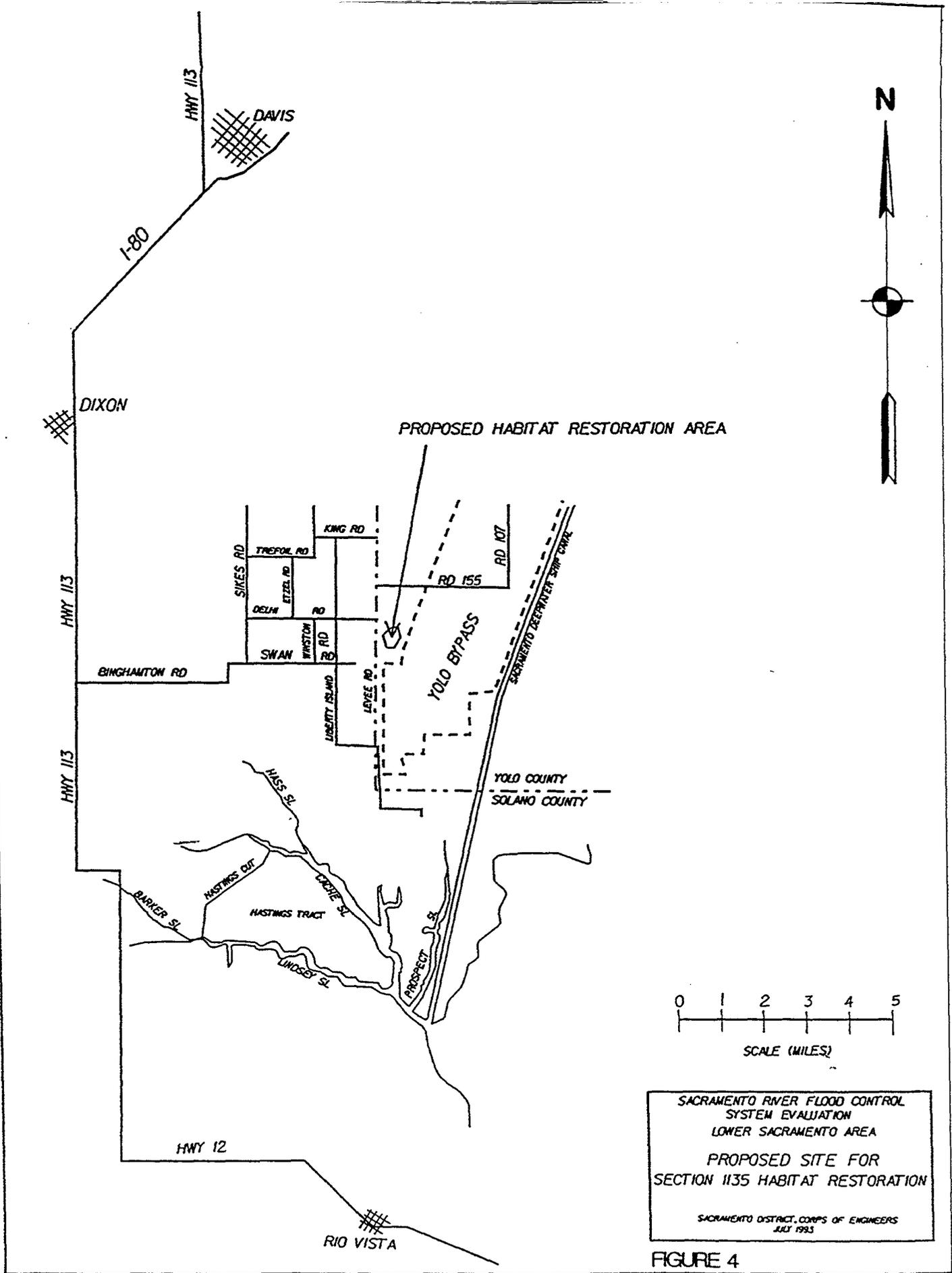


FIGURE 4

APPENDIX

**PLANNING AID LETTER
U.S. FISH AND WILDLIFE SERVICE**



United States Department of the Interior



FISH AND WILDLIFE SERVICE
Ecological Services
Sacramento Field Office
2800 Cottage Way, Room E-1803
Sacramento, California 95825-1846

May 12, 1993

Colonel Laurence R. Sadoff
District Engineer
U.S. Army Corps of Engineers, Sacramento District
1325 J Street
Sacramento, California 95814

Subject: CE/SAC--Sacramento River Flood Control System Evaluation--Phase IV

Dear Colonel Sadoff:

This Planning Aid Letter (PAL) is being provided pursuant to the Scope of Work between our agencies for Fiscal Year 1993. The primary purpose of this PAL is to provide, early in the Corps of Engineers' (Corps) planning process, detailed, site-specific recommendations (Attachment 1) for mitigating impacts to fish and wildlife which are believed likely to arise due to construction of the Corps' proposed project known as the Sacramento River Flood Control System Evaluation (SRFCSE)--Phase IV.

This PAL is provided under the authority of, and in accordance with, the Fish and Wildlife Coordination Act (FWCA), and it is consistent with the Fish and Wildlife Service's (Service) Mitigation Policy, as published in the Federal Register (46:15; January 23, 1981). However, this PAL does not constitute our detailed report as specified in Section 2(b) of the FWCA.

INTRODUCTION AND BACKGROUND

The Sacramento River Flood Control Project consists of about 1,000 miles of levees, plus various overflow weirs, pumping plants and bypass channels that protect communities and agricultural lands in the Sacramento Valley and Sacramento-San Joaquin Delta. The Corps' SRFCSE is evaluating this project to determine the long-term integrity of the flood control system for meeting its designed standards. The SRFCSE was initiated by the Corps following a major flood event in 1986 that severely stressed the existing flood control system, caused some levee failures and near-failures, and raised questions of overall system reliability.

The SRFCSE has been divided into five phases for which the Corps has produced a Programmatic Environmental Impact Statement/Report EIS/R (USACE, 1992). The first two phases involve the most heavily-populated areas: the Sacramento Urban area (Phase I) and the Marysville/Yuba City area (II). The other three phases--Mid Valley (III), Lower Sacramento (IV), and Upper Sacramento (V)--evaluate the less populated areas of the project. This present PAL pertains

only to the Lower Sacramento (Phase IV) area of the SRFCSE. The Service provided its initial PAL for the Phase IV area on May 14, 1990 (USFWS, 1990).

PROJECT DESCRIPTION

The study area for Phase IV, SRFCSE is located along the Sacramento River and tributary and distributary sloughs in Sacramento, San Joaquin, Yolo, Solano and Contra Costa Counties. Communities in the area include Freeport, Walnut Grove, Isleton and Rio Vista. Project levees include those along the west and east banks of the Sacramento River from Freeport (River Mile 46) south to Collinsville (River Mile 0). All project levees in the Delta are also considered in this phase.

The project alternatives being considered have been previously described in detail (USACE, 1992; USFWS, 1990). Briefly, these alternatives are: (1) no action; (2) construct drainage improvements at or near the landward toe of the levee embankment; (3) raise levees (primarily via widening the levee embankment on the landward side); (4) raise levees and construct drainage improvements at or near the landward toe of the levee embankment; (5) construct a cutoff wall through the levee; (6) construct a waterside cutoff wall; and (7) construct drainage improvements and a stabilizing berm along landside levee toe.

SOURCE OF INFORMATION FOR THIS PAL

During March 1993, the Corps provided the Service with 30 x 40-inch "blue-line" copies of aerial photographs of the project area, acquired during either (depending on site) October 31, 1986 or April 7, 1992, on which the locations of the project's general proposed features were hand-sketched. These blue-lines were all at a scale of 1:4,800. Project features identified as to their general location included levee repair sites, proposed borrow areas and proposed staging (i.e., equipment and supply) areas. During late March and April 1993, each of these approximate 95 project work sites identified on the blue-lines was visited by a Service biologist. Information as to baseline habitat conditions and likely Service mitigation recommendations were recorded--both in writing and by video tape--according to best professional judgement. Results of this survey are presented in Attachment 1.

UPDATES TO THE SERVICE'S PREVIOUS PAL

Some of the information presented in our previous (May 14, 1990) PAL for the SRFCSE--Phase IV is now either outdated or in need of further clarification. In particular, we want to advise you that the definition of Shaded Riverine Aquatic (SRA) Cover has recently been expanded and clarified, as described in the Service's draft PAL to the Corps for Contract 42A of the Sacramento River Bank Protection Project (USFWS, 1992a). In addition, for SRA Cover of the lower Sacramento River (from the city of Sacramento downstream to the city of Rio Vista) and its primary distributary sloughs (Sutter, Georgiana, Miner and Steamboat sloughs) the Service's designation for mitigation planning purposes

has recently been elevated from Resource Category 2 to Resource Category 1 (USFWS, 1992b).

The Service's planning goal for Resource Category 1 is "no loss of existing habitat value;" this means we would strive for avoidance of all impacts to this cover type. Occurrences of SRA Cover within the project area of the SRFCSE-Phase IV but not presently included in the Resource Category 1 designation area, would likely be classified as before--as Resource Category 2. The mitigation planning goal for Resource Category 2 is "no net loss of in-kind habitat value." As defined in the Service's Mitigation Policy, "in-kind replacement" means to provide or manage 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 being lost. Also, regardless of whether an occurrence of SRA Cover in the Phase IV project area was determined to be in Resource Category 1 or 2, our associated planning goals would be to achieve no loss of either acreage or linearity along the river channel.

The Service's designation and use of cover types as reported in our 1990 PAL were also somewhat inconsistent. We want to clarify that the key cover types that we stated could be impacted by the proposed Phase IV project include, in addition to SRA Cover, emergent marsh or similar wetlands areas, woody riparian areas, scrub-shrub areas, and grassy (including ruderal and upland/herbaceous) areas. In addition, we now recognize that three distinct cover types not mentioned in our 1990 PAL could also be impacted: agricultural lands, barren areas, and developed areas.

The agricultural lands could include fallow fields, row crops, orchards or vineyards. Evaluation species selected for agricultural lands that could be impacted include songbirds, such as finches and sparrows, and the ring-necked pheasant. Songbirds were selected due to their significant non-consumptive human uses (such as for bird-watching); pheasants were selected due to their high importance as a game bird for hunters in the Central Valley. Generally, the agricultural lands that could be impacted by the Phase IV project are of medium to high value to these particular evaluation species, and still relatively abundant. Thus, the Service would designate such agricultural lands as having a mitigation planning goal of "no net loss of habitat value, while minimizing loss of in-kind habitat value" (i.e., Resource Category 3).

For the relatively small barren and developed areas that could be impacted by the Phase IV project, the Service will adopt a mitigation planning goal to "minimize loss of habitat value" (i.e., Resource Category 4). The rationale for this particular planning goal for each of these two cover-types is presented in the draft PAL provided by the Service to the Corps in November 1992 for the Corps' Sacramento-San Joaquin Delta Investigation (USFWS, 1992c).

Three other corrections to the Service's 1990 PAL for the Phase IV project are as follows: (1) the American shad population of the Sacramento River is not presently flourishing; drought conditions over the past 6 years have substantially reduced the population size and areal extent of successful spawning of this species; (2) the band-tailed pigeon is not a common species

found in the proposed project area; and (3) the threatened and endangered species information needs updating (see following section).

THREATENED AND ENDANGERED SPECIES

The following discussion of federally-listed threatened and endangered species should be regarded as preliminary information, which we are providing to supplement the discussion given in the Service's 1990 PAL, and to assist the Corps in preparation of a Biological Assessment for the Phase IV project. The Corps has previously acknowledged in its Programmatic EIS/R for the SRFCSE that a biological data report and biological assessment would be prepared for each project phase to assess the project impacts on any federally endangered or threatened species found at the specific project work sites.

Appendix A provides a summary of a Federal agency's responsibilities under Section 7(a) and (c) of the Endangered Species Act of 1973, as amended (Act).

We recommend that the Corps also review its requirements, published in 50 CFR 402, for compliance with the Act. The Fish and Wildlife Service has consultation responsibility for most of the federally-listed species that may be affected by the project, and this office should be contacted regarding further consultation requirements. The National Marine Fisheries Service has responsibility for the federally-listed threatened winter-run chinook salmon, and should be consulted on activities which may affect this species. The California Department of Fish and Game should also be consulted regarding its endangered listing of this species.

The Corps should request in writing from the Service a list for the project area of all federally-listed and proposed threatened and endangered species, or an updated list if an earlier list is more than 90-days-old at the time preparation of any Biological Assessment for this project is undertaken.

The most recent list of federally-listed and proposed threatened and endangered species (Appendix B) provided by the Service to the Corps was dated August 27, 1992. Since that time, at least one significant change has occurred: the delta smelt, a formerly proposed species, has now been formally listed as threatened.

Based on the preliminary project information that has been provided to the Service to date, and the Service's recent visits to the proposed work sites, it appears that the greatest likelihood of impacts to listed species due to the Phase IV project may be for the valley elderberry longhorn beetle (Federal-listed; threatened) and Swainson's hawk (State-listed; threatened).

ESTIMATED COSTS TO COMPLETE THE SERVICE'S FWCA INVOLVEMENT

The Corps' development of alternatives that would focus work on the landside rather than the waterside of the levees has *substantially* reduced the potential impacts to fish and wildlife resources from the SRFCSE in general,

and the Phase IV project in particular. The Service commends the Corps for taking this progressive approach.

If the Corps can now also implement a substantial proportion of the critical impact avoidance and mitigation recommendations (identified by an asterisk) given within Attachment 1, the overall net project impacts to fish and wildlife resources from SRFCSE--Phase IV can be kept relatively small. With such a degree of impact avoidance, the Service would not have a need to conduct a Habitat Evaluation Procedures (HEP) analysis to quantify impacts and mitigation needs for the project. We could instead apply the HEP results and findings, including mitigation acreage ratios (i.e., acres of specific mitigation needed for each acre impacted), from the HEP recently completed for SRFCSE--Phase II or other similar analyses. This would mean that the Service's primary activity relative to Phase IV would be impact area determination for the 90 to 100 specific work areas, and the Service's draft and final FWCA Reports could be completed for an estimated \$25,000 and \$6,000, respectively. However, if some of the sensitive habitat areas addressed in the recommendations given in Attachment 1 cannot be fully avoided by the Phase IV project, a complete, new, HEP evaluation would be necessary. This would necessitate an approximate doubling of the cost for the Service's draft FWCA report, and a corresponding increase of about 25 percent for preparation of our final FWCA report.

This concludes our second PAL for the Corps' SRFCSE--Phase IV project. We appreciate the opportunity to provide this interim PAL before commencement of our detailed report as specified in Section 2(b) of the FWCA. We believe that this 'extra' coordination will help ensure maximum project impact avoidance to significant fish and wildlife habitats, thereby reducing the potential replacement mitigation costs for the project.

Prior to the Service beginning its Section 2(b) FWCA report for the project, the Corps will need to provide us with good quality aerial photographs at, or enlarged to, a scale of $\geq 1:2,000$ of each of the specific project work sites. (The "blue-lines" evaluated herein would not be acceptable.)

If you have any questions regarding this PAL or the SRFCSE in general, please contact Richard DeHaven of my staff at (916) 978-4613.

Sincerely,



Wayne S. White
Field Supervisor

cc: ARD, ES, FWS, Portland, OR
NMFS, Santa Rosa, CA
EPA, San Francisco
CDFG, Region II, Rancho Cordova
CDFG, Headquarters, Sacramento
State Reclamation Board, Sacramento

Literature Cited

U.S. Army Corps of Engineers (USACE). 1992. Sacramento River Flood Control System Evaluation, Phase II-V Programmatic Environmental Impact Statement/Environmental Impact Report, May 1992. 63pp and Appendices.

U.S. Fish and Wildlife Service (USFWS). 1990. Planning Aid Letter provided May 14, 1990 by Sacramento Field Office to U.S. Army Corps of Engineers, Sacramento regarding Sacramento River Flood Control System Evaluation-Phase IV. 26pp and Appendices.

_____. 1992a. Draft Fish and Wildlife Coordination Act Report for the Sacramento River Bank Protection Project, Control 42A, provided July 1992 to U.S. Army Corps of Engineers, Sacramento. 126pp.

_____. 1992b. Shaded Riverine Aquatic Cover of the Sacramento River System: classification as Resource Category 1 under the FWS mitigation policy. Special report by Sacramento Field Office, October 1992. 22pp.

_____. 1992c. Draft Planning Aid Letter provided November 25, 1992 by Sacramento Field Office to U.S. Army Corps of Engineers, Sacramento regarding Sacramento-San Joaquin Delta Investigation. 98pp.

ATTACHMENT 1. SITE-SPECIFIC HABITAT CONDITIONS AND RECOMMENDATIONS BY THE FISH AND WILDLIFE SERVICE FOR AVOIDANCE OF IMPACTS, SACRAMENTO RIVER FLOOD CONTROL SYSTEM EVALUATION--PHASE IV.

1. Sheet 2 of 22: The two levee raising (1.3-2.0 ft) areas on western Sherman Island near Sacramento River, River Mile (RM) 4.0 would have minor landside impacts, and any habitat value losses that occurred should be replaceable elsewhere.
2. Sheet 3 of 22: The proposed levee repairs and stability berm, along Threemile Slough on Twitchell Island would likely impact substantial wetlands habitat values along the landside levee slopes and levee toe. Losses could be relatively large. *We recommend replacement of any destroyed habitat values and acreages on Twitchell Island, as close to the impacts areas as possible.

The Proposed Borrow Area (PBA) on Twitchell Island is surrounded by, and possibly intermixed with, various wetlands. *We thus recommend that, at a minimum, any borrow extraction be (a) confined only to non-wetlands (i.e., the pasture/grassland areas, (b) limited in depth to 6 ft. or less, and (c) done in a "sculpted" or mosaic pattern with gentle (>3:1: horizontal:vertical) slopes to help create the maximum post-project habitat diversity possible. The best approach, however, would be to avoid this PBA altogether.

As part of the Western Delta Water Management Program, DWR (Department of Water Resources) has acquired about 2,900 acres (80 percent) of Twitchell Island. Multiple objectives of the Western Delta program include:

- Improving levees for flood control.
- Protecting Delta water quality.
- Providing habitat for waterfowl and wildlife.
- Minimizing oxidation and subsidence.
- Identifying potential wildlife habitat mitigation opportunities for present and future water development projects.

Twitchell Island is the first of several islands that may be acquired as part of the program. To implement objectives of this program, DWR is upgrading the island's levees along the San Joaquin River, has contracted with USGS to study subsidence on the island, and is developing a wetlands restoration plan for the island.

DWR and the Corps recently began discussing a Federal/State cost-sharing program for wetlands restoration at Twitchell Island. The Corps has funding for environmental restoration projects at sites on or adjacent to its existing projects (authorized by Section 1135, Water Resources Development Act of 1988).

The proposed levee raise (1.8 ft.) area on Sherman Island along Threemile Slough nearest the Brannon Island bridge would likely impact some wetlands habitat along the landside levee toe. Related habitat

values and acreages should be replaceable elsewhere, in a designated mitigation site (see below).

The levee raise (1.0 ft.) area in the intermediate area along Threemile Slough on Sherman Island has SRA Cover waterside that could be avoided. Landside, scrub-shrub cover exists that should be replaceable in value elsewhere, in a designated mitigation site.

The northernmost levee raise (1.0 ft.) reach on Sherman Island along Threemile Slough has moderate-to high-value wetlands/scrub-shrub mix that should be replaceable in value and acreage elsewhere, in a designated mitigation site.

4. Sheet 4 of 22: Brannon-Andrus Island levee raising (3.0 ft.) along Georgiana Slough, roughly from RM 0 to 2, would likely have relatively small impacts to low-value cover types. However, on the waterside, some SRA Cover exists, which should be avoided.

The geotech fix/stability berm on Andrus Island, along Georgiana Slough, roughly from RM 2 to 3.7, would destroy significant, moderate-to high-value wetland and scrub-shrub habitat that exists along the landside levee slope and levee toe, due to ongoing seepage. *We recommend that replacement habitat values be provided along Georgiana Slough, as near to the impacts area as possible.

The PBA at "The Oxbow", about RM 30, Georgiana Slough is a well-manicured lawn area. Impacts to fish and wildlife would likely be minimal.

The Proposed Staging Area (PSA) on Tyler Island along Georgiana Slough near RM 4.1 has some moderate-value emergent wetland areas that should be replaceable in value and acreage elsewhere, if impacted. *We recommend that any impacts to the ditch with such wetland growth be fully avoided, however.

The work area on Tyler Island levees near RM 4, Georgiana Slough, would have relatively small impacts which should be replaceable elsewhere, in a designated mitigation site. Waterside, the existing SRA Cover should be avoided.

The work area on Tyler Island levees along Georgiana Slough, roughly from RM 2.5 to 3.2, would have relatively small impacts which should be replaceable elsewhere, in a designated mitigation site. The scrub-shrub and SRA Cover that exists waterside in this reach should be avoided.

The work area on Tyler Island levees along Georgiana Slough, vicinity of RM 1.9 would have moderate impacts to scrub-shrub and wetlands, which should be replaceable elsewhere, in a designated mitigation site. Waterside, the SRA Cover should be avoided.

The work area on Tyler Island levees along Georgiana Slough, roughly from RM 0.6 to 0.8 would likely result in relatively small impacts,

which should be replaceable elsewhere, in a designated mitigation site. Waterside, the SRA Cover should be avoided.

The work area on Tyler Island levees along Georgiana Slough near RM 0.0 to 0.2, would create relatively small impacts, which should be replaceable elsewhere, in a designated mitigation site. Waterside, the SRA Cover should be avoided.

5. Sheet 5 of 22: Tyler Island levee improvements along Georgiana Slough:

0.7 ft. levee raising, approx. RM 8.0-8.5. Landside impact areas are relatively low value non-wetlands types; losses should be replaceable elsewhere. SRA Cover and scrub-shrub areas along the waterside of the levee should be avoided.

1.2 ft. levee raising, approx. RM 8.5-9.6. Landside impact areas would include non-wetland and a small amount of wetland types, which should be replaceable elsewhere. The high-value SRA and scrub-shrub cover along the waterside of the levee should be avoided.

1.6 ft. levee raising, approx. RM 9.8-10.8. Landside impact areas are relatively low value, non-wetlands types; losses should be replaceable elsewhere. Waterside SRA Cover and scrub-shrub areas are of high value and should be avoided.

0.5 ft. levee raising, approx. RM 11.1-11.3. Landside impact areas are relatively low value, non-wetland types; losses should be replaceable elsewhere. Waterside SRA Cover and scrub-shrub areas are of high value and should be avoided.

Any of these Tyler Island work sites along Georgiana Slough could be within 1/2-mile of an active Swainson's Hawk nest, thus construction timing may be restricted. Surveys would be needed before construction to determine the exact locations of nesting Swainson's hawks.

Andrus Island levee improvements along Georgiana Slough:

2.0 ft. levee raise/geotech fix, approx. RM 7.5-8.5. The landside impact area has two areas with significant habitat: a narrow, but high-value ditch with emergent marsh and scrub-shrub; and some elderberry plants on the levee slope. *We recommend that the wetlands impacts here be replaced along Georgiana Slough, as near to this site as possible. *We also recommend that the elderberry plants here be thoroughly surveyed for the present of valley elderberry longhorn beetle emergence holes, and avoided during construction to the maximum extent feasible. The waterside SRA Cover and scrub-shrub is also of high value and should be avoided during construction.

1.0 ft. levee raising, approx. RM 8.5-9.2. Moderate-to high-value scrub-shrub would be impacted landside along the levees, but the

habitat values should be replaceable elsewhere. The very high-value SRA Cover along the waterside should be avoided.

0.5 ft. levee raising, approx. RM 9.6-9.8. Generally, only low-to moderate-value ornamental and fruit trees would be impacted, and their habitat values should be replaceable elsewhere. High-value SRA Cover waterside of the levee should be avoided.

1.0 ft. levee raising, approx. RM 10.0-10.5. Only herbaceous vegetation and low-value scrub-shrub would be impacted, and lost habitat values should be replaceable elsewhere. Excellent quality SRA Cover along the waterside of the levee should be avoided.

1.0 ft. levee raising, approx. RM 11.0-11.3. Orchard and upland/herbaceous habitat would be impacted landside and should be replaceable on-site or elsewhere. SRA Cover along the waterside is of high value and should be avoided.

Any of these Andrus Island work sites along Georgiana Slough may be within 1/2-mile of an active Swainson's hawk nest, thus construction timing may need to be restricted. Surveys would be needed before construction to determine the exact locations of nesting Swainson's hawks.

6. Sheet 6 of 22: Andrus Island levee improvements along Georgiana Slough:

0.8 ft. levee raising, approx. RM 4.75-4.82. Impacts along the landside would be relatively small, and should be replaceable on-site or elsewhere. Waterside scrub-shrub and SRA Cover is scattered and of moderate-to low-value; nevertheless the SRA Cover should be avoided.

PBA, approx. RM 5-6. This is a presently bare (disced), relatively flat agricultural field. An excellent opportunity exists here to conduct borrow removal in conjunction with development of a mitigation area, which would tie in with the adjacent "swamp" area just to the north. Borrow should be removed to a depth of no more than 6 feet in a "mosaic" pattern, with gentle (>4:1) side slopes and "islands" of various sizes left at the original elevations (or raised up to 3 feet). Planting of emergent wetland vegetation and woody riparian vegetation, where appropriate, should then be done. A system to provide a permanent water supply to the area would need to be developed. *We recommend this PBA be developed as a combination borrow/mitigation area, or if borrow extraction in combination with mitigation features proves infeasible, as a project mitigation area only. We want to also advise the Corps that the adjacent swamp area has high habitat values, possibly including nesting raptors, which could affect timing of work in the nearby PBA/possible mitigation area. *We recommend that the Corps assess and advise the Service, in writing, of whether levee improvements along this reach are likely to change the hydrology of the swamp area, in particular, how its annual "wetness" may be

affected. The Service will then be able to assess, using HEP or other means, whether overall habitat values would be significantly reduced, thus necessitating the need for replacement mitigation. If the PBA is pursued in combination with mitigation area development, the adjacent swamp area should also be protected in perpetuity, possibly through acquisition of a "conservation easement".

2.0 ft. levee raising, approx. RM 5.2-6.7. This area contains the swamp described above, which could be substantially impacted, either directly or indirectly, depending upon ultimate project design and specifications. *We recommend avoidance of work in this area, or if that is not feasible, that the slurry cut-off wall alternative be implemented in the vicinity of the swamp, so as to minimize any direct construction impacts, and that indirect impacts (due to reduced wetness) be assessed using HEP and fully mitigated if indirect losses are projected. This construction reach also has variable amounts of scrub-shrub and emergent marsh (ditch areas), generally of low to moderate-value, which should be replaceable at the RM 5.6 PBA/proposed mitigation area, or elsewhere.

PSA, approx. RM 5.7. *We recommend that this PSA, which is adjacent (north side) to the swamp described above, be abandoned, unless all activity related to the PSA is confined to the non-nesting season for birds which use the swamp, and direct physical and hydrological impacts to the swamp's habitat features are fully avoided. Shifting the location of this PSA to the area of the PBA, (RM 5.6) and at least 300 ft. from the southern edge of the swamp, would be acceptable to the Service, however.

PSA, approx. RM 6.7. This PSA is sited at the southeast end of a high-value wetland complex which extends roughly 2,000 ft. from near Isleton Road (to the northwest), to near the Georgiana Slough levee. *We recommend that the staging area be confined to the upland/herbaceous/grassy area immediately adjacent to the Georgiana Slough levee, and that no direct or indirect impacts occur to the wetland complex, which is composed of emergent marsh, ponded areas and scrub-shrub. This nearby wetland complex would be an excellent site to expand, to the southwest, as a mitigation area for this Phase IV project. *We recommend that this be pursued, if our proposed mitigation area, in conjunction with the PBA at RM 5.6, Georgiana Slough, proves infeasible.

2.0 ft. levee raising, geotech fix, ditch fill, berm, approx. RM 6.85-7.50. Mostly low-to moderate-value habitats, which should be replaceable elsewhere, would be impacted along the landside of the levees. SRA Cover along the waterside should be avoided.

Tyler Island levee improvements along Georgiana Slough:

1.0 ft. levee raising, approx. RM 4.8-5.1. Landside, the impacts would be small, exclusively to non-wetlands types, and any habitat

value losses should be replaceable either on-site or elsewhere. *We recommend, however, that the waterside mitigation revegetation site (part of the Sacramento River Bank Protection Project) which is present within the southern end of this reach not be impacted in any way.

0.6 ft. levee raising, approx. RM 5.9-6.1. Landside impacts would likely be minor, and should be offsetable elsewhere. Impacts to the waterside SRA Cover should be avoided.

0.5 ft. levee raising, approx. RM 6.2-6.5. The impacts would be minor along landside areas, and losses should be offsetable here or elsewhere. Impacts to the waterside SRA Cover should be avoided.

0.5 ft. levee raising, approx. RM 6.6-6.7. Low-value areas would be impacted along the landside, and losses should be readily replaceable. The SRA Cover along waterside areas should be avoided.

7. Sheet 8 of 22: The PBA on the western tip of Grand Island near Steamboat Slough RM 15.4 contains moderate-to high-value scrub-shrub habitat that includes elderberry plants, the host plant of the threatened valley elderberry longhorn beetle. *We recommend that this area be avoided for borrow extraction and that the PBA be moved farther south or west, to where the existing habitat is mainly upland/herbaceous cover. Borrow extraction should be accomplished to a depth of no more than 10 ft. below present elevations in a mosaic pattern, with gentle (>4:1) side slopes and "islands" of various sizes left at the original elevations (or raised up to 3 ft.).

The levee improvements (geotech fix, berm) roughly from Steamboat Slough RM 16.2-16.5 on Ryer Island. This area would have relatively minor impacts; any reduced habitat values should be readily replaceable.

The PSA on Ryer Island near Steamboat Slough RM 16.6. This area is low-value habitat, and minimal, if any, impacts would be expected.

The levee improvements (geotech fix/berm) on Ryer Island, roughly along Steamboat Slough RM 19.3-19.7. This work area would affect low-value existing habitats, and any resulting habitat value losses should be readily replaceable.

9. Sheet 10 of 22: The proposed levee improvements (geotech fix/berm) on Ryer Island, vicinity of Cache Slough RM 16 are of concern to the Service. This area fronts a high-value emergent wetland/scrub-shrub area several acres in size which could be negatively impacted if seepage through the levee is halted or reduced. *We recommend that the Corps assess and advise the Service, in writing, as to how levee improvements at this site are likely to change the hydrology of this wetland area, in particular, how its "wetness" may be affected. The Service will then be able to assess, using HEP or other means, whether overall habitat values

would be significantly reduced, thus necessitating the need for replacement mitigation.

10. Sheet 11 of 22: The three levee raising (1.0-5.0 ft.) sites along Hastings Tract, fronting Lindsey Slough (two sites) and Cache Slough (one site), would result in only minor losses of landside habitat, mostly upland/herbaceous vegetation; any net habitat losses should be readily replaceable.

The PBA adjacent to the Cache Slough Gas Field is presently a large, fallow (disced) agricultural field. *We recommend that any borrow extraction here be accomplished to a depth of no more than 10 ft. below present elevations in a mosaic pattern, with gentle (>4:1) side slopes and "islands" of various sizes and configurations left at their present elevations (or raised up to 4 ft.).

The levee raising (1.0 ft.) area near the PBA was not examined by the Service, due to access difficulties.

The 500-ft-long levee raising (2.0 ft.) area north of the PBA, at the junction of Lindsey and Cache Sloughs, would have little or no impact to the habitats landside of the levee; however, it appears likely that SRA Cover (actually, Shaded Palustrine Aquatic--SPA--Cover) waterside of the levee would be impacted. *We recommend impact avoidance of the SPA Cover, but if this is infeasible, full replacement should be provided nearby. One option would be to provide such replacement at the nearby Cache Slough/Yolo Bypass Mitigation Bank area for the Corps' Sacramento River Bank Protection Project.

11. Sheet 13 of 22: The two levee raising (0.5-1.5 ft.) sites along the right bank of Miner Slough upstream of the Courtland Road bridge would likely result in low landside impacts to mainly upland/herbaceous vegetation, with scattered large walnut trees and small scrub-shrub patches; any net habitat losses should be readily replaceable. With regards to the waterside, the upstream site (about 400-ft-long) is riprapped, and lacks any SRA Cover, but the downstream site (about 1,300-ft-long) has SRA Cover that should not be impacted.
12. Sheet 14 of 22: The proposed levee raising (1.0-5.0 ft.) areas on Hastings Tract along Cache Slough would have minor impacts on the landside of the levees where mainly dense upland/herbaceous vegetation presently exists, as long as construction was done outside of the bird nesting season. This reach, which has a gently-sloping landside berm, has numerous nesting red-winged blackbirds, ring-necked pheasants and waterfowl (mostly mallards). *We thus recommend that construction not be done at these sites during the period from March 15 to June 30 annually.

The PBA near the Cache Slough/Yolo Bypass Mitigation Bank area is an agricultural field (row crops) that is currently barren (disced). An excellent opportunity exists here to conduct borrow extraction in conjunction with development of a mitigation area, which would

complement the nearby Mitigation Bank. Borrow should be removed to a depth of no more than 8 ft. in a mosaic pattern, with gentle (>4:1) side slopes and "islands" of various sizes and configurations left at present elevations (or higher). Then, following borrow extraction, the area should be replanted with appropriate wetlands species and provided with a permanent water supply. The two large pumps at the edge of the PBA may facilitate the water supply development. *We thus recommend that this site be developed as a combination borrow/mitigation area.

The proposed landside levee raising (2.3 ft.) area along the right bank of Shag Slough would create significant impacts to moderate-value wetlands, primarily in ditches, areas along the levee toe. These impacts could be offset using the mitigation area recommended in the preceding paragraph, or perhaps in the nearby Cache Slough/Yolo Bypass Mitigation Bank area. Waterside impacts to scrub-shrub and SPA Cover should be avoided.

13. Sheet 15 of 22: The proposed 0.7 ft. levee raising area along the left (east) bank of Cache Slough would impact a 60'x 20' wetland with emergent vegetation at the upstream, landside end of the site. The remainder of the landside area contains dense herbaceous vegetation. This wetland should be avoided during construction, but if that is not possible, wetland habitat should be replaced as close to the work site as feasible. The herbaceous vegetation provides nesting habitat for red-winged blackbirds, western meadowlarks, ring-necked pheasants, and other birds. Construction should therefore not take place during the avian nesting season, roughly from about March 15 to June 30. Waterside, there are scattered shrubs, areas with SPA Cover, and emergent marsh areas, which should all be avoided during construction.

The proposed 2.0 ft. levee raising area along the left (east) bank of Cache Slough would impact mainly dense herbaceous/upland vegetation, which provides nesting habitat for the avian species mentioned at the previous 0.7 ft. levee raising site. Construction should therefore not take place between about March 15 and June 30. The waterside area contains high-value SPA Cover, natural banks, palustrine scrub-shrub habitat, and emergent marsh areas, and should be avoided during project construction.

The proposed 0.5 ft. levee raising area along a short stretch of the left bank of Cache Slough at the confluence of Ulati Creek would have minimal landside impacts to wildlife. Waterside, the habitat is similar to that of the previous 2.0 ft. levee raising site, and should be avoided. In addition, there is a cliff swallow nesting colony on the pumphouse across Cache Slough from the work site, so construction should not take place between about March 15 and June 30.

The proposed 1.7 ft. levee raising area along the downstream portion of the left bank of Cache Slough, close to the confluence with Haas Slough, would impact very dense herbaceous/upland vegetation, utilized by nesting red-winged blackbirds, western meadowlarks, ring-necked pheasants, and other birds. Landside impacts to vegetation could be

offset elsewhere, but construction should not take place during the avian nesting season for these species, roughly from about March 15 to June 30. Waterside, there is high-value SPA Cover and scrub-shrub habitats, and relatively wide areas of emergent vegetative growth. Cache Slough is relatively wide here, thus wetland acreage is greater than at the previous three sites. The waterside areas should be avoided during construction.

The proposed 2.7 ft. levee raising area along the right bank of the downstream portion of Haas Slough, between the Cache Slough confluence and Bunker Station Road, would have significant impacts upon wetlands both landward and waterward of the levee. Drainage ditches lined with emergent vegetation extend about 1/2-mile along the levee toe. In addition, there are several relatively large ponded areas lined with emergent vegetation at several pumps and water outlets. Several mallards were observed at these areas. Also, the entire fields along the middle section of the work site are seasonally flooded and provide valuable wetland habitat. There is thick herbaceous growth on the levee face and top. *We recommend avoidance of work in this area. If that is not possible, we recommend that the Corps assess and advise the Service, in writing, as to how levee improvements at this site are likely to change the hydrology of this wetland area, in particular, how its "wetness" may be affected. Any unavoidable habitat losses should be replaced as close to the impact area as possible. Waterside of the levee, Cache Slough is relatively wide downstream, but narrows rapidly within 2 miles. There is substantial SPA Cover and riparian scrub-shrub habitat along the slough, providing very high-value fish and wildlife habitat. In addition, there are relatively wide, long stretches of emergent vegetation in the slough. *We recommend that waterside impacts be completely avoided.

14. Sheet 16 of 22: The proposed 0.6 ft. levee raising site along the right bank of the unnamed slough between Swan Road and Haas Slough would impact a landside drainage ditch along the entire work site. There is valuable SPA Cover, scrub-shrub habitat, and emergent marsh areas along and within the ditch. Many nesting red-winged blackbird territories are located here, and several mallards were observed in the ditch. This area is also impacted by grazing sheep. *We recommend that any impacts to the landside ditch with such wetland growth be fully avoided. If that is not possible, then these habitat losses should be replaced as close to the work site as feasible. Waterside, the banks of the slough are uniform, with occasional narrow strips of emergents. No SPA Cover or scrub-shrub habitat occurs here.

The proposed 0.6 ft. levee raising site along the left bank of the unnamed slough between Swan Road and Haas Slough, downstream from the site just described may impact vernal and seasonal pools landward of the levee. *We recommend that, these areas which are of very high value to wildlife be avoided during construction. There is also moderately thick herbaceous vegetation along the sites of the levee; this habitat should be replaceable elsewhere. Waterside, there are scattered willows and alders providing valuable SPA Cover and scrub-shrub habitat values. The

natural, uneven banks also provide instream cover. All Impacts to the waterside area should be avoided.

15. Sheet 17 of 22: The PBA, shown on the northeast corner of this sheet is an upland/herbaceous-wetlands mix. This is a quite flat, low-elevation area, and it is doubtful whether any significant amounts of borrow could be extracted due to the high water table. The Service would prefer to see this area avoided. Otherwise, borrow extraction should be limited to the presently low-value upland and grassland-vegetated areas; existing wetlands, as evidenced by hydric soils and/or hydrophytic vegetation, should be avoided. Also, any borrow extraction should occur in a mosaic pattern, to a depth of 6-ft or less, and with gentle side slopes, as described above herein for the Service's other proposed borrow/mitigation areas.

For the proposed 2.3 ft. levee raising area along the right (west) bank of Shag Slough southward from the vicinity of the PBA:

Landside, from the PBA to Liberty Farms, only low-to moderate-value habitats would be impacted, including a shallow, seasonal, 30-40-ft.-wide open water drain ditch bordered by scattered, narrow bands of emergent marsh. Any habitat losses not replaceable on-site should be replaceable elsewhere.

Landside, from Liberty Farms to the southward end of the work area shown on this sheet, impacts to fish and wildlife habitats would vary from low to moderate. The most significant area to avoid would be the 20-25-ft-wide stands of dense bulrush and other emergent vegetation at the base of the levee from roughly Liberty Farms to the new Liberty Island bridge. However, any of the impacts along this reach should be replaceable elsewhere (e.g., the nearby Mitigation Bank area), if on-site replacement proved infeasible.

Throughout this reach impacts waterside of the levee, especially involving SPA Cover, should be avoided.

16. Sheet 18 of 22: The proposed areas of levee raising (1.0-2.0 ft.) all along the right (west) bank of the Shag Slough would likely have minor landside impacts to relatively low-value existing habitats. Such losses could likely be easily replaced either (a) on-site, (b) at the Cache Slough/Yolo Bypass Mitigation Bank, or (c) at another mitigation site. SPA Cover and scrub-shrub cover along the waterside of the levee within this reach should be avoided, however.
17. Sheet 19 of 22: The PBA, shown on the southeast end of this sheet, is a high-value fish and wildlife area that should be avoided to the maximum extent feasible. The area is presently intermixed with seasonal and permanent wetlands, thus providing for relatively high wildlife diversity and abundance. For example, the Service's observations made during late March 1993 suggest a wide range of nesting birds use the area, including ring-necked pheasants, various waterfowl, northern

harriers, and shorebirds. *We recommend this area be dropped as a PBA, and replaced, if necessary, using the adjacent, low-value, agricultural (row-crop) field just to the north.

The use instead of the adjacent agricultural field would provide an excellent opportunity for borrow extraction and mitigation development to be done in concert. Borrow should be removed to a depth of no more than 6 ft. in a mosaic pattern, with gentle (>4:1) side slopes and "islands" of various sizes left at the original elevations, or raised up to 3-ft. higher. Planting of emergent wetland vegetation and woody riparian vegetation should then be done, where appropriate. Development of a permanent water supply to the area would be ideal, but not a requirement for developing mitigation credits. *We recommend that this field, or another nearby agricultural field with low existing habitat values, be developed as a combination borrow extraction/mitigation area, as a replacement for the present PBA.

The levee raising (1.0-2.0 ft.) proposed along the West Levee would have variable, but generally minor impacts to fish and wildlife habitats. The primary cover type is upland/herbaceous. In places, a 10-100-ft-wide, shallow, open water drain, would likely be converted to new levee slope, and small amounts of emergent marsh would be destroyed; these habitat losses should be replaceable on-site or elsewhere. The most potentially significant impacts would occur at the vicinity of Riss Road, where high-value scrub-shrub exists. If feasible, this scrub-shrub should be avoided; if not, it should be replaced nearby.

18. Sheet 20 of 22: The PSA shown along the Sacramento River near its bifurcation with Steamboat Slough would likely create minor, if any, detrimental impacts to fish and wildlife. However, this assumes that impacts to the trees, shrubs and SRA Cover at the site would be fully avoided, and all staging activity would be confined to the site's presently barren areas.

The geotech fix and stability berm area proposed along the left bank of Steamboat Slough from approximately RM 24.4 upstream to the bifurcation with the Sacramento River is a highly sensitive area. Swainson's hawks are known to nest in the vicinity, and waterside along the levees, the SRA Cover and related woody riparian growth are of very high habitat value. Landside, habitat values are generally relatively low, consisting of pear orchards, residential dwellings and related infrastructure; and thus landside impacts would be expected to be correspondingly low. *We recommend that the stability berm along this reach be designed extra wide, perhaps more in the form of a set-back levee. The purpose would be to reduce in extent and delay waterside bank protection work that may be needed in the future under the auspices of the Corps' Sacramento River Bank Protection Project. This may also allow the Bank Protection Project to resort to small, very site-specific control of erosion "pockets" along the waterside, rather than extensive areas of riprapping.

19. Sheet 21 of 22: The PSA adjacent to the left bank of the Sacramento River at about RM 39.4 would likely result in minimal, if any, detrimental impacts. This area is already being heavily used as a farm equipment staging area.

Landside, the geotech/stability berm areas along the Sacramento River left bank from roughly RM 39.8-37.6 would result in small, if any, impacts, as would the proposed levee raising within the town of Hood (approx. RM 38.4-38.5). Likewise, the PSA near the gaging station within the town of Hood would not be a problem from a fish and wildlife perspective.

20. Sheet 22 of 22: The PBA's between the Sacramento River and Interstate Highway 5, roughly due east of the Freeport Bridge, would offer another excellent opportunity for mitigation area development in conjunction with borrow extraction. Borrow extraction would need to be done as described herein above for other similar areas. However, a maximum depth for borrow extraction still would need to be determined. Developing mitigation credit here may be possible, either with or without development of a permanent wetlands water supply. But, because of the proximity to infrastructure and human population, any mitigation area would need to be fenced, with access closely controlled and limited.

The 0.8 ft. levee raising area along the left bank near Sacramento River RM 45.4 would not be a concern from a fish and wildlife perspective, nor would be the two nearby PSA's, provided that no trees or shrubs are removed at the PSA's.

Most of the landside impacts along the left bank of the Sacramento River where a geotech fix/stability berm is proposed from about RM 45.0 downstream to 44.0 (and beyond) would involve removal of ornamental trees and shrubs and upland/herbaceous growth. Such impacts could be offset elsewhere.

21. Sheet 4 of 100: The PBA, roughly at the northeast center of Decker Island should not cause significant fish and wildlife problems. However, this assumes that (a) borrow extraction would be confined to sandy, unvegetated or sparsely vegetated previous dredge spoil areas; (b) adjacent scrub-shrub habitat would be avoided; (c) the very high-value riparian zone along the berm fronting the northwestern edge of the island would be avoided; and (d) if any raptors are nesting in trees on the island's northeast side, borrow removal would only be done during their non-nesting period.
22. Sheet 5 of 100: The PBA in the edge of the Montezuma Hills just west of Rio Vista appears unlikely to result in any significant impacts to fish and wildlife resources.
23. Sheet 13 of 100: PSA--See Sheet 8 of 22.
24. Sheet 14 of 100: PSA--See Sheet 9 of 22.

25. Sheet 15 of 100: The Service would likely not have any significant on-site concerns regarding the PSA at the junction of Steamboat and Sutter Sloughs. There may be nesting Swainson's hawks nearby, however.

The proposed stability berm along the landside of Sutter Slough, for about 1,500-ft just upstream of the junction with Steamboat Slough, would cause moderate habitat value losses due to removal of wetlands (ditch with emergent and woody riparian growth). The Service would prefer that this repair not be completed and that the funds instead be expended as part of the cost for new cross-levee construction and development of a mitigation area within the southern tip of Sutter Island as proposed in the Service's PAL to the Corps for Contract 41B, Sacramento River Bank Protection Project, dated December 8, 1987. Should this not be feasible, the habitat lost due to the stability berm construction should probably be replaced elsewhere.

26. Sheet 19 of 100: Two PSA's--See Sheet 4 of 22 and Sheet 6 of 22.
27. Sheet 20 of 100: PSA--See Sheet 6 of 22.
28. Sheet 18 of 100: PBA and PSA--See Sheet 4 of 22.
29. Sheet 25 of 100: PSA--See Sheet 20 of 22.
30. Sheet 26 of 100: The two sites (500 and 1,100 ft.) along the Merritt Island side of Elk Slough where a drainage system is proposed to be installed, have relatively low existing habitat values, except that there may be elderberry plants, the host plant for the federally-threatened valley elderberry longhorn beetle, present on the work areas. The presence or absence of these plants should be confirmed. If the drainage "fix" at these two sites involves construction of a new ditch in which emergent vegetation is planted or allowed to naturally establish, some enhancement of habitat values could occur which could be used to offset losses on-site or elsewhere.
31. Sheet 28 of 100: PSA--See Sheet 21 of 22.
32. Sheet 29 of 100: The geotech/stability berm area along the Sacramento River left bank, about RM 41.85-41.50, would have relatively small impacts to the landside areas.

The PSA would not be of concern to the Service, unless Swainson's hawks were nesting nearby.

33. Sheet 30 of 100: PSA # MA 9-52--See Sheet 22 of 22.

Appendix A

FEDERAL AGENCIES' RESPONSIBILITIES UNDER SECTIONS 7(a) and (c) OF THE ENDANGERED SPECIES ACT

SECTION 7(a) Consultation/Conference

Requires: 1) Federal agencies to utilize their authorities to carry out programs to conserve endangered and threatened species; 2) Consultation with FWS when a Federal action may affect a listed endangered or threatened species to insure that any action authorized, funded or carried out by a Federal agency is not likely to jeopardize the continued existence of listed species, or result in the destruction or adverse modification of critical habitat. The process is initiated by the Federal agency after determining the action may affect a listed species; and 3) Conference with FWS when a Federal action is likely to jeopardize the continued existence of a proposed species or result in destruction or adverse modification of proposed critical habitat.

SECTION 7(c) Biological Assessment--Major Construction Activity¹

Requires Federal agencies or their designees to prepare a Biological Assessment (BA) for major construction activities. The BA analyzes the effects of the action² on listed and proposed species. The process begins with a Federal agency requesting from FWS a list of proposed and listed threatened and endangered species. The BA should be completed within 180 days after its initiation (or within such a time period as is mutually agreeable). If the BA is not initiated within 90 days of receipt of the list, the accuracy of the species list should be informally verified with our Service. No irreversible commitment of resources is to be made during the BA process which would foreclose reasonable and prudent alternatives to protect endangered species. Planning, design, and administrative actions may proceed; however, no construction may begin.

We recommend the following for inclusion in the BA: an on-site inspection of the area affected by the proposal which may include a detailed survey of the area to determine if the species or suitable habitat are present; a review of literature and scientific data to determine species' distribution, habitat needs, and other biological requirements; interviews with experts, including those within FWS, State conservation departments, universities and others who may have data not yet published in scientific literature; an analysis of the effects of the proposal on the species in terms of individuals and populations, including consideration of indirect effects of the proposal on the species and its habitat; an analysis of alternative actions considered. The BA should document the results, including a discussion of study methods used, any problems encountered, and other relevant information. The BA should conclude whether or not a listed or proposed species will be affected. Upon completion, the BA should be forwarded to our office.

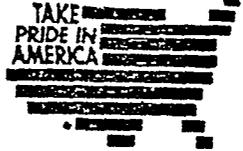
¹ A construction project (or other undertaking having similar physical impacts) which is a major Federal action significantly affecting the quality of the human environment as referred to in NEPA (42 U.S.C. 4332(2)C).

² "Effects of the action" refers to the direct and indirect effects on an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action.



Appendix B

United States Department of the Interior



FISH AND WILDLIFE SERVICE
Fish and Wildlife Enhancement
Sacramento Field Office
2800 Cottage Way, Room E-1803
Sacramento, California 95825-1846

In Reply Refer To:
1-1-92-SP-1211

August 27, 1992

Mr. Walter Yep
Chief, Planning Division
Department of the Army
Corps of Engineers, Sacramento
1325 J Street
Sacramento, California 95814-2922

Subject: Species List for the Proposed Sacramento River Flood Control System - Lower Sacramento Area, Phase IV, California

Dear Mr. Yep:

As requested by letter from your agency dated July 17, 1992, you will find enclosed a list of species designated and proposed as endangered or threatened under the Endangered Species Act of 1973, as amended (Act), that may be present in the subject project area (Enclosure A). This list fulfills the requirement of the Fish and Wildlife Service to provide a species list pursuant to Section 7(c) of the Act.

Some pertinent information concerning the distribution, life history, habitat requirements, and published references for the listed species is also enclosed. This information may be helpful in preparing the biological assessment for this project, if one is required. Please see Enclosure B for a discussion of the responsibilities Federal agencies have under Section 7(c) of the Act and the conditions under which a biological assessment must be prepared by the lead Federal agency or its designated non-Federal representative.

Section 7 consultation, pursuant to 50 CFR § 402 of our interagency regulations governing Section 7 of the Act, should be initiated if you determine that a threatened or endangered species may be affected by the proposed project. Section 7 conference, pursuant to 50 CFR § 402.10, is required if you determine that the proposed action is likely to jeopardize the continued existence of a proposed species. Informal consultation may be utilized prior to a written request for consultation to exchange information and resolve conflicts with respect to a listed species. If a biological assessment is required, and it is not initiated within 90 days of your receipt of this letter, you should informally verify the accuracy of this list with our office.

Also, for your consideration, we have included a list of the candidate species that may be present in the project area (Enclosure A). These species are currently being reviewed by our Service and are under consideration for possible listing as endangered or threatened. Candidate species have no protection under the Act, but are included for your consideration as it is possible that one or more of these candidates could be proposed and listed before the subject project is completed. Should the biological assessment reveal that candidate species may be adversely affected, you may wish to contact our office for technical assistance. One of the potential benefits from such technical assistance is that by exploring alternatives early in the planning process, it may be possible to avoid conflicts that could otherwise

Mr. Walter Yep, Chief, Planning Division

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develop, should a candidate species become listed before the project is completed.

Please contact the Section 7 Coordinator of this office at (916) 978-4866 if you have any questions regarding the enclosed list or your responsibilities under the Act. For questions concerning the threatened winter-run chinook salmon, please contact Jim Lecky, Endangered Species Coordinator, National Marine Fisheries Service, Southwest Region, 501 West Ocean Boulevard, Suite 4200, Long Beach California 90802-4213, or call him at (301) 980-4015.

Sincerely,



Wayne S. White
Field Supervisor



Enclosures

cc: FWS-SFO (Federal Projects), Sacramento, CA (Attn: Rich DeHaven)

ENCLOSURE A

LISTED AND PROPOSED ENDANGERED AND THREATENED SPECIES AND
CANDIDATE SPECIES THAT MAY OCCUR IN THE AREA OF THE PROPOSED
SACRAMENTO RIVER FLOOD CONTROL SYSTEM - LOWER SACRAMENTO AREA, PHASE IV,
CALIFORNIA
(1-1-92-SP-1211, AUGUST 25, 1992)

Listed Species

Fish

winter-run chinook salmon, *Oncorhynchus tshawytscha* (T)

Invertebrates

valley elderberry longhorn beetle, *Desmocerus californicus dimorphus* (T)

Plants

Antioch Dunes evening-primrose, *Oenothera deltoides* ssp. *howellii* (E)

Proposed Species

Fish

delta smelt, *Hypomesus transpacificus* (PT)

Reptiles

giant garter snake, *Thamnophis gigas* (PE)

Candidate Species

Fish

Sacramento perch, *Archoplites interruptus* (2)
Sacramento splittail, *Pogonichthys macrolepidotus* (2)
green sturgeon, *Acipenser medirostris* (2R)

Reptiles

northwestern pond turtle, *Clemmys marmorata marmorata* (2)

Mammals

Pacific western big-eared bat, *Plecotus townsendii townsendii* (2)

Plants

Suisun aster, *Aster chilensis* var. *lentus* (2)
California hibiscus, *Hibiscus californicus* (2)
delta tule-pea, *Lathyrus jepsonii* ssp. *jepsonii* (2)
Mason's lilaeopsis, *Lilaeopsis masonii* (2)

- (E)--Endangered (T)--Threatened (P)--Proposed (CH)--Critical Habitat
(1)--Category 1: Taxa for which the Fish and Wildlife Service has sufficient biological information to support a proposal to list as endangered or threatened.
(2)--Category 2: Taxa for which existing information indicated may warrant listing, but for which substantial biological information to support a proposed rule is lacking.
(1R)--Recommended for Category 1 status.
(2R)--Recommended for Category 2 status.
(*)--Listing petitioned.
(*)--Possibly extinct.