Appendix K

Fish and Wildlife Coordination Act Report

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Suite W-2605
Sacramento, California 95825-1846

In Reply Refer to:
08ESMF00-
2013-CPA-0007-2

Alicia E. Kirchner
Chief, Planning Division
Corps of Engineers, Sacramento District
1325 J Street
Sacramento, California 95825-2922

Dear Ms. Kirchner:

The U.S. Army Corps of Engineers has requested coordination under the Fish and Wildlife Coordination Act (FWCA) for the West Sacramento Levee Improvement Program, Southport Early Implementation Project. The proposed levee modifications would occur along the Sacramento River in the City of West Sacramento, Yolo County, California. The enclosed report constitutes the U.S. Fish and Wildlife Service's FWCA report for the proposed project.

If you have any questions regarding this report, please contact Harry Kahler, Fish and Wildlife Biologist, or Doug Weinrich, Assistant Field Supervisor, at (916) 414-6600.

Sincerely,

Jennifer M. Norris
Field Supervisor

Enclosure

cc:
Sarah Ross Arrouzet, COE, Sacramento, CA
Howard Brown, NMFS, Sacramento, CA
Manager, Region 3, CDFW, Yountville, CA

FISH AND WILDLIFE COORDINATION ACT REPORT
WEST SACRAMENTO LEVEE IMPROVEMENT PROGRAM
SOUTHPORT EARLY IMPLEMENTATION PROJECT
February 2015

This is the U.S. Fish and Wildlife Service's (Service) Fish and Wildlife Coordination Act report on the effects of the proposed West Sacramento Levee Improvement Program (WSLIP), Southport Sacramento River Early Implementation Project (EIP) [Southport Project], City of West Sacramento, Yolo County, California. This report has been prepared under the authority of, and in accordance with, the provisions of the Fish and Wildlife Coordination Act (48 stat. 401, as amended: 16 U.S.C. 661 et seq.).

BACKGROUND

On behalf of the West Sacramento Area Flood Control Agency (WSAFCA), the U.S. Army Corps of Engineers (Corps) has proposed the Southport EIP to implement flood risk–reduction measures along the Sacramento River South Levee in the Southport community of West Sacramento. A series of storms with unusually high levels of precipitation, between December 26, 1996, and January 3, 1997, caused several major flooding events throughout the Sacramento Valley. These events prompted comprehensive studies, which impelled the Corps to revise levee criteria regarding under-seepage and through-seepage deficiencies.

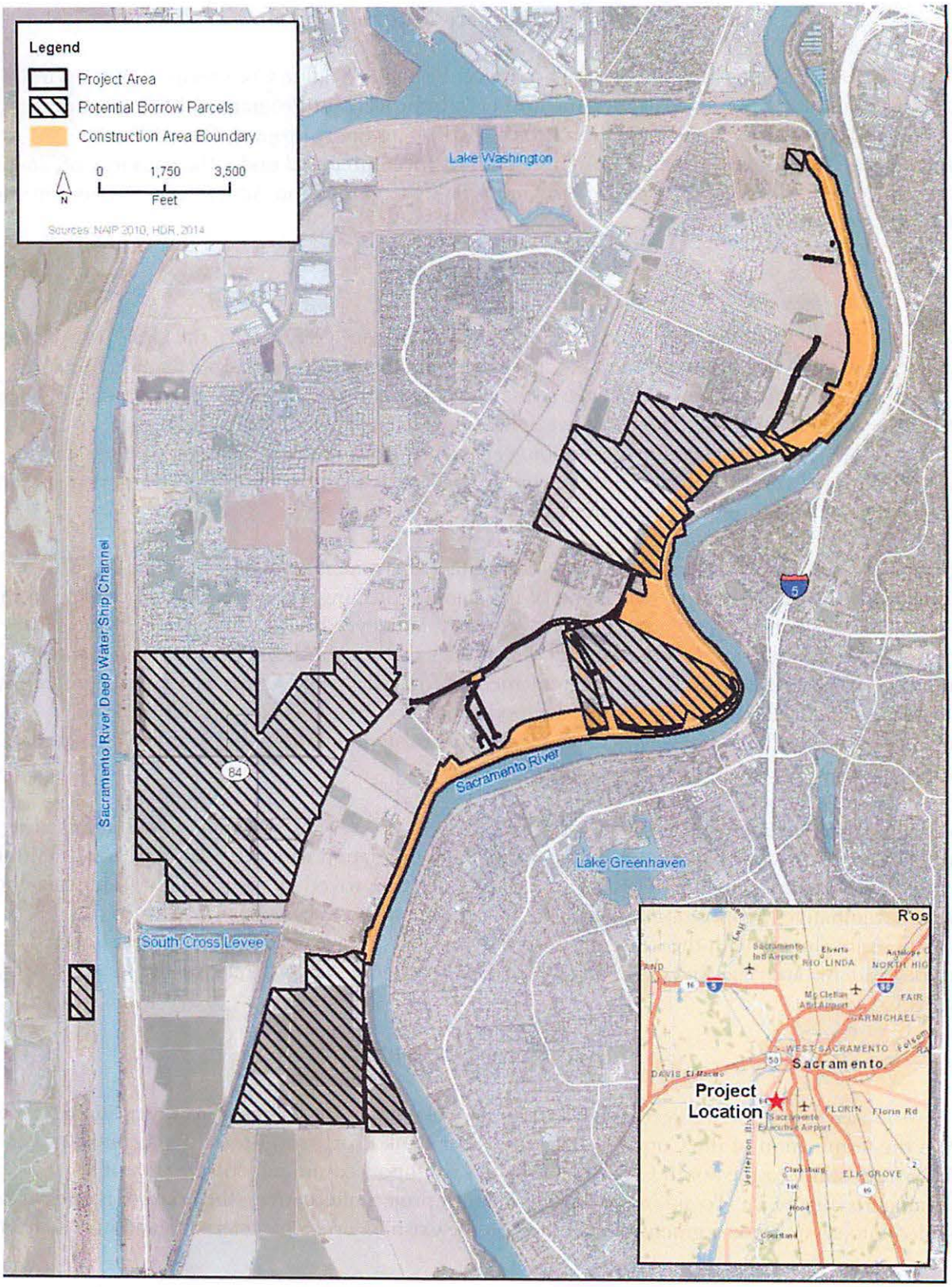
In turn, WSAFCA, in partnership with the California Department of Water Resources (DWR), embarked on a comprehensive evaluation of the levees protecting the city in 2006, according to the Corps criteria for stability, seepage, erosion, geometry, and levee height. The results of the comprehensive evaluation revealed several deficiencies that require substantial improvements to meet current performance standards as implemented federally by the Corps as levee design criteria and at the state level by the Central Valley Flood Protection Board as target levels of flood protection. WSAFCA's goal is to achieve the state-mandated minimum 200-year level of flood protection for the City of West Sacramento by 2025.

To appropriate federal funding for the proposed WSAFCA levee restructuring, DWR administers a program for constructing EIPs as advance efforts in coordination with the comprehensive Central Valley Flood Protection Plan. EIPs are funded by bonds approved by the voters of California under the ballot initiatives Propositions 84 and 1E. Three such projects have been constructed by WSAFCA, beginning with the I Street Bridge EIP in 2008, followed by the California Highway Patrol Academy and The Rivers EIPs in 2011. The Southport Project would be the fourth EIP by WSAFCA.

PROJECT DESCRIPTION

The proposed Southport Project extends about 5.6 miles along the Sacramento River South Levee, from the termination of the Corps' Sacramento River Bank Protection Project repair site at River Mile 57.2R, south to the South Cross Levee by the Southport community of the City of West Sacramento (Figure 1). To aid in the development of project alternatives, the Southport Project was divided into seven levee segments, depending on the existing levee characteristics and needs. From

Figure 1. The Southport Sacramento River Early Implementation Project location, City of West Sacramento, Yolo County, California, 2015.



south to north, segments are A, B, C, D, E, F, and G. WSFACA considered multiple measures and alternatives to remediate deficiencies in each levee segment that would meet the Southport Project goals.

Example measures considered for each levee segment include levee stability and geometry, erosion control, and seepage control. Several criteria were then used by WSAFCA to evaluate the feasibility and effectiveness of each method in each segment (ICF International 2014). Ultimately, along with the No Action Alternative, five viable project alternatives were identified in the July, 2014 Final Southport Sacramento River Early Implementation Project Environmental Impact Statement/ Environmental Impact Report (ICF International 2014).

General Construction Details

Design figures for each of the five action alternatives are located in Appendix A. In advance of other construction activities, utility transmission lines and poles would be removed and relocated within the Southport project construction area. New facilities would be constructed within designated utility corridors before other activities to minimize any loss of services. In certain instances vegetation removal may be necessary to accommodate the utility realignment.

Vegetation removal also would be necessary for general construction. Woody material, both large trees and shrubs, would need to be removed and grounds would be cleared by grubbing activities. About 6 inches of organic material would be removed from the current levee surface. Bulldozers, percussion hammers, haul trucks, and other large equipment would be necessary to demolish and remove buildings and roads from the construction zone. Construction debris from vegetation, roads, and buildings would be hauled to a permitted disposal site within 20 miles. Similarly, old levee materials unsuitable for reuse would be disposed at a permitted facility or dumped as fill at borrow sites.

To construct new levees numerous potential open land borrow sites have been identified on open lands throughout West Sacramento. Also, acceptable quality fill material removed from the existing levee (depending on the chosen alternative) may be reused. A third potential source of constructing material is dredged material that was removed from the Sacramento River Deep Water Ship Channel and stockpiled on the west bank. If necessary, material also can be bought and used from permitted commercial borrow sites within 20 miles of the construction area.

Regardless of any new levee alignment, construction is expected to involve 2 years of work, generally between April 15 and October 31. Construction of a new levee alignment throughout Segments C, D, E, F, and G would occur during the first year of construction, while the second year would involve Segments A and B at the southern end of the Southport Project. Following the first year of construction, tie-ins would be built to connect new levee sections to the existing levee. Construction contracts would likely allow a 6-day work week at 10 hours per day, although slurry wall construction may require up to 24 hours per day, 7 days a week to decrease overall construction time.

Following all construction activities, all temporary structures and facilities would be removed, and all grounds would be hydroseeded with a native seed mix. Permanent structures associated with the Southport Project include new levee slopes, seepage berms, slurry walls, culverts, and roads. Levee maintenance would continue in accordance with the Corps' Operations and Maintenance Manual (Corps 1955) for the Sacramento River Flood Control Project (SRFCP). A supplement to the

SRFCP manual also exists for the Southport Project area and is administered under the responsibility of Reclamation District 900. Additionally, the Southport Sacramento River Recreation Program is a suite of recreation improvements developed by the City of West Sacramento that are compatible with the flood protection goals of Southport EIP alternatives.

Alternative 1 – Adjacent Levee

Alternative 1 involves the construction of adjacent levees on the landward side of the existing South Levee alignment. Essentially, material is added to the existing levee to create a 20-foot crown and 2:1 or 3:1 landside slope, depending on the site. Two years of construction would be required (Table 1). With this alignment, South River Road would maintain the current configuration atop the existing levee crown. About 2.2 million cubic yards of new fill material would be required for the construction of Alternative 1. The new levee centerline alignment generally would reflect a landward shift of about 35 feet from the existing centerline, yet setback levees would be constructed through a northern portion of Segment D and all of Segment E. The alignment of the setback levee portion of Alternative 1 would be about 150 feet from the existing landside levee toe to the proposed waterside toe and would allow a hydraulic connection between Bees Lakes and the Sacramento River. The Alternative 1 levee alignment would contain features such as slurry cutoff walls, 300-foot-wide seepage berms, and rock slope protection about 2.5 feet deep.

Table 1. Summary of Alternative 1 flood-risk reduction measures by project segment, Southport Project, City of West Sacramento (source: HDR, Inc. 2011).

Project Segment	Construction Year	Levee Alignment[+]	Construction Measures
A	2	Adjacent	40-foot-deep slurry cutoff wall* Rock slope protection
B	2	Adjacent	40-foot-deep slurry cutoff wall[a] Landside seepage berm Rock slope protection
C	1	Adjacent	Landside seepage berm Rock slope protection
D	1	Adjacent[a] Setback[b]	30-foot-deep slurry cutoff wall Landside seepage berm[a] Rock slope protection[a]
E	1	Setback	30-foot-deep slurry cutoff wall[a] Landside seepage berm[b]
F	1	Adjacent	Landside seepage berm[a] Rock slope protection
G	1	Adjacent	84-foot-deep slurry cutoff wall Rock slope protection

[+] Proposed levee alignment in relation to current levee location.
* Slurry cutoff walls are 3-foot-wide.
[a] Southern portion of project segment.
[b] Northern portion of project segment.

An access road, either paved or aggregate base, would be constructed on the levee crown for maintenance and recreational uses. Three staging areas would be created under Alternative 1. A 3.4-acre area by Segment B would be used for constructing Segments A and B. A 61.7-acre area by

Segment C and a 17.5-acre area by Segment F would be used to construct Segments C through G. Re-grading would be ongoing during construction; re-grading of sites used in Segments A and B would continue into a third year of work.

Alternative 1 would require the demolition of sections of South River, Davis, and Linden Roads. South River Road, atop the current levee, would be reconfigured to the landside toe of the proposed levee, and Davis and Linden Roads would be reconnected accordingly. Also, 11 residences in Segment B, 1 residence in Segment D, 2 residences in Segment F, and 1 residence in Segment G would be acquired and demolished.

Alternative 2 – Setback Levee

Alternative 2 involves constructing a setback levee about 3.6 miles long along with adjacent levees at Segment A (and the southern portion of Segment B) and Segment G to attach to the existing levee alignment (Table 2). The setback levee centerline would be aligned to a minimum of 400 feet from the existing landside centerline from the northern portion of Segment B through Segment F. The obsolete portions of the existing levee would be degraded and breached to create a wider, offset Sacramento River floodplain with varying inundation levels. Portions of the floodplain in Segments B, C, and F would be used as construction borrow areas and would allow more frequent inundation than floodplains along Segments D and E. The Bees Lakes area in Segment E would then be open to seasonal flow and connected hydraulically to the Sacramento River system.

Table 2. Summary of Alternative 2 flood-risk reduction measures by project segment, Southport Project, City of West Sacramento (source: HDR, Inc. 2011).

Project Segment	Construction Year	Levee Alignment[+]	Construction Measures
A	2	Adjacent	30 to 40-foot-deep slurry cutoff wall* Rock slope protection
B	2	Adjacent[a] Setback[b]	30 to 40-foot-deep slurry cutoff wall Landside seepage berm[b] Rock slope protection[a]
C	1	Setback	30-foot-deep slurry cutoff wall Landside seepage berm
D	1	Setback	30-foot-deep slurry cutoff wall
E	1	Setback	30-foot-deep slurry cutoff wall Landside seepage berm[b]
F	1	Setback	24-foot-deep slurry cutoff wall[a] 84-foot-deep slurry cutoff wall[b] Landside seepage berm Rock slope protection [b]
G	1	Adjacent	84-foot-deep slurry cutoff wall Rock slope protection

[+] Proposed levee alignment in relation to current levee location.

* Slurry cutoff walls are 3-foot-wide.

[a] Southern portion of project segment.

[b] Northern portion of project segment.

As with Alternative 1, Alternative 2 seepage berms would be 300 feet wide. Rock slope protection would be placed along Segment G and a small portion of Segment F in the first construction year and along Segment A and the southern portion of Segment B in the second construction year. Additionally, erosion sites identified throughout the existing levee in other project segments also would be protected by waterside riprap: five sites in Segment C; one site in Segment D; one site in Segment E; and one site in Segment F. Although the existing levee would be breached in other areas, the riprap in these segments would aid in maintaining the designed water flow between the proposed offset floodplain area and the Sacramento River. The obsolete levee would be breached at one section of Segment B, two sections of Segment C, and two sections of Segment F.

Bank protection at the levee breaches is designed to maintain existing vegetation and woody materials. The offset floodplain area would be used as a borrow area and graded to meet the restoration goals. An irrigation system would be installed in the floodplain area for restoration plantings. The finished floodplain elevation would vary between 7 and 20 feet to provide variable environmental and hydrological conditions. The offset floodplain area is proposed as mitigation for loss of habitat resulting from other Alternative 2 construction events. Any floodplain areas created that are in excess of mitigation needs may be used to establish a mitigation bank or mitigation preserve.

A majority of South River Road traffic would be relocated to the landside of the setback levee through extension of Village Parkway. Presently terminating at Lake Washington Boulevard, Village Parkway would be extended through the project area. At its southern extent, the Parkway would follow existing roadways to terminate at the intersection of Gregory Avenue and South River Road, 1 mile north of the South Cross Levee. The Sacramento Yacht Club would continue using a portion of the existing South River Road atop the existing levee at Segment E and the southern portion of Segment F. Davis Road and Linden Road would be rebuilt to provide southern and northern access, respectively, from Village Parkway to the marina area along South River Road.

To accommodate levee and offset floodplain maintenance activities, two aggregate base access roads would be constructed in the offset area: one at the waterside toe of the setback levee and one at the landside toe of the existing levee. An aggregate base access road also would be constructed atop the adjacent and setback levees for inspection, flood-fighting, and vegetation maintenance purposes. Four or five sets of earthen ramps would be constructed to provide access to the setback levee and offset area. Also, 12 residences in Segment B, 1 residence in Segment D, 5 residences in Segment F, and 1 residence in Segment G would be acquired and demolished.

Three staging areas would be created under Alternative 2. A 3.2-acre area by Segment B would be used for constructing Segments A and B. An 11.0-acre area by Segment C and a 13.1-acre area by Segment F would be used to construct Segments C through G. Re-grading would be ongoing during construction; re-grading of sites used in Segments A and B would continue into a third year of work.

Alternative 3 – Slope Flattening

Alternative 3 involves the levee contouring to correct over-steepened banks while maintaining South River Road in its present alignment atop the existing levee. A slurry cutoff wall is proposed in Segments A, D, E, G, and the southern portion of Segment B (Table 3). A landside seepage berm is proposed in Segments B, C, and F. The alignment for the slope-flattening alternative reflects about

a 50-foot landward shift of the existing levee centerline. Alternative 3 also involves the importation of up to 1.1 million cubic yards of embankment fill material for the construction of project features.

Table 3. Summary of Alternative 3 flood-risk reduction measures by project segment, Southport Project, City of West Sacramento. (source: HDR, Inc. 2011).

Project Segment	Construction Year	Levee Alignment[+]	Construction Measures
A	2	Unchanged	Waterside slope flattening 40-foot-deep slurry cutoff wall* Rock slope protection
B	2	Unchanged	Waterside slope flattening 40-foot-deep slurry cutoff wall[a] 300-foot-wide landside seepage berm Rock slope protection
C	1	Unchanged	Waterside slope flattening 300-foot-wide landside seepage berm Rock slope protection
D	1	Unchanged	Waterside slope flattening 30-foot-deep slurry cutoff wall Rock slope protection
E	1	Unchanged	Waterside slope flattening 30-foot-deep slurry cutoff wall Rock slope protection at erosion site
F	1	Unchanged	Waterside slope flattening 300-foot-wide landside seepage berm Rock slope protection
G	1	Unchanged	Waterside slope flattening 84-foot-deep slurry cutoff wall Rock slope protection

[+] Proposed levee alignment in relation to current levee location.
* Slurry cutoff walls are 3-foot-wide.
[a] Southern portion of project segment.

The goal of waterside slope-flattening is to reshape the levee to a 3:1 slope. The levee reshaping would result in a landward shift of the levee centerline of about 50 feet. Slurry cutoff walls would be constructed in three areas: Segment A and the southern end of Segment B; Segments D and E; and Segment G. Seepage berms constructed through Segments B and C and Segment F would be 300 feet wide. Rock slope protection would be constructed along the length of the Southport Project, except Segment E.

However, an erosion site in Segment E would receive rock slope protection. Alternative 3 would require the demolition of 11 residences in Segment B and 1 residence in Segment F. Sections of South River, Davis and Linden Roads would be demolished prior to construction, and South River Road would eventually be demolished through construction. The reconstruction of roads and vegetation removal would be similar to that of Alternative 1. An aggregate base access road would be constructed along the landside toe of the levee. The access road would be open for recreational usage.

Three staging areas would be used in Alternative 3. A 3.3-acre staging area would serve construction at Segments A and B. A 62.6-acre staging area at Segment C along with a 23.4-acre staging area at Segment F would serve construction at Segments C through G. Re-grading would be ongoing during construction; re-grading of sites used in Segments A and B would continue into a third year of work.

Alternative 4 – Reduced Length Setback Levee

Similar to Alternative 2, Alternative 4 involves the construction of setback levees about 2.3 miles in total length (Table 4). The setback location would begin in the northern portion of Segment B and run through Segment E. Alternative 4 differs from Alternative 2 by having adjacent levee construction in Segment F, as well as by having the Bees Lakes area in Segment E remain hydraulically isolated from the Sacramento River. The reduced setback length of Alternative 4 as compared to Alternative 2 also would result in a reduced offset area to the waterside of the proposed setback location. The Alternative 4 setback levee centerline would be offset from the current levee centerline by a minimum of 400 feet. Adjacent levees would be constructed in the northern section of Segment F through Segment G, as well as Segment A through a southern portion of Segment B.

Table 4. Summary of Alternative 4 flood-risk reduction measures by project segment, Southport Project, City of West Sacramento (source: HDR, Inc. 2011).

Project Segment	Construction Year	Levee Alignment[+]	Construction Measures
A	2	Adjacent	40-foot-deep slurry cutoff wall* Rock slope protection
B	2	Adjacent[a] Setback[b]	40-foot-deep slurry cutoff wall[a] Landside seepage berm[b] Rock slope protection[a]
C	1	Setback	Landside seepage berm Rock slope protection at 5 erosion sites
D	1	Setback	30-foot-deep slurry cutoff wall Rock slope protection at 1 erosion site
E	1	Setback	30-foot-deep slurry cutoff wall[a] Landside seepage berm[b] Rock slope protection at 1 erosion site
F	1	Adjacent[b] Setback[a]	Landside seepage berm Rock slope protection
G	1	Adjacent	84-foot-deep slurry cutoff wall Rock slope protection

[+] Proposed levee alignment in relation to current levee location.
* Slurry cutoff walls are 3-foot-wide.
[a] Southern portion of project segment.
[b] Northern portion of project segment.

Most construction details of Alternative 4 are similar to those of Alternative 2. However, Alternative 4 would require the acquisition and demolition of 12 residences in Segment B,

1 residence in Segment D, 2 residences in Segment F, and 1 residence in Segment G. South River Road would be removed from the existing levee in Segments B through F, as well as the southern end of Segment A. Also, Alternative 4 involves only two breaches in the existing levee, both in Segment C.

Three staging areas would be used in Alternative 4. A staging area at Segment B would be used for construction at Segments A and B. Staging areas at Segments C (11.0 acres) and F (11.7 acres) would be used for the construction of Segments C through G. As with other Alternatives, regrading would be ongoing during construction; regrading of sites used in Segments A and B would continue into a third year of work.

Alternative 5 – Setback Levee with Slope Flattening

Alternative 5 is the WSAFCA preferred alternative. Similar to Alternative 2, Alternative 5 involves a 3.6-mile setback levee that runs from Segment B north through Segment F (Table 5). Also, Segment G would include a similar adjacent levee alignment. However; Alternative 5, Segment A work would involve slope flattening along with rock slope protection as with Alternative 3, as well as the hydraulic isolation of Bees Lakes in Segment E. Additional rock slope protection would be placed at five erosion sites in Segment C, and one erosion site in each of Segments D, E, and F.

Table 5. Summary of Alternative 5 flood-risk reduction measures by project segment, Southport Project, City of West Sacramento (source: HDR, Inc. 2011).

Project Segment	Construction Year	Levee Alignment[+]	Construction Measures
A	2	Unchanged	Waterside slope flattening 40-foot-deep slurry cutoff wall* Rock slope protection
B	2	Adjacent[a] Setback[b]	40-foot-deep slurry cutoff wall Landside seepage berm[b] Rock slope protection[a]
C	1	Setback	30-foot-deep slurry cutoff wall Landside seepage berm
D	1	Setback	30-foot-deep slurry cutoff wall
E	1	Setback	30-foot-deep slurry cutoff wall Landside seepage berm[b]
F	1	Setback	24-foot-deep slurry cutoff wall[a] 84-foot-deep slurry cutoff wall[b] Landside seepage berm
G	1	Adjacent	84-foot-deep slurry cutoff wall Rock slope protection

[+] Proposed levee alignment in relation to current levee location.

* Slurry cutoff walls are 3-foot-wide.

[a] Southern portion of project segment.

[b] Northern portion of project segment.

For Alternative 5, vegetation clearing, construction details, and levee breaches would generally be the same as Alternative 2. However, road embankments that act as levees linked to the setback alignment in Segment E would create a ring levee around Bees Lakes, and no effort would be made to hydraulically link the lakes to the Sacramento River. For work at Segments A and B the staging area at Segment B would occupy 3.2 acres, whereas an 11.0-acre staging area at Segment C and a 13.1-acre staging area at Segment F would serve construction in Segments C through G.

MITIGATION POLICY AND RESOURCE CATEGORY DETERMINATION

The recommendations provided herein for the protection of fish and wildlife resources according to the Service's Mitigation Policy as published in the Federal Register (46:15; January 23, 1981). The Mitigation Policy provides Service personnel with guidance in making recommendations to protect or conserve fish and wildlife resources. The policy helps ensure consistent and effective Service recommendations, while allowing agencies and developers to anticipate Service recommendations and plan early for mitigation needs. The intent of the policy is to ensure protection and conservation of the most important and valuable fish and wildlife resources, while allowing reasonable and balanced use of the Nation's natural resources.

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

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

Mitigation planning goals range from "no loss of existing habitat" (i.e., resource category 1) to "minimize loss of habitat value" (i.e., Resource Category 4). The planning goal of Resource Category 2 is "no net loss of in-kind habitat value"; to achieve this goal, any unavoidable losses would need to be replaced in-kind. "In-kind replacement" means providing or managing substitute resources that are physically and biologically the same or closely approximate those lost.

In addition to mitigation planning goals based on habitat values, Region 8 of the Service, which includes California, has a mitigation planning goal of no net loss of acreage for wetland habitat. This goal is applied in all impact analyses.

Throughout the project area 16 cover-types are described in the Southport Sacramento River EIP Environmental Impact Statement/ Environmental Impact Report (ICF International 2014). The 16 land cover-types identified in the project area have been merged into 9 general cover-types in this report (Table 6).

Table 6. Summary of cover-types and acreages directly impacted by all alternatives considered in the Southport Project, City of West Sacramento, Yolo County, California.

Cover-Types	July 2014 EIS/EIR Land Cover-Types*	Project Acreage
Riparian scrub/woodland	Cottonwood riparian woodland	61.18
	Valley oak riparian woodland	15.44
	Walnut riparian woodland	3.02
	Riparian Scrub	14.14
Upland woodland	Valley oak woodland	53.72
	Walnut woodland	0.71
Emergent wetland	Emergent wetland	5.45
	Ditch	24.04
Ponds	Ponds	1.82
Shallow Water Habitat**	Perennial drainage	35.70
Orchards	Walnut orchards	12.18
Agricultural fields	Cultivated agricultural field	343.60
	Disked/plowed agricultural field	238.85
	Fallow agricultural field	1,262.30
Non-native annual grassland	Non-native annual grassland	84.19
Unvegetated/ Developed	Developed/landscaped	123.95
Total Acreage		***2,280.29***

* Land cover-types described by ICF International, 2014.

** Shallow Water Habitat may include shaded riverine aquatic components.

The evaluation species, resource categories, and mitigation planning goals for the nine cover-types that are possibly impacted by the project are summarized in Table 7.

Two evaluation species were selected for the "Riparian scrub/woodland" cover-type. The riparian scrub/woodland cover-type exhibits a variety of characteristics that can support many species in multiple ways. For example, downy woodpeckers will use snags (i.e., dead or dying trees) for breeding and cover (Schroeder 1982a), and yellow warblers will use dense riparian cover for breeding and feeding (Schroeder 1982b). The Service designates the "Riparian scrub/woodland"

Table 7. Evaluation species, resource categories, and mitigation planning goals for the cover-types within the study area of the Southport Sacramento River Early Implementation Project, City of West Sacramento, Yolo County, California.

Cover-types	Evaluation Species	Resource Category	Mitigation Goal
Riparian scrub/woodland	Downy woodpecker Yellow warbler	2	No net loss of in-kind habitat value or acreage.
Upland woodland	Downy woodpecker Wild turkey	2	No net loss of in-kind habitat value.
Orchards	None	3	No net loss of habitat value, while minimizing loss of in-kind habitat value
Emergent wetland	Marsh wren	2	No net loss of in-kind habitat value or acreage.
Ponds	Wood duck	2	No net loss of in-kind habitat value.
Shallow water habitat	Herons and Egrets Juvenile Salmonids	2	No loss of existing habitat value.
Agricultural fields	Black-shouldered kite California vole	4	Minimize loss of habitat value.
Non-native annual grassland	Black-shouldered kite California vole	3	No net loss of habitat value, while minimizing loss of in-kind habitat value
Unvegetated/ Developed	None	4	Minimize loss of habitat value.

cover-type in the Southport project action area as Resource Category 2 with a mitigation planning goal of "no net loss of in-kind habitat value or acreage."

Similarly, the downy woodpecker and wild turkey were chosen as evaluation species for the "Upland woodland" cover-type. As in the "Riparian scrub/woodland" cover-type, downy woodpeckers may use over mature, senescent trees for breeding and feeding. Habitat components important to the wild turkey include the distance between open savannah and tree cover, the amount of herbaceous cover under a tree canopy, and the amount of mast (e.g., acorns) produced by the woodland (Schroeder 1985). These characteristics emphasize the value of upland woodland as habitat for breeding, feeding, and cover from predation. The Service designates the "upland woodland" cover-type in the Southport Project area as Resource Category 2, with a mitigation planning goal of "no net loss of in-kind habitat value."

No species was chosen as an evaluation species for the "Orchards" cover-type. The orchards in the Southport Project area are intensively managed for walnut production. However, walnut orchards can provide habitat value to wildlife species similar to naturally occurring walnut "Upland woodlands." Any walnut orchards that would be permanently removed from crop production should be replaced by "Upland woodland" to ensure no habitat value is lost.

Therefore, the Service designates the "Orchards" cover-type in the project area as Resource Category 3, with a mitigation planning goal of "no net loss of habitat value, while minimizing loss of in-kind habitat value."

The evaluation species selected for the "Emergent wetland" cover-type is the marsh wren. Drainage wetland habitat provides important cover, foraging, nesting, and roosting habitat for such water associated birds as well as some amphibians and aquatic mammals. Insects and spiders are taken from vegetation, the wetland floor, as well as in flight (Gutzwiller and Anderson 1987). For protection from predators, the marsh wren will usually construct nests in reedy vegetation about 15 inches above water 2 to 3 feet in depth (Gutzwiller and Anderson 1987). Due to the medium to high value of this habitat to the evaluation species, and its relative scarcity, the Service designates any emergent wetland habitat within the project area as Resource Category 2, with its associated mitigation planning goal of "no net loss of in-kind habitat value or acreage."

The evaluation species selected for the "Ponds" cover-type is the wood duck. The Pacific Flyway population of the wood duck breeds from British Columbia south to California and east to Montana and winters primarily in the Sacramento Valley (Sousa and Farmer 1983). Food items include mast and fruits, aquatic plants and seeds, insects, and aquatic invertebrates (Sousa and Farmer 1983). Suitable cover for wood ducks may be provided by trees or shrubs overhanging water, flooded woody vegetation and downed timber (Sousa and Farmer 1983). The Bees Lakes comprise the cover designated as ponds within the project area. The Service designates the "Ponds" in the Southport project action area as Resource Category 2 with a mitigation planning goal of "no net loss of in-kind habitat value or acreage."

The evaluation species selected for "Shallow water habitat" cover that would be affected by the project are juvenile salmonids (salmon and steelhead) and the heron and egret family (family Ardeidae). Salmonids were selected because large declines in their numbers are among the most important resource issues in the region, and because of their very high commercial and sport fishing values. Herons and egrets were selected because of the Service's responsibilities for their management under the Migratory Bird Treaty Act, their relatively high value for non-consumptive human uses such as bird-watching, and their value as indicator species for the many birds which use shallow water cover. The Service designates the "Shallow water habitat" in the Southport project action area as Resource Category 2 with a mitigation planning goal of "no net loss of in-kind habitat value or acreage."

The evaluation species selected for the "Agricultural fields" habitat that would be impacted by the proposed project are the black-shouldered kite (white-tailed kite) and the California vole. The black-shouldered kite in California is a common species of open and cultivated bottomland (Faanes and Howard 1987). The black-shouldered kite is an obligate predator on diurnal small mammals; movements and nesting of the kite is largely governed by concentrations of mice and voles (Faanes and Howard 1987). The California vole is a widespread and common herbivore in California (Brylski 1990). Its abundance and widespread distribution, along with daylong activity, make the California vole an important prey species. Because this habitat is not a native and is managed for crop production unless fallowed, the Service designates the "Agricultural fields" habitat in the project area as Resource Category 4, with a mitigation planning goal to "minimize loss of habitat value."

Similarly, the evaluation species selected for the "Non-native annual grassland" cover-type that would be impacted by the proposed project also are the black-shouldered kite and the California vole. Because this cover-type within the City of West Sacramento is of high value for the selected evaluation species, the Service designates the annual grassland cover-type as Resource Category 3, with an associated mitigation planning goal of "no net loss of habitat value, while minimizing loss of in-kind habitat value."

No evaluation species were selected for the "Unvegetated/ Developed" cover-type, This cover-type includes those areas which do not fall within one of the other habitat types, such as roads, access areas, buildings, bare ground, and riprap. Generally, this cover-type would not provide any significant value for wildlife species. Therefore, the Service designates the "Unvegetated/ Developed" cover-type in the project area as Resource Category 4, with an associated mitigation planning goal of "minimize loss of in-kind habitat value."

BIOLOGICAL RESOURCES

The Southport Project area involves construction zones for levee and roads; demolition areas for levees, roads, and structures; traffic and staging areas for project vehicles, equipment, and materials; and potential borrow areas for materials. Nearly 87% of the total land cover directly impacted by the Southport Project has been altered by past human activities (e.g., agricultural activities, development) (ICF International 2014).

Vegetation

Riparian scrub/woodland

As corridors between wetland and upland land cover-types, riparian scrub/woodland cover can provide complexity in vegetation composition and structure, as well as species diversity.

Riparian scrub/woodland cover is associated with drainage areas. In the Southport Project area, it is predominantly found along the waterside of the existing levee, as well as along agricultural drainage ditches. Riparian scrub/woodland cover along the Sacramento River and Bees Lakes areas is dominated by Fremont cottonwoods, Goodding's black willow, valley oak, and northern California black walnut. A common understory species is blue elderberry, which is the host plant for the valley elderberry longhorn beetle.

Riparian scrub/woodland cover along the larger drainage ditches in the Southport Project area is dominated by valley oak. Valley oak riparian woodland occurs on the waterside of the Sacramento River levee and along larger irrigation ditches in the project area. Northern California black walnut is the dominant riparian tree species in some areas. Plant species associated with valley oak riparian woodland include valley oak, sandbar willow, red willow, poison-oak, and Himalayan blackberry.

Some trees in the riparian scrub/woodland are heritage or landmark trees, as defined in the Tree Preservation Ordinance of the City of West Sacramento. Valley oak riparian woodland (Great Valley valley oak riparian) is identified as a sensitive natural community (CDFG 2003). Riparian woodland (Great Valley cottonwood riparian) is identified as a sensitive natural community (CDFG 2003). The California Department of Fish and Wildlife (CDFW) has adopted a no-net-loss policy for riparian habitat values.

Upland Woodland
Upland woodland cover primarily consists of valley oak and California black walnut woodlands. The upland woodlands differ from riparian in that they are not associated with drainage areas. Another common species in upland woodland cover is interior live oak. Generally, upland woodlands of the Sacramento Valley have a moderate shrub cover interspersed with herbaceous cover. Elderberry, coyote brush, and Himalayan blackberry are common understory shrubs.

As with the Riparian scrub/woodland cover, some of the trees meet the definition of heritage or landmark trees as defined in the City of West Sacramento's Tree Preservation Ordinance. Valley oak woodland is identified as a sensitive natural community (CDFG 2003).

Emergent Wetland
Open water and drainage ditches and canals are categorized as emergent wetland cover. Cattails, bulrush, and Himalayan blackberry are common species in emergent wetlands, along with tules and knotweed along the Sacramento River Deep Water Ship Channel. Reclamation District No. 900 currently controls the flow of the Main Canal, where water is pumped from the Sacramento River into the ditches and then pumped out to the deep water ship channel. Due to this water flow, the Main Canal and related ditches are considered waters of the United States of America (U.S.).

Ponds
The Bees Lakes are two small ponds occupying about 1.82 acres, partially covered by duckweed and water meal. Although they are not hydraulically connected to the Sacramento River, Bees Lakes qualify as waters of the U.S. The lakes do not have the water flow properties of drainage areas, but do exhibit similar emergent wetland vegetation and other wildlife habitat characteristics.

Orchards
Two walnut orchards occur in the southern half of the Southport Project area. Walnut orchards usually contain English walnut grafted onto a black walnut rootstock and planted in rows. The orchards are managed for nut production, and therefore are likely subject to herbicide and pesticide applications for cultivation and harvesting, along with heavy pruning and cultivation.

Shallow Water Habitat
Shallow Water Habitat occurs in perennial drainages, and mainly along the banks of the Sacramento River and Sacramento River Deep Water Ship Channel. In the deeper riverine systems, it is defined in terms of delta smelt habitat as that acreage between the mean high water mark and 3 meters below the ordinary mean lower low water mark, for example. Riverine shallow water habitat provides areas for spawning, rearing, and feeding. Drainages are mainly constructed to allow water runoff to the river systems from agricultural fields and other open areas.

Shallow water habitat can contain elements of shaded riverine aquatic (SRA) cover. SRA cover is defined as the nearshore aquatic area occurring at the interface between a river and adjacent woody riparian habitat. The principal attributes of this valuable cover type include: (a) the adjacent bank being composed of natural, eroding substrates supporting riparian vegetation that either overhangs or protrudes into the water, and (b) the water containing variable amounts of woody debris, such as leaves, logs, branches and roots, as well as variable depths, velocities , and currents. These attributes provide high-value feeding area, burrowing substrates, escape cover, and reproductive cover for numerous regionally important fish and wildlife species.

Agricultural Fields
Cultivated agricultural field includes large parcels of wheat, ryegrass, and row crops. Agricultural fields may be vegetated or non-vegetated, depending on management concerns. Other agricultural fields may be disked or plowed. However, most agricultural fields in the Southport Project area appear fallow, and are not managed for current production. These fallow agricultural fields resemble non-native annual grasslands in composition, and may contain small, common shrubs as well.

Non-native Annual Grassland
Non-native annual grassland occurs in the project area mainly on undeveloped parcels, yet also on levee slopes and along roadsides. The non-native annual grassland cover-type also includes two horse pastures (ICF International 2014). The non-native annual grasslands in the project area contain a relatively large proportion of ruderal species, likely because of substantial disturbance from human activities. Elderberry shrubs occur in several areas of non-native annual grassland. Grasses commonly observed in the project area are foxtail barley, ripgut brome, Italian ryegrass, and soft chess. Forbs commonly observed in annual grasslands in the project area are yellow star-thistle, prickly lettuce, bristly ox-tongue, sweet fennel, Italian thistle, horseweed, black mustard, fireweed, broad-leaf pepper grass, common sunflower, pigweed, cheeseweed, bindweed, and telegraph weed.

Unvegetated/Developed
The Unvegetated/Developed cover-type applies to landscaped residential parcels, roads, and other large paved areas. Although landscaping can provide value to some terrestrial species, generally the cover is fragmented and frequented by human activity. These qualities lead to low habitat value.

Wildlife
Overstory trees of riparian and upland woodland cover may be used for nesting and roosting by numerous raptors, including red-tailed hawk, red-shouldered hawk, Swainson's hawk, great horned owl, white-tailed kite, and American kestrel. Overstory trees also provide suitable habitat for songbirds such as Bullock's oriole, yellow-rumped warbler, tree swallow, western scrub jay, and the western yellow-billed cuckoo. Riparian and woodland cover also provides important foraging habitat for resident, migratory, and wintering songbirds. The yellow-billed magpie, acorn woodpecker, and northern flicker nest and forage in woodland habitats.

Understory vegetation of riparian and upland woodlands provides habitat for mammals, including various species of rodents, raccoon, Virginia opossum, and striped skunk. It also provides cover and foraging habitat for reptiles and amphibians, such as terrestrial garter snake, gopher snake, Pacific tree frog, and western toad. Special status species, such as the valley elderberry longhorn beetle, western pond turtle, pallid bat, and western red bat also may use riparian and upland woodland cover for foraging, nesting, and movement.

Emergent wetland provides wildlife habitat value to wading birds such as the great blue heron, great egret, and snowy egrets. This land cover-type provides nesting and foraging habitat for several songbirds, including red-winged blackbird, and marsh wren; foraging and nesting habitat for Virginia rail; and foraging and cover habitat for reptiles and amphibians, including the Pacific tree frog and common garter snake. Emergent wetlands also provide habitat for special-status species, including giant garter snake, northern harrier, tricolored blackbird, and yellow-headed blackbird.
Similarly, ponds provide wildlife habitat value to wading birds, songbirds, amphibians, and reptiles. Green herons, black crowned night-herons, several swallows, and other birds forage around ponds in the project area. As with emergent wetlands, the water may provide breeding habitat for

amphibians such as the Pacific tree frog and western toad. Western pond turtles are known to use the Bees Lakes as habitat. The raccoon and other small mammals that use riparian habitats in the project area also may use the ponds at Bees Lakes for foraging and as a water source.

Orchard crops typically provide less value to wildlife that natural woodland cover-types, yet also may be used for nesting or foraging by species that use woodland habitats. Likewise, agricultural crop lands can provide some habitat value similar to grassland species as well. However, because agricultural fields and orchards are managed for crop production, insects and other vegetation in these cover-types are heavily controlled. Such management objectives can limit the habitat value of these cover-types to birds, small mammals, reptiles, and amphibians.

Shallow water habitat provides essential foraging habitat for wading birds, including great blue heron, great egret, and snowy egret; numerous waterfowl species, including mallard, ruddy duck, and bufflehead. Other birds also use shallow water cover, including eared grebe, double-crested cormorants, several swallow species, black phoebe and belted kingfisher. Mammal species commonly known to use shallow water cover include the raccoon, river otter, and muskrat.

Non-native annual grasslands provide nesting and foraging habitat for several species of songbirds, including savanna sparrow, white-crowned sparrow, and western meadowlark. Raptors use grasslands for foraging, including the northern harrier, red-tailed hawk, and great horned owl. Reptiles found in these habitats include California kingsnake, gopher snake, and western rattlesnake. Mammals such as coyotes, raccoons, California ground squirrels, deer mice, and California meadow voles commonly occur in annual grassland habitat.

Fish

Aquatic habitat in the Southport project area consists of emergent wetlands, ponds, and shallow water cover-types. Emergent wetlands within the project area are mainly comprised of drainage ditches and canals. Because drainage areas contain water pumped from the Sacramento River, small fish species such as silversides may be found in some drainage areas. Similarly, many drainage areas, as well as the Bees lakes, contain mosquitofish.

The Sacramento River contains a variety of habitat characteristics that are important to many fish species. Streamside vegetation provides shallow water habitat cover and aids in temperature control, streambank stability, and habitat complexity. Floodplain and cover is used by all life stages of anadromous fish for shelter and feeding. Together, vegetated floodplain and SRA cover provides habitat for salmonids, Sacramento splittail, delta smelt, black bass, and sunfish.

Root structures of riparian vegetation can provide bank stability and shelter for young fish. Woody debris can provide shelter from predation and refugia from stream flow. Riparian vegetation also influences the food chain of a stream, providing organic detritus and terrestrial insects. Terrestrial organisms falling from overhanging branches contribute to the food base of the aquatic community. Vegetation in emergent wetlands can provide similar benefits to fish habitat. Salmonids in particular are primarily insectivores and feed mainly on drifting food organisms. Along with providing water storage, floodplains can add extensively to the habitat components of shallow water and SRA cover. In general, the Sacramento River channel provides a migratory pathway to many anadromous fish, and also provides seasonal rearing habitat to many other native fish species (Table 8). Non- native anadromous species such as the American shad and striped bass provide recreational sport fishing opportunities. Non-native resident species include several catfish, bass, bluegill, crappie, and sunfish

Table 8. Native fish species potentially occurring in the Sacramento River, adjacent to the Southport Project Area, City of West Sacramento, Yolo County, California.

Resident	Anadromous
California roach	Chinook salmon (winter, spring, fall, and late-fall runs)
Delta smelt	Chum salmon
Hardhead	Green sturgeon
Hitch	Pacific lamprey
Longfin smelt	River lamprey
Prickly sculpin	Steelhead
Sacramento blackfish	White sturgeon
Sacramento pikeminnow	
Sacramento splittail	
Sacramento sucker	
Speckled dace	
Threespine stickleback	
Tule perch	

species. Some non-native species may provide recreational fishing opportunities, such as the largemouth bass, smallmouth bass, and catfish, yet these species also prey upon native juvenile species that use floodplain habitats. The native California roach may be extirpated from the Sacramento River adjacent to the Southport project area due to predation from non-native species (Moyle 2002). Similarly, the native Sacramento perch has been extirpated from much of its former range as a result of predation from non-native carp and catfish (Moyle 2002).

Threatened and Endangered Species

Appendix B contains a list of federally-listed species which may be found in the project area. Generally, the Service has jurisdiction for land and freshwater species, while the National Marine Fisheries Service (NMFS) has jurisdiction for marine and anadromous species. The Corps has consulted with the Service under section 7 of the Endangered Species Act for the West Sacramento General Reevaulation Report Project, which includes the Southport Project. Consultation with NMFS is ongoing. Appendix C contains a copy of the Service's biological opinion for the West Sacramento General Reevaluation Report Project. Species discussed in the biological opinion include the giant garter snake, valley elderberry longhorn beetle, delta smelt, and delta smelt critical habitat. If changes to the project plans as described in the consultation documents occur (i.e., another alternative is selected for implementation), then a re-initiation under Section 7 with the Service is required.

FUTURE CONDITIONS WITHOUT THE PROJECT

Vegetation- The No Action Alternative represents the continuation of the existing levee alignment, including deficiencies, along the Sacramento River. Because no levee improvements would occur, no construction related effects on vegetation or land cover-types would occur. Future compliance with the Corps levee vegetation policy could lead to permanent loss of woody vegetation which would result in a significant effect on riparian habitat.

Wildlife- Since only minimal changes are expected in vegetation, wildlife populations in the study area are expected to persist as they are currently, with normal year-to-year fluctuations of individual species.

Fish- Under the No Action Alternative, the aquatic resources are expected to remain the same for fish species. As with current Sacramento River conditions, aquatic species populations would fluctuate in relation to water temperature, rainfall, contaminants, and other natural population cycles.

Current levee operation and maintenance activities would continue as is; there would be no change in the geomorphic or flood control regimes, and resident and migratory fishes would continue to use the area as they do today. Alterations to levee management policies concerning current vegetation composition and structure could lead to a permanent loss of woody materials. This would result in major impacts to existing riparian habitat and negatively impact fish populations.

Because no levee improvements would be made under the No Action Alternative, existing flood risks would continue. In general, future conditions for fish and wildlife species are expected to remain within the current dynamic ecological conditions. As with current conditions, populations would fluctuate, depending on weather, rainfall, contaminants, diseases, and natural population cycles.

FUTURE CONDITIONS WITH THE PROJECT

Vegetation - Regardless of the project action alternative, wildlife habitats will be impacted along 5.6 linear miles of levees adjacent to the Sacramento River. Additionally, potential road construction, potential construction borrow areas, changes in traffic alignment, and other project activities would affect existing habitat cover. For example, habitat may be lost for western burrowing owls through road construction or the extraction of borrow materials. Although each alternative is unique, similarities exist among the alternatives regarding the impacts to habitat cover. Table 9 summarizes the area of affected cover-types for each alternative. The exact amount of agricultural land to be affected by each alternative is dependent on the amount of borrow material that would be required. Similarly, the amount of developed land necessary for each alternative would be minimized as much as possible, yet is still dependent on a wide variety of project circumstances.

Wildlife - With the project, the alternatives address levee deficiencies through various combinations of slurry cutoff walls, seepage berms, and rock slope protection (riprap). These construction activities could result in potential adverse effects on resident wildlife resources. Not only can animals be physically displaced, but effects include disturbance from construction activity and noise. Amphibian and reptile species typically are not as mobile as other types of wildlife. Consequently they have a greater chance of being killed during construction activities, including the collection of borrow material. Giant garter snakes may use the South Cross Levee, which borders potential borrow sites to the north and south.

Wildlife such as birds and mammals, typically respond to this type of activity by leaving the construction area. It is likely they would move into adjacent habitat outside of the zone of construction noise and disturbance. However, they may be forced to move to less than optimal habitat conditions as other animals may have established territories in the surrounding habitat. Swainson's Hawks, a California State listed species, relies on mature riparian cover for nesting and foraging. Similarly, several bat species may use riparian cover for roosting. Pre-construction nesting bird surveys would avoid disturbing or destroying any nests within the vegetation removal area and assist in complying with the Migratory Bird Treaty Act. Additionally, construction effects to

invertebrate species must be considered as well. For example, the valley elderberry longhorn beetle uses elderberry as its sole host plant.

Table 9. Acreages of cover-types affected by alternative, Southport Project, City of West Sacramento, Yolo County, California.

Habitat Type	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Riparian scrub/woodland	38.85	49.89	47.03	34.27	31.04
Upland woodland	15.45	17.17	14.51	14.66	15.46
Emergent wetlands	1.72	1.99	1.67	1.89	1.91
Ponds	0.0	1.82	0.11	0.0	0.0
Shallow water habitat	48.70	35.86	48.0	38.74	35.76
Orchard and Agricultural fields*	476.0	474.0	479.0	476.0	476.0
Non-native annual grassland	71.73	76.30	77.97	69.77	74.81
Unvegetated/ Developed**	Unknown	Unknown	Unknown	Unknown	Unknown
Total project (estimated known acreage)	652.45	657.03	668.29	635.33	634.98

* The exact amount of agricultural fields to be affected is unknown at this time; acreages provided are maximum estimates.

** The exact amount of Unvegetated/Developed cover to be affected is unknown at this time and cannot be estimated.

Fish – Regardless of the project action alternative chosen, at least 2.0 miles of waterside levee slope would be subject to rock slope protection. Using rock slop protection would permanently affect shallow water habitat and remove SRA cover along the Sacramento River. SRA cover provides shelter, resting, rearing, and feeding areas to multiple fish species (NMFS 2008). The loss of SRA cover can negatively impact anadromous fish by removing protective cover from juveniles. Smaller resident fish also will be negatively impacted by the loss of protective cover. Other benefits provided by streamside vegetation, such as temperature and erosion control, also would be permanently lost. The capacity of the levee slope with riprap to act as a floodplain is extremely limited.

Alternatively, a setback levee alignment with offset floodplain and riparian areas can increase benefits to resident and anadromous fish species. Higher growth rates of chinook salmon have been observed in fish growing in floodplain areas than in conspecifics growing in main channel flows (Limm and Marchetti 2003). Ecologically, much of the biomass produced in riparian and floodplain areas can eventually flow into open water in the form of detritus and stranded terrestrial insects. However, floodplains do carry increased risks of fish stranding, poor oxygen levels, and increased predation if watered areas become cut off from main channel flows (Jeffres et al. 2008).

Alternative 1 – Adjacent Levee- The Adjacent Levee Alternative would create adjacent levees throughout all project sections except Segment E, which contains a setback levee built landward of

Bees Lakes. The setback levee portion of Segment E would allow a hydraulic connection between Bees Lakes and the Sacramento River to develop with the degradation of the existing levee. Wildlife species that use Bees Lakes, such as the western pond turtle, may be affected by the construction of the nearby setback levee, or by alterations in hydrology.

Elsewhere on the waterside, all adjacent levees would be lined with rock slope protection. The existing slopes contain riparian woodland, riparian scrubland, and non-native annual grassland. Possible construction effects include increases in turbidity and suspended sediment due to riprap placement, possible contaminant discharge from the construction equipment, and adverse effects caused by construction noise and vibration. On the landside, seepage berms would be constructed in Segments B through F, except through a portion around the Bees Lakes area. An operation and maintenance corridor also would be constructed outside the seepage berms and landside levee toe along the entire project length.

Wooded riparian and grassland habitats are used by numerous mammals, reptiles, amphibians, and birds found throughout the Sacramento Valley. Often in suburban and urban landscapes, these areas provide a network of natural cover in an otherwise fragmented landscape. Woody vegetation along shallow water habitat provides SRA cover for fish, which is important for a variety of reasons, including temperature regulation. Downed woody debris can also provide habitat for invertebrate species and cover for both terrestrial and aquatic wildlife.

Alternative 2 – Setback Levee- The Setback Levee Alternative involves a setback levee length of 3.6 miles. Because the adjacent levee alignments in Segments A and G would be the same as with the Alternative 1, Adjacent Levee alignment impacts to wildlife and fisheries resources would be equal was well. Like the Adjacent Levee alignment, the Setback Levee alignment would allow a hydraulic connection between Bees Lakes and the Sacramento River. However, in Segments B through F significantly different impacts would result from the Setback Levee Alignment in comparison to the Adjacent Levee Alignment.

On the waterside, the setback levee would leave an offset floodplain area at least 400 feet wide from the levee toe to the Sacramento River. The existing levee would be breached in five locations throughout Segments B through F. Riprap would be used for erosion protection in other areas of the would-be obsolete existing levee to maintain proper floodplain function. The floodplain would vary in height to allow a more natural riparian – wetland interface. Supplemental plantings would increase the amount of existing wooded riparian and wetland habitats. The creation of an offset floodplain area would result in a net increase of riparian and other wooded cover. Although riprap would be used in Segments A and G, the increased riparian acreage would increase the functionality as wildlife habitat along the waterside of the project area.

The increased floodplain area would allow portions of the Sacramento River to function more naturally between the cities of Sacramento and West Sacramento. The inundation of the offset floodplain area would vary accordingly with water levels. Floodplain habitat can provide shade and structure for fish to use for escaping higher velocity flows and predators. However, some bird species such as herons and egrets also can use this habitat for foraging.

On the landside, the setback levee would have 300-foot-wide seepage berms. The seepage berms would not contain woody vegetation. The loss of wooded habitats on the landside would be offset

by plantings on the waterside. Agricultural fields, undeveloped lands, and other habitats would be impacted to create new roadways.

Alternative 3 – Slope Flattening- The Slope Flattening Alternative would not create a new levee alignment. Woody vegetation would be removed from levee slopes, and riprap would protect the waterside slope in all segments except for Segment E near Bees Lakes. The loss of riparian habitat could isolate some species that may require contiguous vegetated areas to move along the river in that vicinity. On the landside, seepage berms would be similar to Alternative 2 – The Setback Levee alignment. The Slope Flattening alternative would result in the loss of the riparian corridor throughout most of the project alignment. Upland wooded habitats also would be lost due to the seepage berms. These losses of wooded cover would result in further fragmentation of wooded wildlife habitats throughout an otherwise agricultural and urbanized landscape.

Alternative 4 – Reduced Length Setback Levee- Conditions with the Alternative 4 – Reduced Length Setback Levee would differ from the Alternative 2 – Setback Levee only in Segments E and F. The existing levee, along with the new alignment in Segment E, would be used to create a ring around Bees Lakes, maintaining the hydraulic isolation. In comparison to the Alternative 2 – The Setback Levee alignment, the reduced Length Setback Levee alternative would result in greater losses to wooded riparian and important open water characteristics (i.e., SRA cover, floodplains) due to the riprap slope protection throughout Segment F, and the removal of woody vegetation on the existing levee in Segment E. Landside effects would be identical to those of Alternative 2 – The Setback Levee alignment, as new roadways would be constructed.

Alternative 5 – Setback Levee with Slope Flattening- On the landside, conditions resulting from the Setback Levee with Slope Flattening alignment would be identical to the Alternative 2 – The Setback Levee alignment. On the waterside, however, Bees Lakes would remain hydraulically isolated, and extra erosion site bank stabilization would be placed on the existing levee. The hydraulic isolation of Bees Lakes may maintain their current function as wildlife habitat.

DISCUSSION

The Service's primary concern with the effects to fish and wildlife is the loss of riparian and wetland habitats. Riparian habitat and shallow water cover provide diversity and complexity that have been severely degraded or completely lost due to local and landscape level disturbance. Historically, the Sacramento River meandered across the floodplain creating a vast complex of riparian and marsh habitats. Because of the dynamic nature of the river system, with some sections of the river scouring and creating a new river channel and other sections accreting and providing a place for early successional vegetation to grow, the variety of fish and wildlife of the Sacramento River system depend on the diversity created with the system.

The setback levee alternatives (Alternative 2, Alternative 4, and Alternative 5) offer the ability to provide onsite compensation for losses of wooded habitats due to construction. Onsite compensation allows for the continuance of the landscape context of the land cover, thus providing improved connectivity and decreasing chances of habitat fragmentation in the Southport Project area.

The Service supports construction designs that allow natural river processes to occur, such as frequent floodplain inundation and associated floodplain cover. Setting the levee back benefits fish

and wildlife species along with providing flood protection. Setback levees increase the capacity of water storage by creating more floodplain habitat, and decrease the chances of levee erosion in the immediate area by potentially allowing some meander in stream flow. Throughout the Sacramento River system, the Service's goal is to work toward the creation of a sustainable, reliable, and resilient flood and riparian system. Setback levee designs are a step in this direction; therefore setback designs are generally preferred by the Service where possible.

Vegetation on river banks, as well as in shallow water habitats, is important in maintaining elements of SRA cover, erosion control, roosting spots, cover from predation and for predators, and feeding opportunities for wildlife species. Even with the Alternative 2 – Setback Levee alternative which contains 3.6 miles of setback levee, there are still about 2.0 miles of levees designed with rock slope protection upstream and downstream of the setback levee. Such extensive lengths of continuous riprap at both ends can limit the effectiveness of the offset floodplain area as a contiguous riparian landscape for many wildlife species. Means should be provided to allow woody vegetation to persist among the rock slope protection areas so that there is no loss of SRA cover values and overall loss of riparian habitat values can be minimized.

To mitigate the loss of habitat value for fish and/or wildlife species the Service believes that a ratio of 2:1 should be used to offset the loss of riparian scrub/woodland, upland woodland, emergent wetland, ponds, and shallow water habitat cover-types (Table 10). This ratio takes into account temporal losses of habitat value while vegetation matures over time. Non-native annual grasslands and former agricultural lands that will not return to production should be reseeded with a native seed mix.

Table 10. Compensation need for the habitats affected by the Southport Project, Preferred Alternative, City of West Sacramento, Yolo County, California.

Cover-Type	Area Affected (acres)	Compensation Need (acres)
Riparian scrub/woodland	31.04	62.08
Upland woodland	15.46	30.92
Emergent wetlands	1.91	3.82
Ponds	0.0	Not Applicable
Shallow water habitat	35.76	71.52
Orchard and Agricultural fields	476.0	Re-seed
Non-native annual grassland	74.81	Re-seed
Unvegetated/Developed	Unknown	Re-seed*

* Any disturbed areas left unvegetated should be re-seeded with a native seed mix.

If the offset floodplain area is to be used as compensation, the resource agencies should be included in the planning for how the compensation areas will be operated and maintained. For compensation areas to be effective, they should be managed in perpetuity, with established goals and monitoring plans. Compensation goals should be clearly outlined and corrective measures established to ensure that compensation is achieved and maintained.

RECOMMENDATIONS

As part of the Southport Project construction plans, the Service recommends that the Corps implement the following:

1) Minimize effects to shallow water habitat along the Sacramento River by planting native woody materials within rock slope protection areas. Work with the Service, NMFS, and CDFW to develop planting and monitoring plans; and DWR and WSAFCA to develop a variance to allow vegetation within the Corps' vegetation free zone to remain in place, especially in areas designed for rock slope protection.

2) Minimize impacts to wildlife species by reseeding all lands disturbed by construction activities that will not be used for another purpose with native grasses and forbs. Similarly, agricultural lands that will remain out of production should be reseeded with native forbs and grasses. Reseeding should be conducted just prior to the rainy season to enhance germination and plant establishment.

3) Compensate for the loss of 31.04 acres of riparian scrub/woodland by creating 62.08 acres of riparian scrub/woodland.

4) Compensate for the loss of 15.46 acres of upland woodland by creating 30.92 acres of upland woodland.

5) Compensate for the loss of 1.91 acres of emergent wetland by creating 3.82 acres of emergent wetland.

6) Compensate for the loss of 35.76 acres of shallow water habitat by creating 71.52 acres of shallow water habitat.

7) All compensation areas should be created within the newly expanded flood plan area. Plantings should be done at the optimal time for success, and a monitoring plan should be developed to track success of the plantings.

8) For all compensation areas, develop an operations and maintenance plan that is coordinated with the Service and other resource agencies.

9) Conduct pre-construction surveys for breeding migratory birds including the State listed Swainson's hawk and burrowing owl.

10) Comply with local tree ordinance requirements for any landmark or heritage trees that are impacted by the project.

11) Consult with the CDFW regarding impacts to State-listed species.

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Appendix A:

Southport Sacramento River Early Implementation Project
Post-Construction Design Alternatives

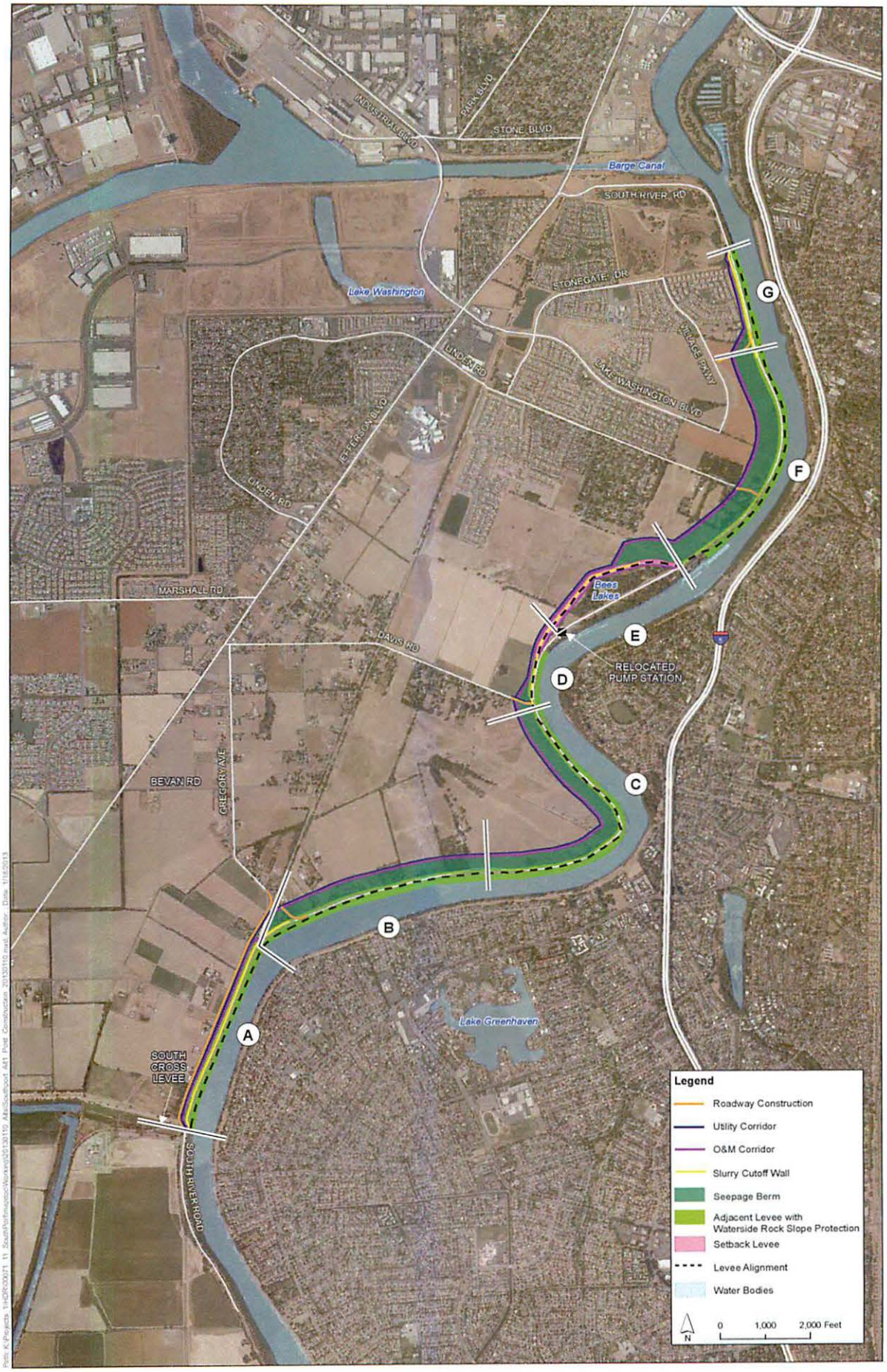

Plate 2-2b
Southport Sacramento River Early Implementation Project Post-Construction Conditions - Alternative 1

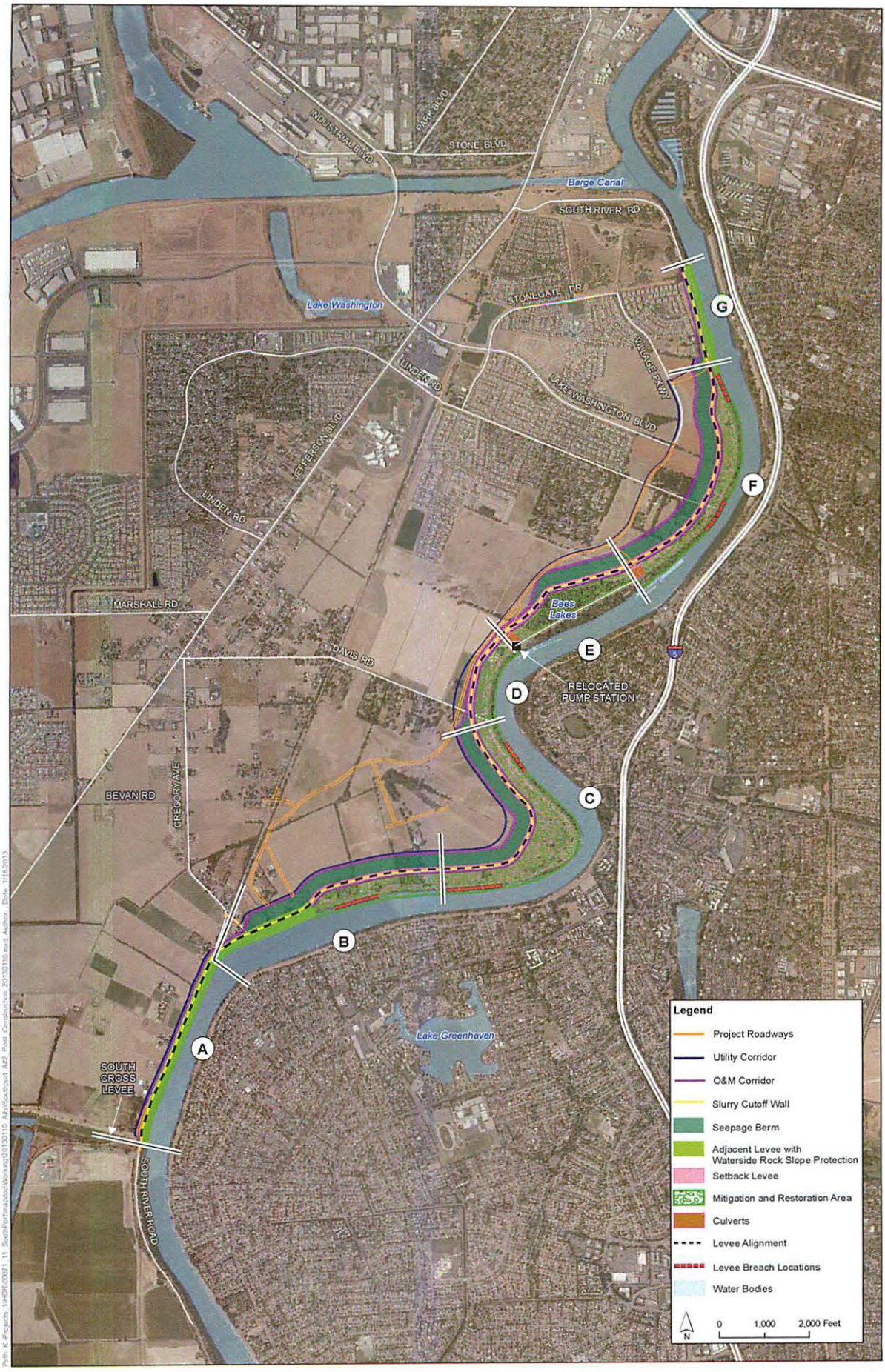

Plate 2-3b
Southport Sacramento River Early Implementation Project Post-Construction Conditions - Alternative 2

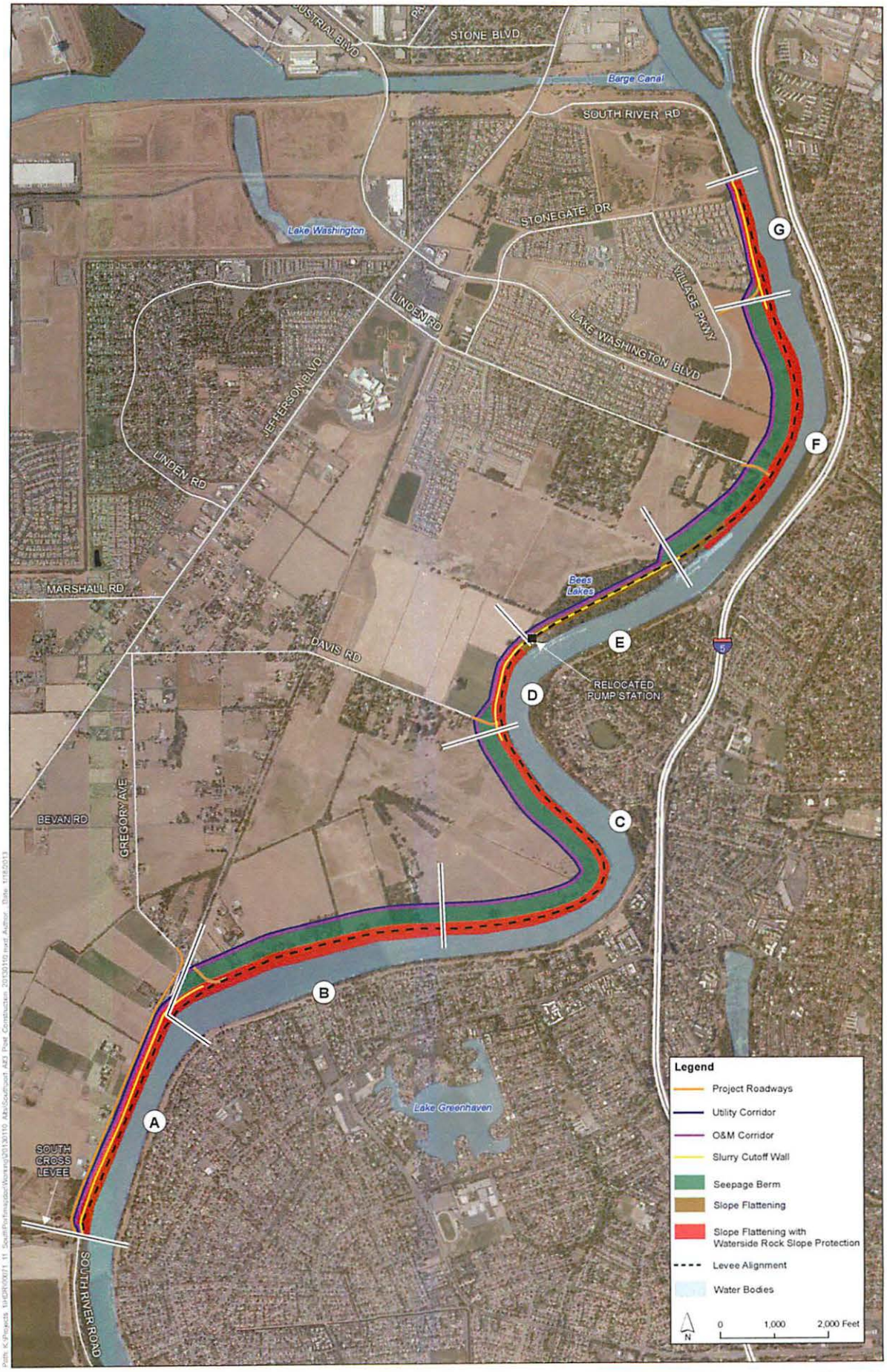

Plate 2-4b
Southport Sacramento River Early Implementation Project Post-Construction Conditions - Alternative 3

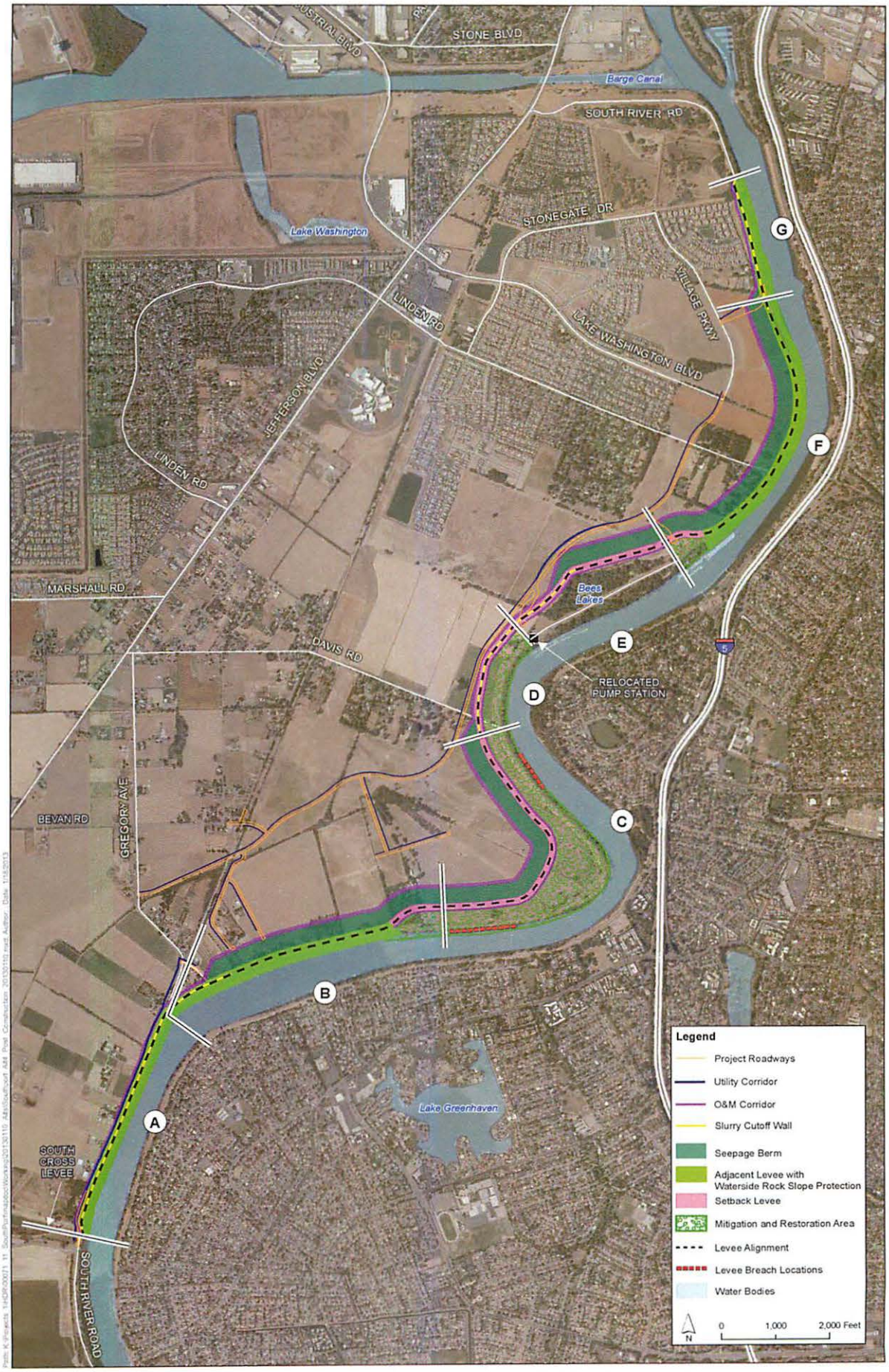

Plate 2-5b
Southport Sacramento River Early Implementation Project Post-Construction Conditions - Alternative 4

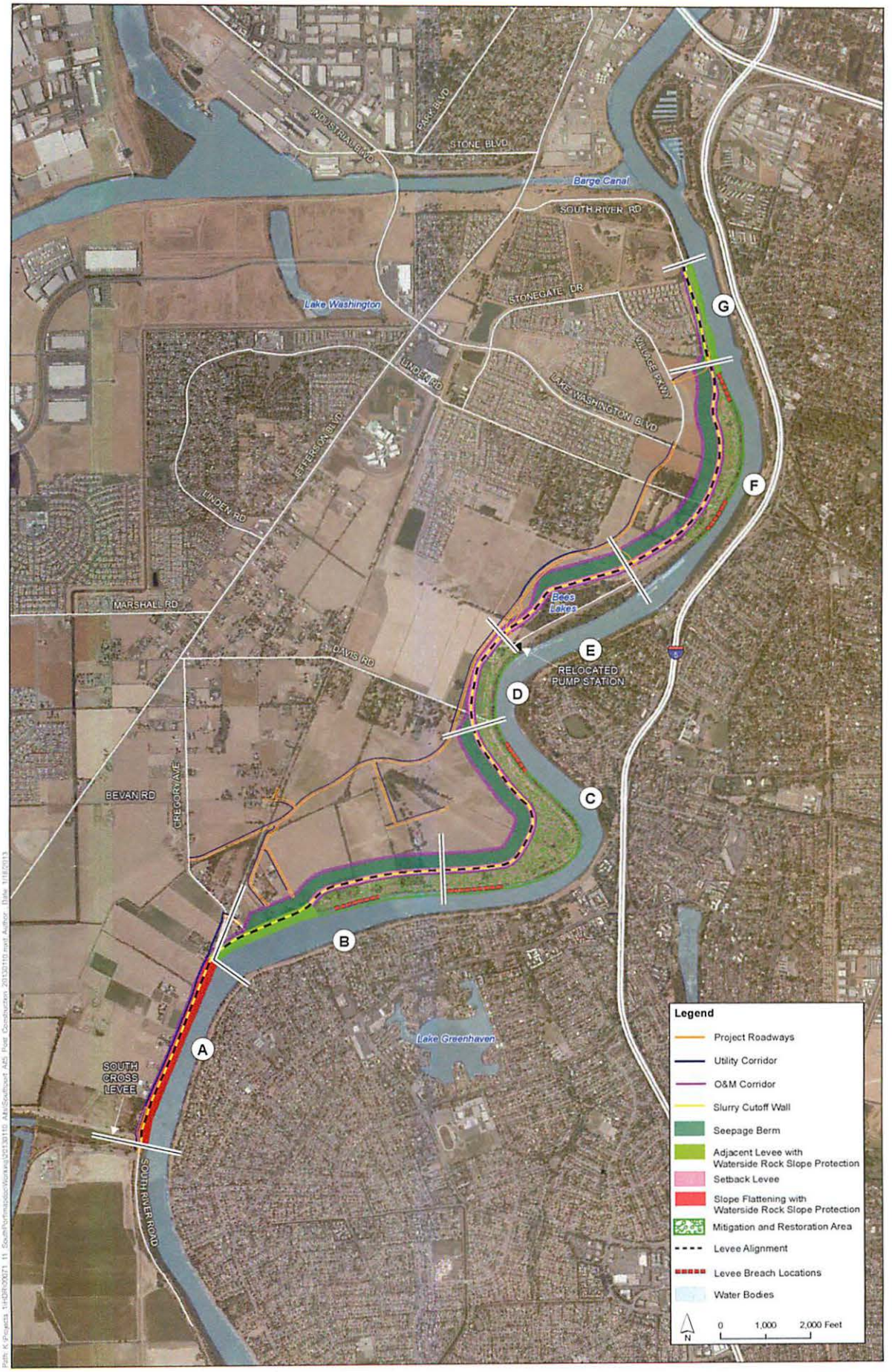

Plate 2-6b
Southport Sacramento River Early Implementation Project Post-Construction Conditions - Alternative 5

Appendix B:

Federal Endangered and Threatened Species that May Occur in or May be Affected by the Project

U.S. Fish & Wildlife Service
Sacramento Fish & Wildlife Office
Federal Endangered and Threatened Species that Occur in or may be Affected by Projects in the

Sacramento West
U.S.G.S. 7 1/2 Minute Quad
Document Number: 130703083953
Generated January 22, 2015

Listed Species

Invertebrates

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

Fish

- *Acipenser medirostris*
  - green sturgeon (T) (NMFS)
- *Hypomesus transpacificus*
  - Critical habitat, delta smelt
  - delta smelt (T)
- *Oncorhynchus mykiss*
  - Central Valley steelhead (T) (NMFS)
  - Critical habitat, Central Valley steelhead (NMFS)
- *Oncorhynchus tshawytscha*
  - Central Valley spring-run chinook salmon (T) (NMFS)
  - Critical Habitat, Central Valley spring-run chinook (NMFS)
  - Critical habitat, winter-run chinook salmon (NMFS)
  - winter-run chinook salmon, Sacramento River (E) (NMFS)

Amphibians

- *Ambystoma californiense*
  - California tiger salamander, central population (T)
- *Rana draytonii*
  - California red-legged frog (T)

Reptiles

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

Birds

- *Coccyzus americanus occidentalis*
  - Western yellow-billed cuckoo (T)

- *Vireo bellii pusillus*
    - Least Bell's vireo (E)

Key:

- (E) Endangered - Listed as being in danger of extinction.
- (T) Threatened - Listed as likely to become endangered within the foreseeable future.
- (NMFS) Species under the Jurisdiction of the National Oceanic & Atmospheric Administration Fisheries Service. Consult with them directly about these species.
- Critical Habitat - Area essential to the conservation of a species.

Important Information About Your Species List

How We Make Species Lists

We store information about endangered and threatened species lists by U.S. Geological Survey 7½ minute quads. The United States is divided into these quads, which are about the size of San Francisco.
The animals on your species list are ones that occur within, or may be affected by projects within, the quads covered by the list.

- Fish and other aquatic species appear on your list if they are in the same watershed as your quad or if water use in your quad might affect them.
- Amphibians will be on the list for a quad or county if pesticides applied in that area may be carried to their habitat by air currents.
- Birds are shown regardless of whether they are resident or migratory. Relevant birds on the county list should be considered regardless of whether they appear on a quad list.

Plants

Any plants on your list are ones that have actually been observed in the area covered by the list. Plants may exist in an area without ever having been detected there. You can find out what's in the surrounding quads through the California Native Plant Society's online Inventory of Rare and Endangered Plants.

Surveying

Some of the species on your list may not be affected by your project. A trained biologist and/or botanist, familiar with the habitat requirements of the species on your list, should determine whether they or habitats suitable for them may be affected by your project. We recommend that your surveys include any proposed and candidate species on your list.
See our Protocol and Recovery Permits pages. For plant surveys, we recommend using our Guidelines for Conducting and Reporting Botanical Inventories. The results of your surveys should be published in any environmental documents prepared for your project.

Your Responsibilities Under the Endangered Species Act

All animals identified as listed above are fully protected under the Endangered Species Act of 1973, as amended. Section 9 of the Act and its implementing regulations prohibit the take of a federally listed wildlife species. Take is defined by the Act as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" any such animal. Take may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or shelter (50 CFR §17.3).

Take incidental to an otherwise lawful activity may be authorized by one of two procedures:

- If a Federal agency is involved with the permitting, funding, or carrying out of a project that may result in take, then that agency must engage in a formal consultation with the Service.
- During formal consultation, the Federal agency, the applicant and the Service work together to avoid or minimize the impact on listed species and their habitat. Such consultation would result in a biological opinion by the Service addressing the anticipated effect of the project on listed and proposed species. The opinion may authorize a limited level of incidental take.
- If no Federal agency is involved with the project, and federally listed species may be taken as part of the project, then you, the applicant, should apply for an incidental take permit. The Service may issue such a permit if you submit a satisfactory conservation plan for the species that would be affected by your project.
- Should your survey determine that federally listed or proposed species occur in the area and are likely to be affected by the project, we recommend that you work with this office and the California Department of Fish and Game to develop a plan that minimizes the project's direct and indirect impacts to listed species and compensates for project-related loss of habitat. You should include the plan in any environmental documents you file.

Critical Habitat

When a species is listed as endangered or threatened, areas of habitat considered essential to its conservation may be designated as critical habitat. These areas may require special management considerations or protection. They provide needed space for growth and normal behavior; food, water, air, light, other nutritional or physiological requirements; cover or shelter; and sites for breeding, reproduction, rearing of offspring, germination or seed dispersal.

Although critical habitat may be designated on private or State lands, activities on these lands are not restricted unless there is Federal involvement in the activities or direct harm to listed wildlife.
If any species has proposed or designated critical habitat within a quad, there will be a separate line for this on the species list. Boundary descriptions of the critical habitat may be found in the Federal Register. The information is also reprinted in the Code of Federal Regulations (50 CFR §17.95). See our Map Room page.

Candidate Species

We recommend that you address impacts to candidate species. We put plants and animals on our candidate list when we have enough scientific information to eventually propose them for listing as threatened or endangered. By considering these species early in your planning process you may be able to avoid the problems that could develop if one of these candidates was listed before the end of your project.

Species of Concern

The Sacramento Fish & Wildlife Office no longer maintains a list of species of concern. However, various other agencies and organizations maintain lists of at-risk species. These lists provide essential information for land management planning and conservation efforts.

Wetlands

If your project will impact wetlands, riparian habitat, or other jurisdictional waters as defined by section 404 of the Clean Water Act and/or section 10 of the Rivers and Harbors Act, you will need to obtain a permit from the U.S. Army Corps of Engineers. Impacts to wetland habitats require site specific

mitigation and monitoring.

Updates
Our database is constantly updated as species are proposed, listed and delisted. If you address proposed and candidate species in your planning, this should not be a problem. However, we recommend that you get an updated list every 90 days. That would be April 16, 2015.

Appendix C:

Endangered Species Consultation for the West Sacramento General Reevaluation Report Project, Including the Southport Project

January 2015

Editor's Note: this appendix has been removed to reduce file size. The report is appended to the Final EIS as Appendix J-4.