UNITED STATES DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE

REVISED DRAFT FISH AND WILDLIFE COORDINATION ACT REPORT FOR THE

GUADALUPE RIVER FLOOD CONTROL PROJECT, UPPER REACHES

PREPARED BY:

U.S. Fish and Wildlife Service
Division of Ecological Services
Sacramento Field Office
Sacramento, California

PREPARED FOR:

U.S. Army Corps of Engineers
San Francisco District
San Francisco, California

April 1997

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Sacramento Field Office
3310 El Camino Avenue, Suite 130
Sacramento, California 95821-6340

IN REPLY REFER TO:

April 25, 1997

Mr. William Angeloni
Chief, Planning/Engineering Division
Corps of Engineers, San Francisco District
211 Main Street
San Francisco, California 94105-1905

Subject: CESF-Guadalupe River Flood Control Project, Upper Reaches

Dear Mr. Angeloni:

In accordance with the Scope of Work for Fiscal Year 1996, enclosed are three copies of the Fish and Wildlife Service's revised draft Fish and Wildlife Coordination Act Report for the subject project. It is based on substantial changes to the alternative designs and includes revisions to the 1993 aquatic Habitat Evaluation Procedures (HEP) analysis, as well as a new terrestrial HEP study conducted in 1996. Comments on the draft report and most recent HEP studies have been carefully considered in preparation of this report, and incorporated where the Service deemed appropriate. By copy of this letter, we request that the California Department of Fish and Game and National Marine Fisheries Service provide us with their comments and/or concurrence with our findings within 30 days of receipt of this document.

As always, we thank your staff for their cooperation during the planning process. If you have any questions, please contact Dr. Steven Schoenberg of my staff at (916) 979-2107.

Sincerely,

for Wayne S. White
Field Supervisor

ENCLOSURE

cc: FWS, AES, Portland, OR
CDFG, Monterey (Keith Anderson)
CDFG, Yountville (Margeret Roper)
GCRCD, San Jose (Libby Lucas)
JSA, Sacramento (Jeff Kozlowski)
NHI, San Francisco (Richard Roos-Collins)
NMFS, Santa Rosa (Dante Maragni)
SCVWD, San Jose (Terry Neudorf)
SWRCB, Sacramento (Oscar Balaguer)

EXECUTIVE SUMMARY

This is the Fish and Wildlife Service's revised draft detailed report on the Corps of Engineers' (Corps') proposed Upper Guadalupe River Flood Control Project. The project would increase the level of flood protection to part of suburban San Jose, California. This report evaluates how the project would affect fish and wildlife resources and provides recommendations for avoiding, minimizing, and compensating adverse impacts.

Two alternatives for flood protection of lands adjacent to the Guadalupe River from I-280 to Blossom Hill Road: the locally-preferred bypass/widening alternative with 100-year flood protection, and the Corps' widening alternative with 50-year flood protection. The bypass/widening alternative consists of a bypass around Reaches 6-8, cribwall or gabion edge floodways with relatively high bench cuts (~6 feet above invert) in Reaches 9-11 (some with partial bypasses), levees in Reach 12, access ramps, and erosion protection (both biotechnical and gabion). To replace 17.3 acres of impacted forest and scrub-shrub, 23.7 acres of mitigation would consist of riparian planting infill on channel slopes, restoration in Reach 10b, and on top-of-bank terraces away from the stream edge at various locations. The widening alternative involves excavation of deep bench cuts (~3 feet above invert) in Reaches 7 and 10-11, floodwalls in Reach 8, and no work in Reach 9. About 12.6 acres of mitigation, for 13.5 acres of affected riparian forest and scrub-shrub, would include unlimited riparian plantings on affected impact areas, infill, and restoration of Reach 10b. A terrestrial HEP analysis showed that the acreage necessary to mitigate lost riparian values in-kind is similar for the two alternatives (19-21 acres).

Stream and streamside vegetation impacts differed between alternatives. The bypass/widening alternative affected somewhat more overhead shade, and slightly less riparian contact with stream edge, than the widening alternative. Mitigation increased contact by 4,000 feet for the bypass/widening alternative (primarily in Reach 10b), and by 9,000 feet for the widening alternative (10b plus on-site). Restoration of 10b would greatly increase fish passage through and stream conditions within this reach. An aquatic HEP analysis was performed for the overall project was conducted with two Reach 10b success scenarios. Mitigation for aquatic impacts was moderately inadequate for both scenarios for the bypass/widening alternative, and adequate for both scenarios for the widening alternative.

The bypass/widening alternative provides comprehensive flood and erosion protection, but causes partial, permanent impacts to high quality areas (e.g., Reach 9,10a), such as thinning of the riparian corridor and replacing larger trees with smaller and shorter willow species. One low quality area (Reach 10b) would be improved substantially by plantings, however the success of such mitigation is highly dependent on the as yet unverified assumption that water supply, through streamflow or groundwater, will be sustained in perpetuity. The widening alternative has more stream edge vegetation, but does so at the expense of greater temporal impacts, and with a lower level of flood protection.

Although the locally-preferred plan is greatly improved over previous designs, opportunities for impact avoidance and corridor preservation are not as yet fully optimized. Project modifications, both major and minor, are identified on a site-specific basis to maximize bank edge vegetation consistent with flood control objectives.

TABLE OF CONTENTS

I. INTRODUCTION 1

II. PROJECT ALTERNATIVES 3
A. Bypass/widening Alternative 5
B. Widening Alternative 5
C. Reach-Specific Comparison of Alternatives: Construction Impacts and Mitigation 5

III. EXISTING RESOURCES 8
A. Vegetation 8
B. Fisheries 9
C. Wildlife 10
D. Endangered Species 10

IV. FUTURE WITHOUT THE PROJECT 12

V. FUTURE WITH THE PROJECT 13
A. Bypass/widening Alternative 13
1. Riparian Habitat 13
2. Riverine Habitat 14
B. Widening alternative 17
1. Riparian Habitat 17
2. Riverine Habitat 17

VI. DISCUSSION 19
A. Mitigation Policy 19
B. Cover-types and Mitigation Goals 20
C. Modifications for Conservation and Enhancement 22
D. Acceptability of Alternatives 24
1. Widening Alternative 24
2. Bypass/widening Alternative 24

VII. CONCLUSION AND RECOMMENDATIONS 26

REFERENCES 29

LIST OF APPENDICES

APPENDIX A: Habitat Evaluation Procedures report
APPENDIX B: Terrestrial HEP data, futures, and calculations
APPENDIX C: Aquatic HEP transect data, future summary, and HSI calculations
APPENDIX D: HEP "Form D" compensation analysis computer outputs
APPENDIX E: Overstream shade cover summary, impacts, and future assumptions
APPENDIX F: Undercut bank survey and natural bank ratio calculations
APPENDIX G: USFWS March 25, 1997 list of endangered, threatened and proposed species

LIST OF FIGURES

Figure 1. The Guadalupe River watershed 2
Figure 2. Reach location map 4

LIST OF TABLES

Table 1. Riparian forest and scrub-shrub: existing conditions and summary of impacts 13
Table 2. Summary of impacts to undercut bank and natural bank (new revetment) 15
Table 3. Summary of impacts on overhead vegetative stream shade 15
Table 4. Contact length of riparian forest with stream edge: existing conditions and impacts . . . 16
Table 5. Summary of terrestrial and aquatic HEP compensation analyses 17

I. INTRODUCTION

This document is the Fish and Wildlife Service's (Service's) draft detailed report on the proposed Upper Guadalupe Flood Control Project. It has been prepared under the authority and under the provisions of Section 2(b) of the Fish and Wildlife Coordination Act (FWCA, 48 stat. 401, as amended; 16 U.S.C. 661 et seq.). The Service has previously provided Planning Aid Letters in 1989 and 1991, and a Draft FWCA report 1993 (USFWS 1993), for this project. Since the 1993 report, the project alternatives and associated mitigation plans have been substantially revised.

Based on new designs, comments on the 1993 report, and other information provided through February 1997, this report compares the impacts of the locally-preferred, bypass/widening alternative (100- year flood protection) with the Corps of Engineers' (Corps') National Economic Development plan widening alternative (50-year flood protection). Pursuant to the Scope of Work for fiscal year 1996, this report: (1) reviews existing data on the importance of local fish and wildlife resources, (2) identifies project impacts to these resources, (3) ranks the alternatives from a resource conservation standpoint, (4) identifies modifications for further resource conservation and enhancement, and (5) revises the aquatic and terrestrial quantitative evaluation using Habitat Evaluation Procedures (HEP). The information in the present report has been informally coordinated with the local sponsor, Santa Clara Valley Water District (SCVWD), the California Department of Fish and Game (CDFG) , and the National Marine Fisheries Service (NMFS), several of whom participated in the HEP revision. We request these agencies to formally comment or provide a letter of concurrence on the findings of this draft report; any comments we receive will be fully considered in preparation of our final report.

The Guadalupe River drains a 160-square-mile area in the Santa Cruz Mountains and suburban San Jose, flowing north from the confluence of Alamitos and Guadalupe Creeks through the City of San Jose, emptying into San Francisco Bay (Figure 1). The climate of the Guadalupe River Basin is similar to the rest of the San Francisco Bay area. Summers are generally warm and dry, whereas winters tend to be cool and wet. Temperatures range from an average high of 81°F in July to an average low of 49°F in January. Precipitation in the basin occurs primarily from November to April; average annual precipitation ranges from about 14 inches near the Bay to over 50 inches in some headwater areas.

Water resource developments include reservoirs on Alamitos, Guadalupe, Los Gatos, and Arroyo Calero Creeks, and a number of man-made groundwater percolation ponds located on or adjacent to the Guadalupe River and Guadalupe Creek which are used to enhance basin groundwater recharge. At its origin, base flow runoff in the Guadalupe River is largely captured by reservoirs, with controlled releases from the reservoirs and from the SCVWD Almaden Pipeline maintaining perennial stream habitat downstream on Guadalupe Creek and at the percolation ponds along Coleman Avenue and upstream of Branham Lane. Little or no summer flow exists for much of the streambed downstream of Hillsdale Avenue, except in a few recent years, when groundwater pumping into Canoas Creek was conducted. The river does obtain some accretions seasonally from Canoas and Ross Creeks within the project area, and from Los Gatos Creek downstream of the project area.

The project includes privately and federally-funded portions that include sections of the Guadalupe River from Blossom Hill Road and Interstate 280 (Reaches 6 through 12), and Highway 101 to Interstate 880 (Reach A). These reaches display channel incision and bank erosion, while lacking sufficient capacity to contain peak discharges. The project also includes previously modified sections of Ross Creek (to 700 feet upstream of Jarvis Avenue), and Canoas Creek (to about 1,300 feet

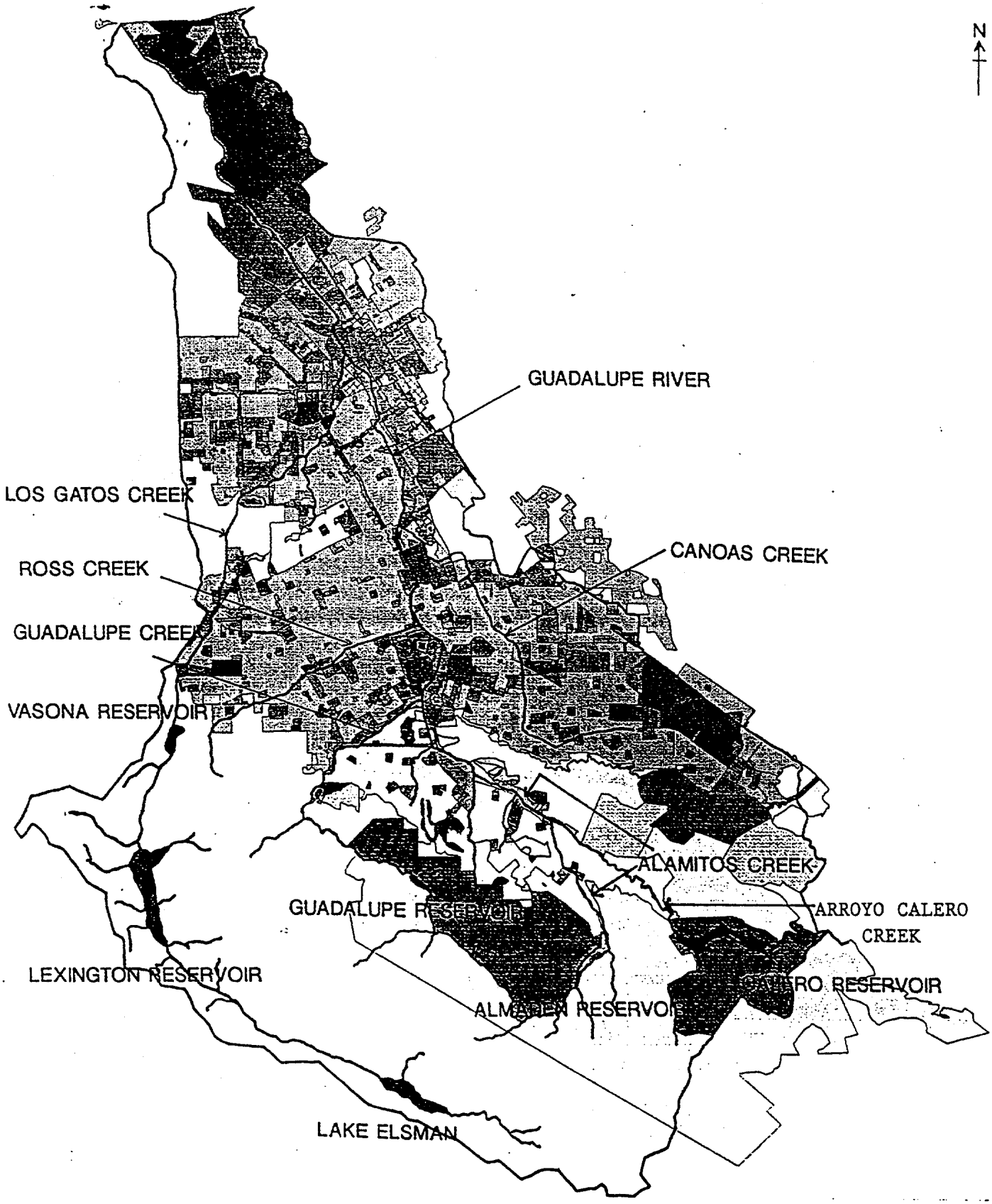

Figure 1. The Guadalupe River watershed, showing the locations of tribuatries and water supply reservoirs (from SCVWD 1997).

upstream of Nightingale Drive). The extent and type of construction varies with alternative and would include a combination of the following: channel bypasses, channel widening, channel lining with gabions or cribwalls, bridge reconstruction, floodwalls, and levees. The purpose of the project is to modify these areas so that the river will convey flows up to the 100-year event. For the quantitative analysis of impacts and mitigation in this report, only portions within the Corps' study area (excluding Reaches 'A' and 6) were considered.

II. PROJECT ALTERNATIVES

For our analysis, the project area is divided into 17 distinct sections which differ in hydrologic input, topography, past flood control work, and/or construction-type prescribed under the two project alternatives (Figure 2). The boundaries of these sections are as follows:

(1)	Reach A: Highway 101 to Interstate 880	(STA 48000-58000)
(2)	Reach 6: Interstate 280 to Southern Pacific Railroad (SPRR)	(STA 71300-74100)
	Reach 7: SPRR to Western Pacific Railroad (WPRR)	
(3)	SPRR to Willow Street	(STA 74100-75300)
(4)	Willow Street to STA 76300	(STA 75300-76300)
(5)	STA 76300 to Alma Street	(STA 76300-77300)
(6)	Alma Street to WPRR	(STA 77300-78100)
(7)	Reach 8: WPRR to Willow Glen Way	(STA 78100-79500)
(8)	Reach 9: Willow Glen Way to Curtner Avenue	(STA 79500-84500)
	Reach 10: Curtner Avenue to Capitol Expressway	
(9)	Subreach 10a: Curtner Avenue to Canoas Creek	(STA 84500-85700)
(10)	Subreach 10b: Canoas Creek to Berkshire Drive	(STA 85700-88800)
	Subreach 10c: Berkshire Drive to Capitol Expressway	
(11)	Berkshire Drive to Hillsdale Road	(STA 88800-90650)
(12)	Hillsdale Road to 100 feet upstream of Capitol Expressway	(STA 90650-91350)
	Reach 11: Capital Expressway to Branham Lane	
	Subreach 11a: Capitol Expressway to San Jose Water Company well field	
(13)	upstream of Capitol Expressway to downstream of Ross Creek	(STA 91350-91850)
(14)	downstream of Ross Creek to S.J. Water Company	(STA 91850-93800)
(15)	Subreach 11b: San Jose Water Company well field to 300 feet upstream of Ross Creek	(STA 93800-95300)
(16)	Subreach 11c: 300 feet upstream of Ross Creek to Branham Lane	(STA 95300-96100)
(17)	Reach 12: Branham Lane to Blossom Hill Road	(STA 96100-101735)

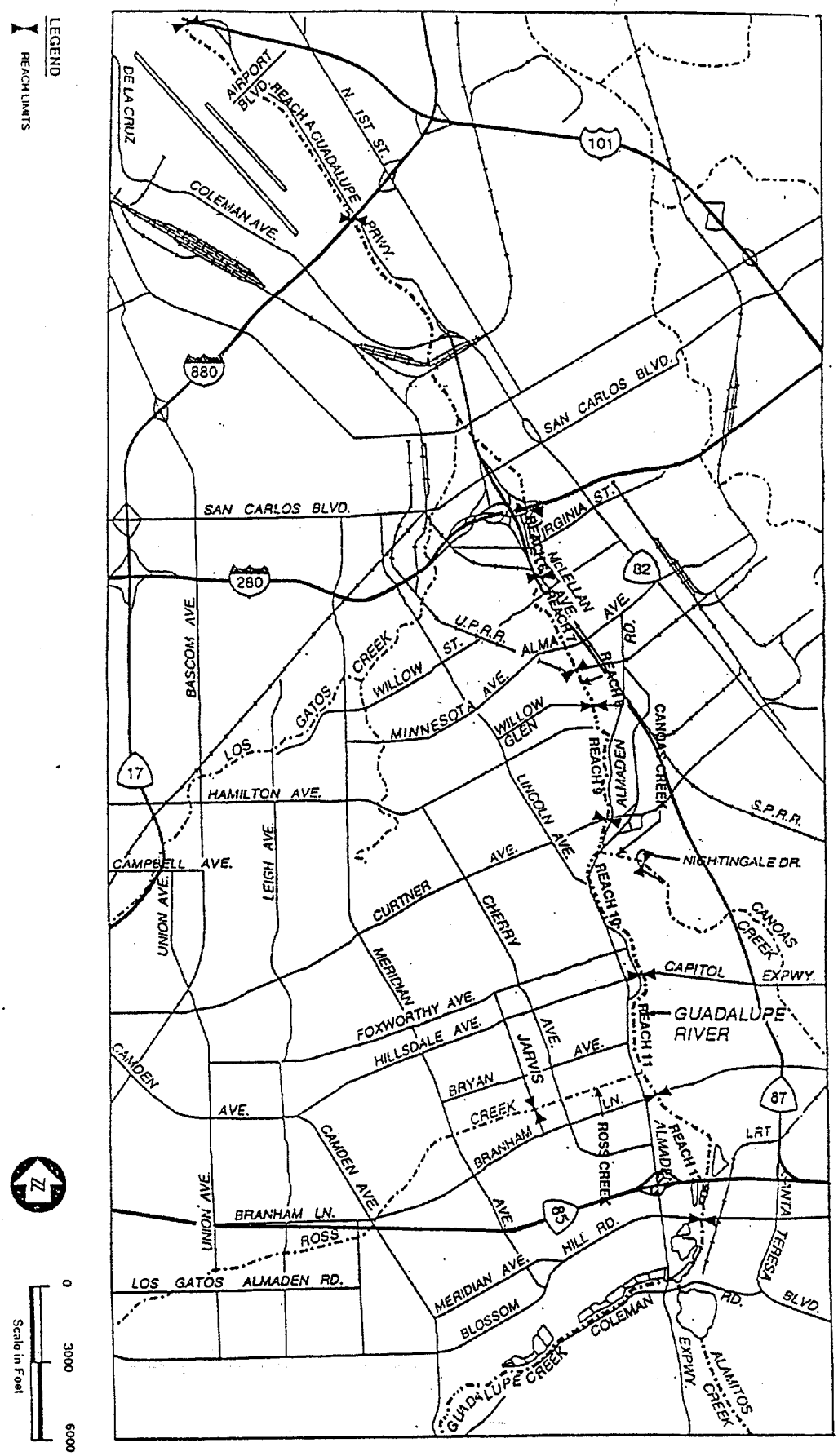

Figure 2. Reach location map for the Upper Guadalupe River Flood Control Project.

A. Bypass/widening Alternative (Locally Preferred Plan)

This plan consists of both bypass and widening elements, and provides a 100-year level of flood protection. A bypass would be constructed around the natural channel in Reaches 6-8. Channel widening would be done in most of Reaches 9, 10A, 10C, 11A-C, and a portion of Reach 12, and the banks reinforced in some sections with a combination of stepped gabions and cribwall construction. Short bypass features, with partially gabion-stabilized banks would be constructed in a two locations in Reach 9 and one site in Reach 11A. Several areas in the bypassed reaches would receive biotechnical erosion protection. Bridges at Willow Glen Way and Curtner Avenue would be replaced, the bridge at Hillsdale Avenue would be removed, and new bridges would be constructed over open portions of the bypass floodway at Willow and West Virginia Streets. Levees in Reach 12 would be raised. Floodwalls would be constructed along Canoas Creek, and Ross Creek would be widened and lined with articulated concrete mattress. Ramps and maintenance roads would be constructed for access to one or both sides of the channel, depending on location. Non-federal work would include minor channel improvements in Reach A, with addition of a levee and floodwall, and access ramps.

To mitigate for impacts to riparian cover, 22.55 acres would be planted and managed as riparian forest. The mitigation consists of a combination of replanting within the impact area, "infill" replacement of ruderal herbaceous and scrub-shrub on areas adjacent to the river, and widening of the existing riparian corridor on areas of other cover-types (urban landscaping, ruderal herbaceous).

B. Widening Alternative (National Economic Development or NED Plan)

This plan includes only widening elements and provides a 50-year level of flood protection. Widening would be done in Reaches 7, 10A, 10C, a part of 11A, and 11B-C. No substantial work would be done in Reaches 9, 10B, most of Reach 11A, Reach 12, or Ross Creek. Bridges would be replaced at the Willow Street, Alma Street, UPRR, Willow Glen Way, and Hillsdale crossings. Floodwalls would be constructed along Reach 8, a portion of Reach 7, and Ross Creek. Levees along Canoas Creek would be raised. Some access ramps and maintenance roads would be constructed, though less extensive than the bypass/widening alternative. Non-Federal work in Reaches A and 6 would occur as in the bypass/widening plans.

Mitigation with riparian replanting would total 11.75 acres, predominantly on the lower, excavated benches within the impact areas, as well as infill.

C. Reach-Specific Comparison of Alternatives: Construction Impacts and Mitigation

The table below provides a reach-specific comparison of the proposed construction, impacts to habitat, and mitigation measures:

Bypass/widening Alternative	Widening Alternative
Reach 6: A gabion bypass channel would be constructed to the east of the river on current residential property with its exit near Grant Street. Riparian mitigation will be at the top of bench to the east and infill to the west.	*Reach 6:* Non-federal work assumed to be the same as the bypass.

Bypass/widening Alternative	Widening Alternative
Reach 7 (741-753): Continued gabion bypass channel avoids riparian impacts; top of bench riparian mitigation between river and bypass, and on east bank between the bypass and Willow Street; west bank ramp near Route 87 southbound.	*Reach 7 (741-753):* East bank widening with bench cut 3-feet above the invert causes riparian impacts to the bank edge; mitigation on all impact areas, and on west bank and top of bench between SPRR and Route 87 northbound.
Reach 7 (753-763): Continued gabion bypass channel and riparian impact avoidance, and top of bench riparian mitigation between river and bypass. West bank ramp near Willow Street. Some biotechnical work with boulders/plants on the west bank.	*Reach 7 (753-763):* Continued east bank widening and riparian impacts, with mitigation on all impact areas.
Reach 7 (763-773): Continued gabion bypass channel and riparian impact avoidance, and top of bench riparian mitigation between river and bypass. East bank ramp impacts near Alma Avenue.	*Reach 7 (763-773):* continued east bank widening and riparian impacts, with mitigation on all impact areas.
Reach 7 (773-781): Continued gabion bypass channel. East bank ramp near impacts Alma Avenue.	*Reach 7 (773-781):* Continued east bank widening riparian impacts; mitigation on all impact areas. East bank top floodwall.
Reach 8: Continued gabion bypass channel and top of bench infill. Riparian impacts from bypass exit near Willow Glen Way.	*Reach 8:* Floodwalls on both bank tops; minimal riparian impacts assumed.
Reach 9: Mainly east bank widening with 5- to 6-foot bench cuts thinning riparian corridor except for some existing trees. Two 400-500 foot partial east bank bypasses opposite Pine Avenue and upstream of Malone Street. Repositioning of natural channel upstream of Malone Street. Two biotechnical and one stepped gabion erosion protection sites at the channel edge; 6:1 sideslope cribwall floodway protection along Almaden Road. Mitigation as 10-foot-wide planting areas on east bank, bench upstream of Malone Street and on both created bypass islands.	*Reach 9:* No work.
Reach 10a: East bank widening with 5-foot bench cut; 6:1 cribwall along Almaden Road; 10-foot-wide willow revegetation band near river edge.	*Reach 10a:* East bank widening with 3-foot bench cut; 6:1 sideslope cribwall along Almaden Road; 5-20-foot-wide revegetation band near river.

Bypass/widening Alternative	Widening Alternative
Reach 10b: No floodwork. Restoration consisting of gabion replantings on west between southbound and northbound Almaden expressway crossings; mixture of wetland or riparian plantings on natural bank from the northbound crossing to Streamgage 23b.	*Reach 10b:* Same as bypass.
Reach 10c (888-906): Excavate east bank to 6-foot above invert cut avoids some bank edge; riparian mitigation on 100-foot-wide band next to east bank; 6:1 sideslope cribwall on the east floodway edge.	*Reach 10c (888-906):* Partial impacts from east bank widening to 3-foot cut downstream of Foxworthy Avenue and west bank from Foxworthy to Hillsdale Avenues always to bank edge; replanting on all impact areas except ramp access on west. About 1:1.5 floodway sideslope.
Reach 10c (906-913): East bank excavation to 6-feet above invert goes to bank edge; east bank not planted; west bank converted to riparian; continued cribwalls.	*Reach 10c (906-913):* Both banks excavated mitigation on impact areas; less steep floodway sideslopes without cribwalls.
Reach 11a: Mostly east bank excavation to bank edge; 1:1-2 sideslope stepped gabion floodway. East bypass around 400-500 feet of riparian opposite Chard Drive. Mitigation as infill on west bank only.	*Reach 11a:* Minor (400-feet) east bank widening. Mitigation on impact area and west bank infill similar to bypass alternative.
Reach 11b: West bank excavation of floodway to the invert widens river channel precluding vegetation on bank edge; 2:1 sideslope earth river banks; 6:1 sideslope cribwall floodway west bank. Two west bank ramps with stepped gabions. Reconfigure Ross Creek outfall, some hardening. Riparian mitigation about 100 feet from stream edge.	*Reach 11b:* Excavate most of east bank and about half of west bank to 3-foot bench height with 1:.75-1.5 sideslope gabion floodway slope on both sides. Mitigate in all impact areas. One west bank ramp. Assume the same Ross Creek outfall work and impacts.
Reach 11c: Continue west side floodway, with riparian mitigation away from west stream edge.	*Reach 11c:* Continue east bank excavation/on-site mitigation as in 11b.
Reach 12: Levees constructed/raised on one or both banks on non-riparian areas; riparian revegetation, with the exception of 420 feet upstream of Branham Lane, is not near stream channel though some is associated with existing percolation ponds.	Reach 12: Same as bypass alternative.

III. EXISTING RESOURCES

A. Vegetation

Vegetation surveys of the project area have been previously conducted in the late 1980's by Habitat Restoration Group (HRG, Felton, CA), and additional vegetation parameters were surveyed as part of the revised terrestrial HEP conducted for this report (SCVWD 1997). The project area consists of a mixture of riparian forest, ruderal herbaceous, scrub-shrub, and hardbanking features. In general, the stream edge and lower banks are dominated by willows and cottonwood, middle bank areas by black locust, walnut, box elder, and others, while the upper banks support coast live oak, sycamore, valley oak, as well as walnut, California pepper tree and privet. The shrub understory includes himalaya blackberry, poison oak, and young trees. Landscaping plantings include eucalyptus, holly oak, and fruit trees. Shallower portions of the river invert support freshwater marsh species like tules, while deeper areas are barren of vegetation.

Between reaches, the riparian areas differ considerably in age and quality of vegetation. Reaches 6 through 9 possess older, more dense, and more continuous riparian vegetation. In Reach 6, which is not included as part of the Federal project alternatives, the most abundant species are cottonwood, willow, and black walnut, with the most mature vegetation downstream of Virginia Street on the west bank. Reach 7 shows greater variability. The short section between Route 87 and SPRR has relatively sparse riparian cover and actively eroding banks. Much more continuous riparian cover is present in the section immediately upstream past Willow Street to about STA 760. At this point, the east bank is mainly ruderal scrub, and the west bank becomes steep, with a mixture of young trees in what appears to be recently collapsed bank, and older trees at the stream edge. This latter site, up to STA 763 is the location of the first biotechnical repair element proposed in the bypass/widening plan. From this point of Reach 7 to Alma Avenue, the riparian cover is sparser, particularly on the east bank. The remaining portion of Reach 7 from Alma Avenue to UPRR, as well as all of Reach 8 is again much higher quality riparian cover, with denser, larger trees, and more overwater shade. Between 450 and 600 feet of bank hardening is present in each of Reaches 6, 7 and 8.

Beginning at Willow Glen Way, the riparian cover in Reach 9 includes larger cottonwoods, black locust, walnut, box elder and occasional large sycamores, but fewer willows than downstream reaches. The riparian cover is up to 200 feet wide, and supports as high as 240 feet/acre of tree basal area (Appendix A). Several areas with very steep natural or hardened banks are present. Some of these steeper areas are unstable and have younger trees such as the biotechnical site downstream of Curtner Avenue, while others, such as the west bank upstream of Malone Road, have significant groves of cottonwoods. The riparian cover is nearly continuous trees, with the exceptions of several hundred feet of bank hardening at each of two east bank sites; one upstream of Malone Road and another bordering Almaden Road and scrub-shrub bordering the east bank for about 600 feet downstream of Curtner Avenue.

Despite very steep banks, Reach 10a is nearly continuous riparian forest and has a similar species mix to that in Reach 9. Reach 10b has been modified by channel widening and gabions, supporting primarily ruderal herbaceous and limited scrub vegetation, and a few, recently planted cottonwood saplings. Bounded by streamgage 23b upstream, this area can exhibit very dry soils in the summer months and is not used for percolation. Reach 10c does have more permanent water, and a relatively continuous riparian corridor north of Hillsdale Avenue. There are some large sycamores on the upper bank, with the densest vegetation on the west bank between Kell Way and Foxworthy Avenue.

Vegetation bordering the prune packing plant on the east bank north of Hillsdale Avenue is sparse, low quality riparian, ruderal scrub, and/or ornamental trees.

Reach 11a is a mosaic of riparian and ruderal scrub cover of varying quality. Black locust is the most common species, particularly on the east bank opposite Chard Drive, although there are some large specimens of oak, willow, sycamore, and eucalyptus just south of Capitol Expressway. Poison oak forms some dense patches. The west bank has patches of scrub, a mix of blackberry with various woody shrubs, as well as other areas with medium-to-large willows, cottonwoods, and sycamores. Reaches 11b and 11c shows some continuous, moderate-aged riparian vegetation on the east bank, south of Branham Lane and adjacent to Wellington Square, but the rest of these subreaches is ruderal vegetation, or much sparser riparian cover.

Reach 12 has been affected by former quarrying, agriculture and, until recently, instream percolation operations. Only herbaceous annuals grow in the ponded area exposed when the dams are removed, while limited riparian vegetation is present above the percolation pond edge on the west bank.

The areas along Ross and Canoas Creeks that would be impacted by the project consist predominantly of ruderal herbaceous vegetation on the banks and some freshwater marsh vegetation in the channel bottom. A portion of Ross Creek has already been stabilized with concrete.

B. Fisheries

Historically, the Guadalupe River probably supported small runs of winter-run steelhead trout and coho salmon (Skinner 1962). Adults of both species would have normally entered the river in early winter, and the young would remain for at least one year, migrating upstream into the cooler tributaries. Initial logging, followed by numerous barriers, impoundments, diversion, subsidence, pollution from urban runoff, gravel mining, and introduction of non-native fish species have greatly reduced the habitat quality of the river.

Nevertheless, adult chinook salmon and steelhead trout have been documented on the Guadalupe River at least since 1986 (Ulmer 1988, studies by Harvey Stanley Associates and Habitat Restoration Group, HRG 1991, as summarized in SCVWD 1997). Though it had been believed that these fish were strays attracted by discharge from a groundwater pumping operation, the fish have continued to ascend the river since cessation of the pumping in 1992 (Western Waters Canoe Club, 1995, personal communication). Several chinook salmon fry were collected in the vicinity of Branham Lane in March 1996. The life cycles of salmon and steelhead in this system are poorly known and subject to considerable speculation. Historically, the Bay area streams would not have had sufficiently cool, sustained flows to allow salmon, which occur mainly on the mainstems of major Central Valley and some coastal streams. The persistence of chinook salmon in the Guadalupe River may partly be a result of supplemental flows derived from urban basement and/or air conditioner discharges, or perhaps artesian water supported by ongoing percolation operations. Peak flows following storm events in the Guadalupe River basin have also increased greatly due to urbanization; this may result in moving young fish soon after emergence to lower portions of the river, potentially reducing the normal requirement for typical stream rearing. The limited surveys of salmon spawning suggest that about 85% occurs downstream of the project reaches, between Brokaw Road and San Carlos Street.

Other fish species populations vary somewhat with location. The more important native species are California roach, hitch, Sacramento sucker, and prickly sculpin while non-natives include largemouth

bass, green and pumpkinseed sunfishes, mosquitofish, goldfish, and carp. Pacific lamprey have also been observed in redds downstream of the project area (Hedding Street), and attached to the Blossom Hill drop structure upstream of the project area.

C. Wildlife

A wildlife monitoring study conducted in 1986-1987 included systematic, twice monthly bird surveys in 49 plots for a period of 12 months throughout the project length (except for Reach 8), trapping for mammals where activity was observed or suspected, and trapping for reptiles and amphibians in eight areas (reviewed in SCVWD 1997).

Of the 121 bird species observed, 11 were observed only once, including an unidentified falcon and several owls, while 16 species of waterfowl were observed only at the percolation ponds in Reach 12. The ten most abundant species are (in order of decreasing abundance): housefinch, bushtit, mallard, white-crowned sparrow, Anna's hummingbird, California towhee, yellow-rumped warbler, song sparrow, black phoebe, and cedar waxwing. The survey does indicate that the Guadalupe River has a lower number of breeding bird species than similar but less urbanized streams in the region. This may be in part due to the relatively narrow width of the stream corridor, competition for avian nest sites by European starlings, or nest parasitism by brown-headed cowbirds. Nevertheless, the avifauna is undoubtedly much more abundant and diverse than similar-sized rivers which have been more fully channelized and cleared. For a heavily urbanized area such the city of San Jose, the existing wildlife corridor of the Guadalupe River is considered a relatively scarce and valuable asset.

Common amphibian species along the Guadalupe River, include the bullfrog, western toad, and Pacific treefrog, which are restricted for at least part of their lifecycles to riverine or wetland habitats, and Calfiornia slender salamander, which may occur in other cover-types as well. Reptiles which occur in the project reaches, both in riparian and other cover-types, include the western fence lizard, gopher snake, common garter snake, ringneck snake and western skink. Typical mammals include muskrat, opossum, shrews, squirrels, gophers, mice, voles, raccoon, and several bats, primarily in riparian areas, as well as cats and dogs. Mammals would be less abundant and diverse in ruderal, upland landscaping, and urban forest areas than in riparian areas.

D. Endangered Species

Below are brief discussions of federally-listed and endangered and threatened species, and species proposed for these designations, which may occur in the project area or be affected by the project. The Corps should review its Federal agency responsibilities as outlined in Appendix F. The most recent list for the project was developed on May 15, 1996; as preliminary information, we have provided updated lists dated January 16, 1997 (Appendix F). The Service has consultation responsibility for all species other than anadromous fishes, which are the responsibility of NMFS. The Corps should make a written request for updating any such list that is more than 90 days old at the time that preparation of a Biological Assessment, or updated Biological Assessment, for the project is undertaken.

American Peregrine Falcon - Endangered (*Falco peregrinus anatum*): This species prefers ledges of high cliffs with commanding views of surrounding woodlands, forests, or coastal habitats; most occupy nests below 4,000 feet elevation. They prefer to nest near marshes, lakes, and rivers that support an abundance of birds, but may travel several miles from their nesting grounds to forage on

pigeons, shorebirds, waterfowl, and songbirds. Coastal and inland marsh habitats are especially important in fall and winter, when they attract large concentrations of shorebirds and other water birds. It is probably an infrequent visitor to the project area, having been observed in Reach 6, just downstream of the project area. Construction activities for either alternative could result in some temporary reduced use of the lower reaches by this species, while the widening alternative would result more prolonged due to larger temporal losses of riparian cover in Reach 7.

California clapper rail - Endangered (*Rallus longirostris obsoletus*): This species' prime habitat consists of large salt marshes with well-developed tidal slough networks and adjacent mudflats. The project area is considerably upstream of tidally-influenced area such that known or potential habitat for this species is unlikely to be adversely affected.

California Red-Legged Frog - Threatened (*Rana aurora draytonii*):
This species was formerly abundant in fresh and brackish water marshes and riparian habitats surrounding San Francisco Bay. Population decline is believed to have been caused by loss or degradation of preferred riparian habitat; negative influences include (a) the removal of streamside woody or emergent aquatic vegetation that results in loss of shading and more warmwater microhabitats, (b) loss of refugia such as undercut banks, holes, root masses, and gravel substrate and (c) introduction of exotic predatory fish and bullfrogs. California red-legged frogs lay their eggs in clusters around aquatic vegetation from December to early April. The larvae require 3-5 months to complete metamorphosis. Adults are highly aquatic when active but are less dependent on permanent water bodies than other frog species.

Routine flood control maintenance includes vegetation removal, herbicide spraying, shaping of banks to control erosion, and desilting operations. Thus, construction and maintenance of a flood control project on the upper Guadalupe River may have some adverse impacts on this species and its habitat. Currently, the project area has some areas of extensive undercut banks in association with waters deeper than 2 feet and scattered freshwater emergent vegetation; habitat attributes preferred by the red-legged frog.

This species may occur within the project reaches. The most recent records of red-legged frog include sightings in 1987 at the head of Lexington Reservoir, on Los Gatos Creek, and in 1977 about 1.5 miles downstream of Guadalupe Reservoir, on Guadalupe Creek. Appropriate surveys in accordance with approved Service protocols would need to be done to confirm presence or absence. Until such surveys are complete, presence would be assumed.

Other species: Most of the remaining species are not present in the project area. Two of the listed plant species, Santa Clara Valley dudleya and Metcalf Canyon jewelflower, are associated with serpentine soils that are absent from the project area. The other listed plant species, robust spineflower, is found in west side coastal montane woodland or scrub, also absent from the project area. Similarly, the project area does not overlap the known habitat of bay checkerspot butterfly, the only listed invertebrate species. The listed delta smelt and proposed Sacramento splittail are found in estuarine areas of the Sacramento-San Joaquin Delta well outside of the project area and they are not likely to be affected.

However, steelhead trout are proposed for listing and are known to be present near or within the project area. Adult steelhead have been seen entering the river, however, reproduction and smolting have not yet been confirmed. Steelhead are an anadromous form of rainbow trout. Adults in the Bay

area populations exhibit what is known as the winter-run pattern, migrating during the rain and snowmelt season from December to June. They spawn in cool, small-graveled rivers, after which the adults may return to the ocean. The young rear for at least 1 year in freshwater (usually two years), before migrating to the ocean as smolts, where they mature after another 1 to 3 years. If reproduction does occur presently, the loss of shaded riverine aquatic cover in some project reaches could cause water temperature increases which may adversely impact this species. Restoration of a low-flow channel and riparian vegetation in other reaches could have potential temperature and passage benefits.

IV. FUTURE WITHOUT THE PROJECT

The following description of existing conditions and impacts is based on evaluation of habitat conditions in 1993 and 1996 for the aquatic and terrestrial HEPs, and evaluation of impacts by comparison with project plans for the two alternatives. On a reach-specific basis, we estimated the following impacts: (1) slope-corrected acreage losses of riparian forest and scrub-shrub (Table 1), (2) losses, in area and lineal feet, of overstream vegetation, or "overhead shade"(Table 2), (3) losses, in lineal feet, of natural bank and undercut bank (Table 3), (4) changes in habitat value, expressed as Average Annualized Habitat Units (AAHUs), using HEP models for the project impact and mitigation areas (Table 5, *see* Appendix A for details), and (5) changes in lineal feet of contact of riparian cover with stream edge (Table 4). Habitat losses and riparian contact lengths were based on construction and mitigation plans provided in July 1996 superimposed over cover-type maps prepared from 1986 surveys, and provided by the local sponsor's consultant (Jones and Stokes Associates, Sacramento) in September 1996. Impacts to undercut lengths, and overstream shade cover lengths and areas were based on 1993 measurements by the HEP team, using the 1996 construction plans.

Past bank protection activities have ranged from placement of sacked concrete or gabions, to apparently haphazard dumping of broken concrete. Sections of the river that are not hardened show active bank erosion, undercutting, and channel incision, apparently caused by high peak flow velocities. As-needed maintenance would probably continue without the project, involving removal of fallen trees or branches protruding into the channel and short-term fixes such as placement of riprap in newly eroded areas.

Riparian quality would remain high in sections with adequate water (e.g. Reaches 6-9, 10a); those with insufficient water (Reach 10b) or periodic inundation (Reach 12) would support minimal or no vegetation. The riparian community would have moderate to high dominance by non-native species, such as black locust and black walnut, although some native species like willows and cottonwoods would establish in areas with perennial water. The width and continuity of the riparian corridor, overstream shade, and undercut banks, would remain approximately at its current state, as would use by fish and wildlife resources.

V. FUTURE WITH THE PROJECT

A. Bypass/widening Alternative

1. Riparian Habitat

Construction of the bypass/widening alternative would impact 17.27 acres (11.26 acres of riparian forest, and another 6.01 acres of riparian scrub-shrub) (Table 1). Habitat area would increase modestly with mitigation (23.72 acres, corrected for slope), however the distribution and quality of habitat would change both positively and negatively, depending on the reach. Significantly reduced wildlife use would occur during the 2 year construction period due to disturbance by earthmoving equipment and placement of project features. Establishment of shrub cover will be relatively rapid and vigorous during initial irrigation (3-5 years), and more variable and site dependent thereafter. Overall, the need to establish a significant portion of the mitigation on higher bench elevations away from the river will result in a greater proportion of xeric species like oak and sycamore, while floodway capacity concerns will result in more and shorter willow riparian species on lower benches. The portion of the mitigation area specified for cottonwood and mixed riparian tree species should, over a minimum period of 30 years, restore values equal to or greater than pre-project conditions.

Table 1. Riparian forest and scrub-shrub: existing conditions and summary of impacts of construction of the bypass/widening or widening alternatives of the Guadalupe River Flood Control Project (Federal portions only). Loss and mitigation acreages only are corrected for slope; existing conditions are from SCVWD (1997) and are not slope-corrected. Values are in acres.

Reach	Existing Riparian Forest	Rip. Forest Loss, alternative:		Existing Scrub-Shrub	Scrub-Shrub Loss for alternative:	
		Bypass	Widening		Bypass	Widening
7	4.43	1.02	2.31	1.29	0.52	1
8	1.66	0.26	0.033	0	0	0
9	8.97	3.65	0	0.48	0.45	0
10a	1.68	0.64	0.92	0.38	0.29	0.37
10b	1.26	0	0	2.6	0.83	0.83
10c	4.4	1.82	1.96	0.92	0.77	0.49
11a	3.94	2.4	0.58	2.49	1.97	2.1
11b-c	3.47	1.45	2.14	1.1	1.16	0.75
12	2.28	0.02	0	4.17	0.02	0
Total Project	32.09	11.26	7.96	13.43	6.01	5.54

Over time, the wider corridor would improve conditions in the bypassed stream Reaches 7-8, and next to percolation areas in Reach 12, providing a buffer to disturbance. HEP analysis showed that the project would require about 20.7 acres to compensate losses to all evaluation species in-kind. The relatively low mitigation ratio (1.4:1) is a consequence of relatively low values for existing scrub-shrub, the moderate existing forest age (about 30 years), and uniform assumptions regarding growth and cover development on mitigation sites (Table 5, Appendix A). If these assumed conditions are not achieved, mitigation would not be adequate to compensate for project impacts.

Although complete losses would not occur in any reach, permanently reduced corridor widths in some areas and a redistribution of quality habitat would take place. The most significant impacts of the project would occur in Reach 9 where the east bank habitat would be partially narrowed and hardened by floodway and bypass features. On-site mitigation in Reach 9, while providing some side shade, would probably result in more limited wildlife use for the full length to Curtner Avenue. East bank floodway construction would also reduce riparian corridor width in Reaches 10a and 11a, although the existing quality is not quite as high as in Reach 9. Floodway construction on the east bank of Reaches 11b-c and several hardening elements in this area would reduce values at the stream edge, and replace them with riparian plantings not less than 100 west of the bank.

At the upper end of the project, most of the mitigation for riparian losses is planned in Reach 10b, Reach 12, and to a lesser extent, the west bank of Reaches 11a and 11c. The success of Reach 10b plans will likely be dependent on the provision of water and uncertain groundwater depths; this area is downstream of the percolation area and receives virtually no accretions from urban runoff. If plantings establish successfully, habitat quality and wildlife use will increase greatly over existing conditions. If, over the long term, sufficient water is not provided and/or groundwater depths become too low for plant establishment, the mitigation will probably fail after irrigation has ceased. Water supply would probably be less of a concern to riparian vegetation in Reaches 11-12, although actual stream habitat may still be less permanent than the impact areas.

The type of vegetation in on-site mitigation in some impact areas would differ from that lost. Low-growing, dense willow species are specified for portions of Reaches 9 and 10a adjacent to the floodway, presumably to maximize floodway capacity. These species lack some of the habitat features provided by larger tall species like cottonwoods, such as snag production and deadwood, large woody debris, upper canopy nest sites and perches, large horizontal projection of overstream cover, and association of large shallow roots with bank undercuts. These near-floodway areas would also be subject to seasonally high velocities which would scour the ground humus layer.

The species which utilize the mitigation areas would be somewhat different than existing conditions. Mitigation areas at low elevation or on steep slopes near the water edge would be represented by species associated with water, hydrophytes and/or thick shrub layers: belted kingfisher, yellow warbler, northern oriole, black phoebe, and, near wetland mitigation areas, common yellowthroat and mallard. In the more open sycamore and oak riparian areas, one would expect other bird species such as white-breasted nuthatch, western kingbird, western bluebird, and eventually, acorn woodpecker. Amphibians would be more prevalent near the water edge than on riparian plantings higher on the bench or farther from the water.

2. Riverine Habitat

About 10% of the remaining, existing natural bank, would be hardened with a combination of gabions, cribwall, concrete, and boulder biotechnical treatments; total revetment (existing plus project associated) would approach 30% of the total stream length (Table 2). With the exception of the biotechnical treatment, woody vegetation would not regrow, and some areas near bypass entrances and exits would be maintained. About 15% of the natural undercuts would be lost, and the benches lowered and/or banks hardened such that these would probably not reform.

Table 2. Summary of impacts to undercut bank and natural bank (new revetment), due to construction of bypass or widening alternatives for the Upper Guadalupe River Flood Control Project (Federal portions only). All values are in feet.

reach	bank length	existing undercuts	undercut losses, feet		existing revetment	new revetment, feet	
			bypass	widening		bypass	widening
7	8578	4265	600	1900	1636	640	640
8	2968	850	40	0	774	290	0
9	9906	2090	350	0	2185	1325	0
10	14272	1300	110	520	7872	100	100
11	9280	185	0	115	0	1180	575
12	1800	0	0	0	0	0	0
Grand totals	46804	8690	1100	2535	12467	3535	1315

About a third of the overhead stream shade would be lost initially with construction of the bypass/widening alternative (0.86 acres, 4,775 lineal feet) (Table 3). Much of this loss is localized in floodway areas of Reaches 9, 10a, and 11b, and in bypass entrance/exit elements of Reaches 7-8. Until vegetation re-establishes, stream temperatures could increase in affected reaches during the spring-fall. Some temperature impacts would remain in areas with one-sided widening, such as Reach 10a, 11a, and 9. The higher bench cuts will avoid some streamedge trees in Reach 9, but not 10a. At mitigation sites, vegetative sideshade should begin to establish rapidly following plantings with rapidly growing willows. However, values associated with large trees like woody instream cover via exposed roots and overstream perches would increase more gradually over a period of 30-40 years, and be more limited in the near stream willow pallette. In the bypassed sections (Reaches 7,8), topographic shade created by channel incision and most vegetative shade would be preserved, and stream temperatures should be similar to existing conditions. More detailed model studies would be needed to better estimate thermal impacts for both alternatives.

Table 3. Summary of impacts of the bypass/widening and widening alternatives of the Upper Guadalupe Flood Control Project on overhead vegetative stream shade (Federal Portions only).

Reach	Existing Conditions		Bypass/widening Alternative			Widening Alternative		
	stream area	shade area	shade loss acres	shade loss feet	construction methods	shade loss acres	shade loss feet	construction methods
7	1.85	0.67	0.11	543	ramps, boulder biotech	0.33	1900	excavate east bank
8	0.67	0.21	0.03	154	bypass entrance	0	0	no work
9	1.84	0.91	0.35	1813	partial east/west bank widening bypass, bould biotech, ramps	0	0	no work
10a	0.58	0.19	0.10	669	same as widening	0.11	598	excavate east bank
10b	2.17	0	0	0	mitigation area	0	0	mitigation area
10c	1.39	0.16	0.07	535	excavate east bank	0.09	735	east/west widening
11a	1.46	0.20	0.05	293	excavate east bank , bypass	0.02	90	some east bank
11b	1.06	0.16	0.10	444	ramps, excavate west bank	0.10	465	east/west widening
11c	0.38	0.08	0.04	324	ramps, excavate west bank	0.04	246	excavate east bank
12	0.30	0.001	0	0	same as widening	0	0	no excavation
Totals:	12.69	2.58	0.86	4775		0.68	4034	

Increased temperatures may have an adverse impact on anadromous fishes (salmon and steelhead), known to spawn in the project area. However, establishment of a low-flow channel could result in better passage conditions which, if upstream barriers are removed in their entirety, would allow use of upstream tributaries. Water temperatures are perrenially cooler in these tributaries and may benefit some anadromous species like steelhead trout. Selection of spawning areas is also dependent upon flow and substrate; where inadequate flows exist, the fish may choose to remain in and downstream of the lower reaches of the project and there would be no passage benefit at these times.

The net impact of the project on stream shade can be roughly approximated using the contact length with riparian cover. For the alternative as a whole, stream edge contact should increase by about 4,000 feet (Table 4); significantly, all of this increase is attributable to the extensive natural and gabion bank plantings in Reach 10b.

The results of the aquatic HEP indicated that over half of the habitat value losses occurred in Reaches 9, 10a, and 11a, while the majority of the habitat value gains would be achieved through mitigation in Reach 10b (Table 5). Nevertheless, mitigation would not be adequate to compensate for losses, even under optimistic scenarios for shade development in Reach 10b; this is attributed in part to portions of the channel border in this reach being designated for freshwater marsh which does not provide overhead cover and other SRA attributes. Using conservative futures for Reach 10b, we estimate a deficit of about -13.7 AAHUs, requiring an equivalent compensation area of about 15.04 acres.

Though not indicated as revetted in cover maps, some steepsided portions of the impacted riparian area (e.g., east bank along Almaden Road, Reach 10a; west bank upstream of Malone Street, Reach 9) , as well as the channel invert at various work locations (e.g. downstream of Hillsdale, Reach 10c; Reaches 11a-b) have been partially covered with dumped concrete or other riprap. Presently affected terrestrial areas have somewhat less ground cover, possibly reducing wildlife use, while aquatic areas would experience less overhead shade and benthic productivity than would a natural bank or bottom. Presumably, much of this rubble will be removed during construction of the project, and mitigation areas could exceed baseline conditions in quality in some specific areas.

Table 4. Contact length of riparian forest with stream edge: existing conditions and summary of impacts of construction of the bypass/widening or widening alternatives of the Guadalupe River Flood Control Project (Federal portions only).

Reach	bank length	Existing	bypass impact	bypass mitigation	net change	widening impact	widening mitigation	net change
7	8578	4728	830	735	-95	2503	3768	1265
8	2968	2276	260	0	-260	0	0	0
9	9906	7682	2680	945	-1735	0	0	0
10a	2832	2106	130	110	-20	859	927	68
10b	6390	0	0	4363	4363	0	4363	4363
10c	5050	3948	110	785	675	1650	2312	662
11a	4850	2676	1180	2266	1086	387	1590	1203
11b-c	4430	2589	740	312	-428	1419	1720	301
12	1800	70	0	420	420	0	420	420
Total	46804	26075	5930	9936	4006	6818	15100	8282

Table 5. Summary of HEP analysis for the Upper Guadalupe River Flood Control Project (Federal Portions only). See Appendix A for details.

A. Terrestrial HEP: Compares the impacts and mitigation for five riparian species models; chooses the area needed for compensation as that which compensates impacts to all species (bold number). All Reaches are combined.

Alternative	Bypass/Widening (23.72 acres mitigation)			Widening (12.61 acres mitigation)		
Model	Net Change in AAHUs		compensation area needed (acres)	Net Change in AAHUs		compensation area needed (acres)
	Plan Alternative	Management Plan		Plan Alternative	Management Plan	
Northern Oriole	-5.73	14.61	9.31	-4.68	7.76	7.59
P-C Flycatcher	-8.69	15.04	13.70	-7.56	8.03	11.87
R-S Towhee	-10.43	15.04	16.44	-8.39	7.99	13.23
Yellow Warbler	-5.21	7.51	16.47	-3.58	3.99	11.30
D. Woodpecker	-8.69	9.96	**20.70**	-7.98	5.29	**19.00**

B. Aquatic HEP: Reach-specific comparison of impacts and mitigation using a single, cover-type SRA model; allows equal compensation between reaches. The recommended values (bold numbers) are based on a worst-case scenario (50% success in Reach 10b); parenthetical values of full success in Reach 10b are for informational purposes only. The candidate management area is equal to the stream area, and is 11.7 acres with either alternative.

Reach	Bypass/Widening			Widening		
Model: SRA Cover-type	Net Change in AAHUs		compensation area needed	Net Change in AAHUs		compensation area needed
	Plan Alternative	Management Plan		Plan Alternative	Management Plan	
7	-8.05	5.14	Conservative: assuming 50% success in Reach 10b **15.04** acres	-26.46	16.22	Conservative: assuming 50% success in Reach 10b **11.30** acres
8	-2.01	0		0	0	
9	-18.26	6.06		0	0	
10a	-9.22	7.65		-9.22	8.12	
10b	-2.51	7.76 (15.52)	Optimistic: assuming 100% success in Reach10b 13.11 acres	-2.51	7.76 (15.52)	Optimistic: assuming 100% success in Reach10b 10.14 acres
10c	-7.06	6.89		-9.28	10.38	
11a	-7.26	9.63		-4.36	7.22	
11b-c	-7.55	3.82		-8.61	7.46	
12	0	1.24		0	1.24	

B. Widening alternative

1. Riparian Habitat

Construction of the widening alternative would impact about 13.5 acres (7.96 acres of riparian forest and 5.54 acres of riparian scrub-shrub). About 12.61 acres of riparian forest would be replanted as mitigation. The distribution of impacts and mitigation are different from the bypass/widening

alternative. Low, 3-foot-high bench cuts for the widening alternative (Reaches 7, 10a, 10c, portions of 11a, and 11b-c) would necessitate vegetative removal to the stream edge. Except for Reach 10b, mitigation for the widening alternative would be of varying width largely on these same bench impact areas. The mitigation in Reach 10b, and associated effects would be the same as just described for the bypass/widening alternative. Reaches 7 and 11c would be greatly affected by east bank widening in areas of high baseline riparian habitat quality, which would reduce values for a considerable period following construction until mitigation vegetation grows back. Impacts would be nearly the same in Reach 10a despite a lower bench height. In Reach 10c, most of the high quality vegetation on the west bank between Kell Way and Foxworthy Avenue would be lost (with the exception of a ramp tentatively sited for the west bank downstream of Foxworthy Avenue, these areas would be replanted).

Due to the lower level of flood protection with the widening alternative, impacts are avoided in certain areas, and more vegetation allowed in others. In particular, Reaches 8 and 9 would not be impacted by this alternative, and the values and utilization by wildlife would remain high. Impacts would also be avoided on the entire east bank of Reach 11a, and infill planting allowed on the west bank. The short section from Hillsdale Avenue to the Capitol Expressway would have mitigation plantings on both sides, compared with only one side for the bypass/widening alternative.

Despite a third less impact area than the bypass/widening alternative, the HEP results indicate that nearly the same acreage (19 acres) of mitigation would be required to fully offset all impacts in-kind. This is due to slightly higher baseline Habitat Suitability Indices (HSIs) for the impact areas affected by the widening alternative for four models. The same qualitative differences between impact and mitigation vegetation would occur, and be greater or less depending on the planting pallette distribution. If the replanted benches allowed more large trees (cottonwoods, large willows, sycamores), vertical habitat and wildlife diversities would increase. On the other hand, if these benches were planted with short willow species, diversity would be lower. The Corps should provide a tentative distribution of planting pallettes for the mitigation area of the widening alternative.

2. Riverine Habitat

Impacts would be significant where one-sided widening is planned; of the 0.68 acres of lost overhead shade, nearly half of this is in Reach 7. The 3-foot bench cuts would remove vegetation to the stream edge, creating an open environment that would result in increased stream temperature. These increases could result in mortality of egg and juvenile stages of salmonids such as chinook and steelhead. The lower benches would reduce topographic shade permanently, although over time, vegetative shade would probably offset most of this impact. On one hand, the lower benches may limit the amount of undercuts which might be created in impacted banks; it is estimated that this alternative would result in twice the naturally undercut bank losses (2,535 feet) as the bypass/widening alternative, mostly due to widening Reach 7. On the other hand, the amount of hardscape is about 2,215 feet less for the widening alternative, owing to its fewer ramps and bank protection features. This would allow some additional component of instream cover through exposed roots and more dense shrub layers at the stream edge.

Stream edge contact after mitigation would increase by over 8,000 linear feet over baseline conditions, of which half is associated with Reach 10b, and the rest significant infill in Reaches 10c and 11a-c. This increased planting at the stream edge may eventually moderate adverse impacts of

increased water temperature, although both shade and other cover benefits would vary dependent on the revegetation species.

Compared to the bypass/widening alternative, habitat value impacts for the widening alternative would be much greater in Reach 7, nil in Reaches 8-9, and about the same in Reaches 10a-11c (Table 5). In addition to the same mitigation values in Reach 10b, additional habitat value is predicted to occur with the widening alternative in Reach 7. Overall, the mitigation area needed did not exceed the stream area, even when mitigation on Reach 10b was assumed to be 50% successful.

VI. DISCUSSION

A. Mitigation Policy

The recommendations herein for mitigation and the protection of fish and wildlife resources conform with 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, conserve, and enhance fish and wildlife resources. The policy helps ensure consistent and effective Service recommendations, while allowing agencies and developers to anticipate Service actions and plan early for mitigation needs.

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 habitat values involved. The Resource Category designation covers 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. Mitigation goals range from "no loss of existing habitat value" (Resource Category 1) to "minimize loss of habitat value" (Resource Category 4). The goal for Resource Category 2 is "no net loss of in-kind habitat value"; to achieve this goal, any unavoidable losses of habitat value would need to be replaced in-kind. As defined in the Mitigation Policy, "in-kind replacement" means providing or managing substitute resources to replace the habitat value of the resources lost, where such substitute resources are physically and biologically the same as, or closely approximate, those lost.

In applying the Mitigation Policy during a habitat impact assessment, each specific habitat or cover-type which may be impacted by the project is identified. Selection of evaluation species is then conducted based on several rationales, including: (a) species known to be sensitive to specific land and water use actions, (b) species that play a key role in nutrient cycling or energy flow, (c) species that utilize a common environmental resource, or (d) 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. Evaluation species used for Resource Category determinations may or may not be the same as those used in an application of the Service's HEP, if one is conducted. Finally, 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.

In addition to mitigation goals defined according to Resource Categories in the National Mitigation Policy, Region 1 of the Service has a further goal of "no net loss of wetlands *acreage* or habitat *values*, whichever is greater." The Service applies this goal for all proposed Federal and non-Federal

water development or flood control activities in California that may affect wetlands habitats. For the purposes of this project, all wetlands, both freshwater marsh and any riparian habitat (riparian forest, riparian scrub-shrub, SRA-cover) impacted would be subject to this goal of no net loss.

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

Exclusions to the Mitigation Policy are that it does not apply to: (a) threatened and endangered species, (b) projects permitted or licensed prior to Service authorities, or (c) Service recommendations related to enhancement of fish and wildlife resources. The Policy also allows some latitude in Service guidelines for meeting the goal of in-kind replacement of habitat value as prescribed by the Resource Category 2 determination. Specifically, *exceptions* to this goal may be recommended at the discretion of the Service, when either (a) different habitats and species available for replacement are determined to be of greater value than those lost, or (b) in-kind replacement is not physically or biologically attainable in the ecoregion. One example where this may be appropriate would be replacement of scrub-shrub with riparian forest. The scrub-shrub which is present in the project area is representative of recently disturbed areas that are transitional to riparian forest and overlap in species composition. Since riparian forest would result in greater habitat values (to both terrestrial and aquatic components), such a substitution would be acceptable to the Service.

B. Cover-types and Mitigation Goals

The project area has cover types: **riparian forest; riparian scrub-shrub; ruderal herbaceous; freshwater emergent marsh; Shaded Riverine Aquatic cover (SRA cover); Shaded Palustrine Aquatic cover (SPA cover), urban forest, and upland landscaping.**

Riparian Forest consists of woody vegetation predominated by trees greater than 5 meters tall and which is in close proximity to and under the hydrologic influence of an adjacent watercourse. It is present in the project area as a narrow band (40-100 feet wide) along the stream margin in most reaches. Typical species of this cover-type are cottonwood and various willow species on the lower banks, black walnut and box elder on the middle banks, and sycamores and live oak on the upper bank. Understory species include shrubs such as poison oak, young willows, elderberry, blackberry, and others. Riparian forests provide nesting, resting, and/or foraging values for diverse avian wildlife, including kingfishers, woodpeckers, orioles, warblers and other songbirds, as well as reptiles, amphibians and small mammals. Appropriate evaluation species would include birds such as the yellow warbler and northern oriole, which occur in such habitats and whose habitat preference reflects the proximity of trees to water. Within Santa Clara County and the project area in particular, this cover-type is present only along a very few rivers and creeks, of which the Guadalupe River is the major river and largest individual component. Although probably much more widespread historically, riparian forests have been severely reduced by initial agricultural activities followed by more recent and intensive urban development. By virtue of its regional scarcity, importance to wildlife, and non-consumptive human values (e.g., birdwatching) we have designated riparian forest as Resource Category 2 (i.e., no net loss of in-kind habitat value).

Riparian scrub-shrub cover consists of modest (at least 10%) to high density woody vegetation less than 5 meters tall, in areas which are in relative close proximity to and under the hydrologic

influence of a watercourse. This cover-type has been re-classified from the previous designation as "ruderal" scrub-shrub, as the areas so designated were largely within the incised channel, and had some features (seasonal influence of the stream channel) on growth. Such areas are distributed throughout the river corridor as patches and are typified by young trees (willows, cottonwoods, black walnut, black locust, boxelder), native shrubs like poison oak and blackberry, as well as coyote bush on the upper banks. These areas probably occur where there has been modest disturbance in the past, but infrequent maintenance such as clearing or herbiciding. Migratory songbirds were selected to represent the values of this cover-type, because of the importance of such habitat as a source of food, water, and cover for songbirds, and the abundant occurrence of songbirds where scrub-shrub is present. Because of the scarcity of scrub-shrub habitat in the project area, we have designated it as Resource Category 2 (i.e., no net loss of in-kind habitat value).

Ruderal herbaceous cover consists of areas with no or very low proportions of woody vegetation, and are predominated in the project area by non-native species like bermuda grass, horseweed, fennel, field mustard, wild oat, yellow star thistle, and others. These areas may or may not be under the influence of adjacent watercourses. The lack of woody vegetation in these areas probably reflects recent disturbance, frequent ongoing maintenance (e.g. herbicides), and/or reduced water availability. Such areas are used by small mammals and reptiles, and raptors which forage on them, although avian use is probably greatly reduced compared to riparian areas. Although natural habitats of any kind have been reduced by urbanization, ruderal herbaceous cover is more common, with moderately large contiguous tracts occurring near Reaches 10c and 12. Due to this greater abundance and lower value, we designate it as Resource Category 4 (i.e., minimize loss of habitat value).

Shaded Riverine Aquatic (SRA) cover is the unique, nearshore aquatic zone which occurs along the edge of flowing waters where the adjacent riverbank is composed of natural substrate, and supports riparian vegetation which overhangs or protrudes into the water. SRA cover has three primary habitat characteristics (Fris and Dehaven 1992): overhanging vegetation, in-water cover, and natural, often eroding banks associated with flowing waters. These attributes provide refuge from predators, moderation of water temperature stress, food, rearing areas and/or spawning substrates for a variety of fishes (including the proposed endangered steelhead trout), as well as perches, resting, and nesting areas for many bird species. Such areas are very important as a source of cover and forage for resident fish species like roach, hitch and sucker, juveniles of anadromous species such as chinook salmon and steelhead trout, and avian predators. Appropriate evaluation species could include juvenile salmonids, and waterbirds such as herons and kingfishers. Along the Guadalupe River and its tributaries, SRA cover has been adversely impacted by numerous bridge crossings, concrete, sacrete and gabion bank protection, rubble dumping into the stream channel, vegetation maintenance, and diversion of baseflows into upstream percolation ponds. By virtue of its support of a high diversity of aquatic and terrestrial species and its regional scarcity, SRA cover in the project area is designated Resource Category 2, with goals of no net loss of in-kind habitat value.

Shaded Palustrine Aquatic (SPA) is a nearshore aquatic zone which occurs along the interfaces of riparian areas with water bodies that are not streams or river channels, such as the proposed riparian mitigation plantings next to percolation ponds in Reach 12. Such areas retain some but not all of the attributes of SRA cover. Both in-water and over-water cover occur in SPA, however, lack of flowing water would limit features like undercuts and exposed roots, and the size of the percolation ponds would mute temperature moderation benefits of SRA cover. Such cover would nevetheless be used by evaluation species like warmwater fishes and kingfishers. SPA cover is appropriately placed in Resource Category 2 (i.e., no net loss of in-kind habitat value).

Freshwater Emergent Marsh occurs in less shaded, shallow portions of the stream channel or adjacent perrenially wet soils, and supports obligate wetland species like cattail, tule, and creeping water primrose as well as facultative species like curley dock and other herbs and sedges. These areas are used for cover and forage by water-affiliated birds like mallard, herons, egrets, and black phoebe, as well as toads, frogs, and garter snakes. Such areas are extremely important to these evaluation species, and this cover-type is not regionally abundant. Accordingly, it is placed in Resource Category 2 (i.e., no net loss of in-kind habitat value).

Urban Forest is typified by native and non-native trees planted in backyards of houses adjacent to the river corridor; the most significant areas which would be impacted are in Reaches 7-8 of the bypass/widening alternative for floodway construction. Though this habitat supports similar species as riparian forest, wildlife use and overall values are reduced owing to a variety of human influences: mowing, herbiciding, understory removal, pets, pollutants, and pavement. Widespread residential development and irrigation make this cover-type relatively common. Due to this greater abundance and lower value, we designate it as Resource Category 4 (i.e., minimize loss of habitat value).

Upland Landscaping consists almost entirely of non-native shrubs and small trees, both highly managed in form and arrangement as aesthetic features near residences and businesses. As with urban forest, some songbirds may use upland landscaping, particularly if adjacent to riparian areas, but the productivity of this habitat is low and the disturbance level high. It is appropriately placed in Resource Category 4 (i.e., minimize loss of habitat value).

C. Modifications for Conservation and Enhancement

In our 1993 report (USFWS 1993), the following potential modification approaches were discussed which could avoid impacts of the project, focussing primarily on the locally-preferred bypass/widening alternative: (1) substitute bypasses for widening of Reaches 9 and 10a, (2) restore a natural channel in concert with conversion of percolation from in-stream to an off-stream facility in Reach 12, (3) restore appropriate depths and widths of the low-flow channel in Reach 10b in particular as well as 11a downstream of Ross Creek, (4) raise bench heights in floodway areas, such as in portions of Reach 9, and throughout Reaches 10a and 10c, and in order to do so, steepening sideslopes on the landward side of floodways (such as with cribwall construction). The revised plans incorporate these approaches in modified fashion in some of the recommended areas, and have added other biotechnical elements for erosion protection in others. Several bypass concepts are described in part in the "minimize vegetation impacts", or MVI alternative, discussed in the draft EIR/EIS (SCVWD 1997). The MVI alternative bypass concept relies on residentially developed lands, mainly on the west bank. We have carefully reviewed these plans and recommend the following specific modifications to the bypass/widening alternative for conservation purposes:

1. *Design additional floodway capacity (widening, box culvert, bypass extention) to allow for more floodway vegetation (especially large trees) or avoid impacts entirely:* (a) increase the width of the floodway channel from Willow Glen Way to the Pine Island Bypass, using currently undeveloped San Jose Water Company property, and allow more vegetation on this widened bench; (b) construct a box culvert bypass around Reach 9 and 10a, under Almaden Road (or adjacent parking lots, e.g., upstream of Curtner Avenue) from STA 810 to an exit just north of Almaden Expressway Southbound; (c) increase the width of the floodway channel on the east bank between Hillsdale Avenue and the Capitol Expressway, onto a developed area now used as a parking lot, and reduce maintenance of the east bank to allow for more vegetation; (e) from Chard Avenue to Ross Creek,

increase floodway width on the west bank at the expense of one northbound lane of the Almaden Expressway; the increased capacity of which should be used to permit unlimited stream edge riparian on the east bank, currently designated as a maintained floodway. Consider replacing any unacceptable reduction in traffic capacity in conjunction with this modification, with an additional lane on median strip land; (f) immediately upstream of Ross Creek, acquire sufficient property to obtain floodway capacity on the west side, so as to allow revegetation on the west bank as far as possible up to Branham Lane. If modifications 4(e-f) are not possible, a secondary option would be to relocate some of the revegetation area from the edge of the floodway to the bank of the stream channel.

The cost of these options would vary, but would be higher than currently proposed project features due to the need to acquire lands and, possibly mitigate infrastructural features. A very coarse range of cost would be between $1,000,000-$5,000,000 per 1,000 feet of stream.

2. *Restore a low-flow channel in Reach 12 through relocation of percolation ponds off-stream:* Described under the MVI alternative in SCVWD (1997), this would involve discontinuing operation of the two in-stream percolation ponds between Branham Lane and Blossom Hill Road, excavating a low-flow channel from the first seasonal dam along the west side to future Chynoweth Avenue as well as a bench on the west bank upstream of Chynoweth, and revegetating both sides of this new channel, and both sides of the existing channel up to Blossom Hill Road. The pre-existing large channel would function as a bypass for floodflows, and the new channel would contain baseflows and have unlimited vegetation. The stream channel and riparia may receive some water through lateral groundwater movement from adjacent percolation ponds. Including the percolation ponds, the cost of this option to be around $15,000,000.

3. *Replace traditional existing or proposed riprap with biotechnical features, for example:* (a) downstream of the first boulder biotech site on the west bank (STA 760), (b) proposed stepped gabions on the west bank opposite the Pine Island Bypass (~STA 803-805), (c) ~STA 810, east bank, where Almaden Road is closest to the river, (c) proposed stepped gabions on the west bank opposite the Malone Bypass; (d) unvegetated area near the existing west bank ramp downstream of Willow Glen Way; (e) west bank revetment upstream of Willow Glen Way bridge; (f) west bank revetment downstream of the Almaden Expressway Southbound crossing, (g) bordering access ramps at many locations. The cost would probably on the order of the cost of the replaced method.

4. *Minimize Ramps and Roads:* (a) Eliminate the east bank access ramp upstream of Alma Avenue, which appears to be duplicated by the access ramp downstream of Alma Avenue; require maintainance vehicles to back down the remaining ramp to access area south of Alma, (b) reposition the east bank access ramp upstream of Willow Glen Way so that access is beneath the bridge (slated to be replaced), reducing impacts to high quality vegetation, (c) eliminate at least one of the three ramps all within 400 feet of Malone Road. The cost-savings associated with this modification would be site-specific and relatively low, on the order of $100,000 per element.

5. *Modify designated "boulder biotechnical" erosion repair sites to minimize hardening of channel banks and bottom:* in these sites (identified in alternatives section), the plan cross-sections suggest geoweb on the steepest slopes, but a continuous cover of 3.5 foot diameter boulders, presumably for grade control, on the channel bench to bank toe. The problem in this method is that it will limit shrub layer vegetation, while causing acceleration of water velocities over the repaired areas which may cause additional erosion downstream. Instead, we recommend using natural materials (live logs,

rootwads) with limited rock (not more than quarter ton) at the bank toe, and as partial cross-channel grade stabilizers (dimensions of 3-5 feet wide and deep) buried at grade and spaced one for every 6 inches drop in grade (about 130-150 feet apart). This should be sufficient to control erosion.

6. *Supplement lower-quality, non-native ruderal-scrub with native riparian plantings at sites not currently designated on the mitigation plan:* (a) east bank (STA 756-63); (b) west bank, just downstream of Alma; (c) west bank, downstream of Ross Creek (Reach 11b); (d) off-site, in Reach 6, low scrub on both banks just downstream of the SPRR crossing. The cost would vary with the size of the planting, and need for irrigation (range $5,000-$20,000 per acre).

D. Acceptability of Alternatives

1. Widening Alternative

The widening alternative evaluated in this report differs significantly from the previous version (USFWS 1993), which included widening of Reach 9 in both alternatives. Since the widening alternative provides a level of flood protection that would not be preferred by the local sponsor, its purpose in this analysis is only to provide a basis for determining the Federal cost share for mitigation of the proposed project. The widening alternative avoids impacts in Reaches 8-9, has less impacts overall on riparian areas and overstream shade, less revetment, and more mitigation as unlimited vegetation on the streambank than the bypass/widening alternative. Undercut bank losses are greater than the bypass/widening alternative. Some areas unimpacted by this alternative may be subject to bank failure and emergency repairs. The low benches would remove all vegetation to the bank edge, might limit undercut bank formation, and the planting regime (not specified) could involve smaller trees. A major concern with the widening alternative is the extensive temporal losses due to low bench cuts near the bank edge; a considerable period of time would pass before shade vegetation would establish, which might cause losses of the small runs of anadromous fish on the river. The values achieved by mitigation would vary with the type of trees allowed; this has not been specified for this alternative. Establishing a higher berm immediately adjacent to the river could possibly avoid this temporal loss of shade.

2. Bypass/widening Alternative

The bypass/widening alternative would provide some potential benefits due to better management. Rubble removal could increase shrub layer quality on land and benthic production in the stream channel. Areas with lower-quality scrub-shrub or non-native riparian trees would be replaced more desireable native species. Where permanent impacts occur, they are not of a complete nature so that complete fragmentation of the corridor is avoided. Aquatic and terrestrial habitat would be improved in Reach 10b, and the stream geometry there would allow for better fish passage.

Quantitative analyses indicated only partial acceptability of the bypass/widening plan based on consistency with mitigation planning objectives. First, we evaluated losses and mitigation quantities using a number of habitat parameters, including riparian and stream area, contact of bank with riparian area, undercut losses and shade losses. For the project as a whole, this mitigation does technically achieve the Regional objective of no net quantitative loss of habitat area. Also, using formal HEP procedures (Appendix A), it was determined that riparian mitigation proposed would be sufficient to replace riparian habitat values. The aquatic HEP indicated that mitigation would be slightly deficient. The alternative would balance losses of riparian contact with mitigation, avoid

most undercut features, and hopefully replace lost shade. However, the habitat value will be redistributed, with impacts in highest quality areas, and mitigation in lowest quality areas.

The mitigation proposed in Reach 10b is not contiguous with an area of similar quality to Reaches 6-8, and it is uncertain whether such mitigation will be successful there. During our field sampling in 1993, when the impacted Reach 9 exhibited moist soils and standing water, Reach 10b was extremely dry. The position of Reach 10b immediately downstream of the percolation area yet upstream of potential accretions from tributaries or urban runoff, and the possibility that groundwater may recede well below the surface, raise an important concern as to the persistence of riparian vegetation and support of aquatic resources in this area. Provision of water through irrigation would be sufficient to maintain terrestrial habitat only and is not generally done or desired in perpetuity; losses of surface water or soil moisture due to depth to groundwater will also affect aquatic habitat and wildlife. This area is intended to provide a significant portion of the riparian and SRA cover mitigation, as well as some freshwater wetland. Until the issue of water supply to Reach 10b is fully investigated and resolved, the overall project cannot be considered acceptable.

Qualitative differences between the impacted and mitigation vegetation are an important consideration, and in some cases raise further objections about project acceptability. First, the proposed designation of top-of-bench plantings as "riparian" and the prospective success on such terraces is uncertain. Over the long term, mitigation plantings will be subject to natural variation in groundwater levels that may recede below the roots of shrubs and some trees, causing death or inhibited growth. Such areas between floodways and the stream will also lack signficant surface runoff influence. These higher plantings are intended to be composed of more xeric species like oak and sycamore resistent to drought. This portion of the mitigation (30% of the total), while expected to provide sufficient habitat value, is different from the lost vegetation near the channel invert and slopes. Second, the willow riparian plantings on low benches (15% of the total) maximize floodway capacity but, as discussed earlier (*see* Future With the Project), does so at the expense of many habitat components unique to large trees with a shrub understory .

An important consideration in the acceptability of the project are cumulative impacts from other projects, past and anticipated (partially summarized in Table 5.3, Volume 1 and p. 2-19 of Engineer's Report *in* SCVWD 1997). These are very extensive throughout the Guadalupe River and its tributaries. We estimate at least a quarter of the banks within the project reaches has been permanently revetted with hardscape; the proposed project will increase this by another 5-6%. Past projects in the area include the Almaden Expressway in 1975 (Reach 11), gravel quarrying in Reach 12 followed by instream percolation pond installation, smaller sacreted areas, removal of large trees, and non-systematic placement of broken concrete and/or boulder riprap. Mitigation for these projects is either unknown or simply did not occur. Since such areas are proposed for mitigation for the current project (e.g. Reach 10b), we recommend the Corps thoroughly research all past permitted and Federal project activities to ensure that these have not been specified as mitigation for any other project.

Other projects include mitigation, but not necessarily in a linear corridor or on a natural bank. Major impacts downstream of the proposed project include the partially constructed Lower Guadalupe Flood Control Project (or "downtown" project) which, when completed, would affect about 4 miles of the lower river, including extensive hardbanking with limited vegetation in one section (Contract 3). Guadalupe River Park (also in downtown San Jose) has been completed, and includes significant gabion, albeit aesthetically compatible, bank protection features and riparian losses along both the

Guadalupe River and its major tributary, Los Gatos Creek. Also downtown, extensive impacts have been caused by construction of Route 87 and other related road interchanges near or crossing the river, and more could occur with freeway upgrades. Floodway maintenance to relatively low roughness design specifications further limits vegetation in several significant lengths of the river outside the project area, including leveed areas in the vicinity of the San Jose Airport north to Alviso (including Reach A), and much of Alamitos Creek.

The Guadalupe River presents a common planning problem in that various residential, commercial, or roadway developments encroach nearly to the top of channel slope. Even in reaches where the vegetation is not fully developed, there is deficient capacity to carry design floodflows in most areas. Some project reaches upstream of Reach 8 would be qualitatively altered by one-sided widening to or very near to the bank edge. In some portions, the use of cribwalls in conjunction with higher bench cuts allows some, narrow width, bank edge vegetation in widened areas constrained by right-of-ways. Elsewhere, one bank would remain open, causing both reduction in corridor width as well as increased disturbance to wildlife. Impact avoidance (and the mitigation vegetation) in these areas appears to be limited by a desire to maintain flood control features within existing right-of-ways, thereby minimizing project costs. Based on our evaluation of potential options (*see* Modifications, above), we do not believe that maximum avoidance has been achieved with this design. Major modifications which include culvert under existing roadways, or removal of roadways for open bypasses, need to be taken seriously. The final design must maximize avoidance and mitigation on site, and be supported by binding assurances of mitigation success .

VII. CONCLUSION AND RECOMMENDATIONS

The Service recognizes the riparian corridor of the upper Guadalupe River and its tributaries as a valuable regional resource, providing the only habitat in an otherwise large urban area for a diverse terrestrial wildlife and aquatic species assemblage, including small runs of anadromous fish. It is our agency's position that any proposed project for flood control in the basin be done in a manner which would allow an enhanced riparian corridor with maximum potential habitat quality and minimum necessary human intervention following construction. Such a design should allow for natural bank and stream bottom with unlimited mature riparian vegetation growth (both height and understory) on both sides of the river, and a widened riparian corridor, with the major floodway capacity separate from the river channel on either a widened bench or bypass. Although portions of the project approach these objectives through the use of bypass floodways, we have significant remaining concerns about the design, impacts, and mitigation in other areas, and about the cumulative impact of this project in combination with other projects and developments within or near the corridor.

The Service recommends that the Corps of Engineers:

1. Modify the design of the project to meet the goal of continuous, bank edge vegetation on both sides of the channel, with a riparian width of no less than 50 feet wide beginning at the top of the low-flow channel bank. The recommended approaches and locations are described in full detail in the Modifications section, and include (in order of decreasing significance) :

    (a) Design additional floodway capacity (widening, box culvert, bypass extention) to allow for more floodway vegetation, especially large tree species, or avoid impacts entirely in Reaches 9, 10a, and 11a-b;

(b) Restore a low-flow channel in Reach 12 through relocation of percolation ponds off-stream to allow additional riparian corridor and stream values;

(c) Replace existing or proposed hardbank protection with biotechnical features that maximize vegetation;

(d) Eliminate some proposed ramps and roads to minimize hardbanking;

(e) Reduce channel and bank hardening in "boulder biotechnical" erosion repair sites;

(f) Supplement lower-quality, non-native ruderal-scrub with native riparian plantings at sites not currently designated on the mitigation plan;

2. Provide or fund studies to fulfill data needs necessary to assess impacts and mitigation, as follows:

(a) prepare a reach-specific summary of anticipated mitigation conditions for both alternatives, classified by plant composition (pallette distribution), elevation above the channel invert, distance from the channel edge, and other corridor parameters as described in recommendation 3c-d;

(b) for each alternative, conduct a updated reach-specific baseline survey of terrestrial cover-types in the impact areas, with slope-corrected areas, so as to allow comparison of the existing condition of the impact areas with the proposed mitigation pallettes, in terms of plant composition, elevation above the channel invert, distance from the channel edge (assuming a stream edge at the one-third bankful stage, and corridor parameters as described in recommendation 3c-d;. This will allow an objective evaluation of the ecological equivalence between the impacted sites and mitigation sites.

(c) concurrent with 2(b), make any necessary corrections to SRA and riparian areas due to differences in water levels assumed for the 1984 terrestrial and 1993 SRA studies.

(d) evaluate groundwater depths and responses in different water-year types, and soil types in proposed mitigation sites with particular attention to Reach 10b; such studies should be sufficient to evaluate the probable long-term success of vegetation on these sites with irrigation not to exceed 5 years;

(e) evaluate riparian impacts and mitigation, and thermal impacts on stream temperatures of this project in combination with the Lower Guadalupe Flood Control Project; clearly distinguish mitigation areas of the upper and lower projects.

3. Provide mitigation sufficient to compensate all habitat area and value losses in-kind; based on HEP and other quantitative analyses in this report, such mitigation would fulfill the following criteria:

(a) no less than full replacement of habitat value of all aquatic and terrestrial habitat, with the exception of scrub-shrub where it is replaced by riparian forest;

(b) no net loss of in-kind wetland acreage, where wetlands include freshwater marsh, riparian forest and scrub-shrub, and Shaded Riverine Aquatic cover (i.e., stream area);

(c) no net loss in linear feet of habitat corridor parameters (i.e., riparian contact with stream edge, total overhead cover, overhead cover by large trees, stream length with two-sided vegetation, stream length with one-sided vegetation);

(d) riparian mitigation located within 100 feet of the low-flow channel and at elevations sufficient to allow influence of the stream on vegetation and eliminate the need for long-term irrigation; in no case should elevation exceed 20 feet above the invert of the stream;

(e) no less than full replacement of large riparian tree sub-covertypes (i.e., with the cottonwood/willow and "mixed" planting pallettes) at the water edge and within 40 feet of the channel.

(f) under the assumptions that the proposed mitigation were to meet the above criteria, and that no significant changes in the HEP were to result from information requested in recommendation #2 or comments received, the minimum mitigation areas would be:

	Area needed to compensate for:	
Alternative	Terrestrial Impacts	Aquatic Impacts
Bypass/Widening	20.7 acres	15.04 acres
Widening	19.0 acres	11.30 acres

4. Develop a comprehensive mitigation and monitoring plan to ensure that habitat value objectives are achieved, through monitoring of key characteristics of the riparian and stream cover, soil moisture, streamflow, and water temperature, with agreement of the Service on parameters and monitoring protocols.

Performance criteria for SRA cover should also be incorporated into the plan, such as (a) persistence of surface water in the mitigation sites equivalent to the impact sites, (b) shade cover by vegetation and undercut banks compared to target levels, (c) mitigation of instream temperature impacts to pre-project levels. The Corps should clearly state hydrologic criteria such as soil moisture and depth of the groundwater table which will be maintained in perpetuity in all mitigation areas through naturally-occurring flows or, if necessary, upstream releases past streamgage 23b. The biological basis for such criteria should be clearly stated and be consistent with the needs for riparian growth as specified in the mitigation plan. The plan should include specific remedial actions and timetables in the event of mitigation failures, and such actions should be a legally binding responsibility of the local sponsor.

5. Research all past permitted and federally-sponsored project actions in the project reaches to ensure that proposed mitigation areas have not been previously designated as mitigation.

6. Complete appropriate Section 7 consultations and conferences, and implement any additional measures determined by the Service or NMFS staff to minimize and offset impacts to listed species.

References

Fris, M. B. and R. W. DeHaven. 1992. Shaded Riverine Aquatic Cover of the Sacramento River System: Classification as Resource Cateegory 1 under the FWS mitigation policy. Sacramento Field Office 20 pp.

Santa Clara Valley Water District (SCVWD). 1997. Draft Environmental Impact Report/Statement: Upper Guadalupe River Flood Control Project. ~1,500 pp (3 volumes).

Skinner, J. E. 1962. An historical review of the fish and wildlife resources of the San Francisco Bay Area. Water Projects Branch Report No. 1. Department of Fish and Game. 225 pp+maps.

United States Fish and Wildlife Service (USFWS). 1993. Draft Coordination Act Report: Upper Guadalupe River Flood Control Project. Sacramento Field Office. 103 pp+Appendices.

Ulmer, L. 1988. Anadromous fish species utilization of Guadalupe River and Coyote and Penetencia Creeks, Santa Clara County (1986-87). Unpublished file report. California Department of Fish and Game, Region 3. Yountville. 9 pp + map.

APPENDIX A: Habitat Evaluation Procedures Report for the Guadalupe Flood Control Project, Upper Reaches

Introduction

Habitat Evaluation Procedures, or HEP, is an accounting methodology developed by the Fish and Wildlife Service (Service) for quantifying the value of habitat to selected wildlife species or communities associated with that habitat. It is based on the assumption that habitat area can be weighted by a model index value between 0.0 and 1.0 called a Habitat Suitability Index (HSI), that provides a measure of suitability for the particular species or community assemblage of concern. The models convert measured or estimated habitat variables (usually denoted V1, V2...etc.) that are important to life requisites of these evaluation species to Suitability Indices (SIs), and combines these SIs using specified equations to obtain the HSI. This is done for several points of time (referred to as Target Years, or TYs) over the life of the project; each set of HSIs for a given condition is referred to as the "futures". For these futures, the HSI is then multiplied by the habitat area to obtain habitat units, and the average of these over the life of the project (Average Annualized Habitat Units, or AAHUs) used as a basis for determination of differences due to project construction (called Plan Alternatives, or "PAs") and/or mitigation plans (called "MPs"). The losses are expressed by the difference between futures with project (without mitigation) and without project conditions for the impacted sites. Mitigation plan gains are expressed by the difference between futures with and without management for the mitigation site(s). Finally, the adequacy of the mitigation plan may be appraised by comparing the candidate management area to the area needed for full mitigation.

In order to accomplish such an analysis, HSIs must be evaluated over the life of the project both for with and without-project conditions. Baseline data serve as a good starting point for evaluating current conditions, however, changes in the future must be estimated. Ideally, this would be done through examination of previously-studied mitigation sites or a chronosequence of natural habitat of known age. Unfortunately, data on such areas is generally sparse and highly dependent on site-specific characteristics like water availability and soils. Thus, the typical approach involves a concensus-based setting of future HSIs based on best-professional-opinion by what is referred to as a "HEP-team". For most Federal projects such as this, the HEP-team minimally consists of at least one member of the Service, the lead Federal agency, and the local sponsor, but may include regulatory State agencies and consultants.

Background and Justification

Service participation in the Upper Guadalupe Flood Control Project as a Federal project began in late 1992. A previous terrestrial HEP was done in 1987-1988 without Service participation and submitted to us to review in preparation of a preliminary draft Coordination Act Report. In the late 1980s, there was increasing evidence that the Guadalupe River supported anadromous fishes and, consistent with just-completed HEPs for a separate flood control project on the lower reaches, the Corps funded additional HEP work for the Service to evaluate SRA cover for upper reaches. Baseline studies of SRA cover and evaluation of preliminary plans were completed and published in 1993. In our 1993 report and subsequent review of the original terrestrial HEP, we believed that the mitigation ratio recommended (0.8:1) was atypically low for moderate-value riparian systems, questioned the validity of the study, and provided general guidance that the mitigation ratio be at least 2:1.

The revised plans for both bypass/widening and widening alternatives supplied for analysis in June-July 1996 included significant differences in both impact and mitigation areas. The aquatic HEP data were sufficiently recent and available in Service files such that a revision of the impacts and futures could be done without remeasurement. However, the terrestrial HEP was not adequately documented

and over 9 years had passed since the measurements were made. Several cover variables were apparently mis-measured as closure and lacked consistency between models and the sample sites appeared to be not within the impact sites and, in any case, unavailable for Service review. The 1987 HEP did not evaluate scrub-shrub which, in the latest mitigation plans, would be replaced by riparian forest. Inclusion of scrub-shrub is consistent with the Sacramento Field Office's recent analysis for the Lower American River (USFWS 1996), and other projects throughout California. The 1987 HEP recommended, but did not implement, slope-corrections to the impact and mitigation areas. Lastly, in response to the Service's 1993 report, the Corps would not accept the Service-recommended mitigation ratio unless supported by quantitative assessment specific to the project area.

In view of these events, the Corps funded a revised terrestrial HEP to be conducted in November 1996. Members of the HEP-team included the Fish and Wildlife Service (Steve Schoenberg), California Department of Fish and Game (Margeret Roper, Keith Anderson), Corps of Engineers (Bill DeJager), and the Santa Clara Valley Water District (Terry Neudorf, Dennis Cheong, Rechelle Blank). Field work was performed cooperatively by representatives of the Service, Corps, and local sponsor. Per guidance from the Corps, the general assumptions of a 100-year project life and equivalent mitigation in Reaches 10b and 12 were applied to both terrestrial and aquatic HEPs.

TERRESTRIAL HEP:

Models

The models selected, with the exception of the belted kingfisher, are the same as those previously chosen and accepted by the local sponsor through their consultant, Habitat Restoration Group, in 1987. Except for the yellow warbler, the models were not modified from published versions. All models have been used throughout California by the Service's Sacramento Field Office and have been accepted by various State and Federal agencies. Three of the models (northern oriole, rufous-sided towhee, pacific coast flycatcher) were developed for specific use in California These models were discussed with the HEP-team on November 19, 1996, prior to the sampling.

Northern Oriole (USFWS 1986): this model is deemed appropriate by the Service for use in the project's riparian habitat, reflecting large trees and the overstory layer of the canopy. The model is sensitive to age structure of the riparian area and riparian width. The species is present throughout the project area as a permanent resident.

Pacific Coast Flycatcher (USFWS 1984a): this model is deemed appropriate by the Service for use in the project's riparian habitat, and includes variables which give value to moderate tree density and size. This species is found in deciduous or coniferous forests and woodlands, especially near water, and prefers well shaded areas; it is thus an appropriate choice for the project area. In an 1986 survey of the project area (unpublished MS thesis, Syndie Meyer), this species was considered a common, permanent resident, and was observed in spring, summer, and fall.

Rufous-sided Towhee (USFWS 1984b): this model is deemed appropriate by the Service for use in the project area. The model emphasizes ground and shrub quality variables that represent this species' use of the lower canopy. This species utilizes a variety of environments, including forest edge and riparian thickets such as found in the project area, and has been documented as a rare, but permanent resident in the project area (brown towhee is the more common species).

Downy Woodpecker (Schroeder 1982b): this species is associated with riparian soft-woods like willow and cottonwood in lowland stream bottoms; this habitat is present in the project area, and this bird is a common, permanent resident in all of the project area subreaches. The Service developed and validated this model for general use throughout this species' range. The model emphasizes values of older, moderate density riparian and forest systems.

Yellow Warbler (Schroeder 1982a): the preferred habitat of this species is a deciduous, riparian assemblage of willows, cottonwoods, sycamores, and alders. It is a common, summer resident species within the project area. The Service developed and validated this model for use throughout this species' range; the model includes shrub variables representing the middle canopy, and the preference of this species for hydrophytic shrubs. Slight modification of the model to include tall trees is consistent with forage beats ranging up to 40 feet above the ground, the presence of such trees in the project area, and the impact of the project on tall trees with a shrub understory..

Baseline Methods

Field sampling of the riparian forest cover-type was conducted on November 24-26, 1996 by Steve Schoenberg (Service), Bill DeJager (Corps) and Nina Kogut (SCVWD). Prior to field work, impact maps for the bypass/widening and widening alternatives were examined, and tentative sample sites identified to correspond with the impact areas; larger and/or more sites were established for larger (or longer) impact sites, which varied considerably in vegetative density and quality. In general, plots randomly chosen within an impact site, and were about 100-200 feet long and of varying width (0.1-0.2 acre). Cover measurements for tree and shrub categories were made using the line intercept measurement where possible, otherwise, in very steep terrain, visual estimates were made in subplots. All trees were surveyed for height and diameter. Basal area was determined using the Bitterlich method (Hays et al. 1981) with a "cruz-all". Representative riparian scrub-shrub areas identified in the mitigation and impact areas were photographed, and parameters for the two models (yellow warbler and rufous-sided towhee) which were not strictly dependent on tree presence, estimated from the photographs and May 1996 blue-line aerial photography supplied by the Corps.

HSIs were then calculated for plot-specific data, with the exception of snag density in the woodpecker model. Snags appeared to be non-randomly distributed, resulting in excessively high calculated HSIs in some impact areas, and nil HSIs in most others since the model involves selection of a minimum value of the suitability indices. Therefore, the snag value used was the impact-area weighted SI across all plots applied to each individual plot. To calculate an overall HSI for the baseline of the impact area, each plot was weighted by its representative impact area; plots with large areas received greater weights, and a different set of weights was determined for each alternative because the impact areas differed between alternatives. The alternative baseline HSI was then equal to the sum of the products of the plot-specific HSIs and weights. All baseline data, formulas, and calculations are provided in lines 1-367 (riparian forest) and lines 665-730 (riparian scrub-shrub) of the spreadsheet labeled "UGTERHEP.XLS" in Appendix B.

Impact areas that were used were the totals from September 18, 1996 preliminary draft maps and tables prepared for the bypass/widening alternative by Jones and Stokes Associates for an upcoming EIR/EIS, and communicated verbally by Bill DeJager (Corps) on December 16, 1996, for the widening alternative. These totals were then corrected for slope, as recommended in the 1987 HEP, using 1993 topographic maps. A good portion of the mitigation for both alternatives occurs on relatively level land, either bench plantings or top of slope plantings (e.g., Reaches 7 and 12). A

rough, Corps-provided estimate of the proportion of such level plantings was used to obtain a slope-correction for the mitigation areas (see lines 665-677 of the spreadsheet, Appendix B).

Future Assumptions

For purposes of this analysis, it is assumed that construction of each element of the project will take two years. Although the overall construction may be staggered considerably over time, each element of the project will have a life of 100 years, and a period of analysis is 103 years. We evaluated the project as if construction occurred concurrently in all project reaches. In addition, we assumed the measured, baseline conditions adequately represent the future without the project in both the impact and mitigation sites.

Weightings of futures for the mitigation sites were established based on an approximate distribution of the riparian mitigation area among five plant pallettes as follows (supplied by memo from Tim Messick, Jones and Stokes Associates, Sacramento; listed in order of most hydric to most xeric): 15% willow, 20% cottonwood/willow, 35% mixed species, 5% sycamore valley oak, and 25% oak. This distribution was used for both alternatives, despite the fact that the bench height distribution may be different, requiring different distributions for the two alternatives. Weighted mean baseline variable measurements (Appendix B, cells AI369-AJ385) were used as a reference condition indicative of a 30-year old stand of unmanaged riparian forest. Separate futures for each of the five palletes were drafted by the Service representative and distributed to the HEP team for review in early January 1997. Comments recieved at the January 10, 1997 meeting from HEP-team members, a February 4, 1997 meeting with a Corps consultant (Tim Messick, Jones and Stokes Associates, Sacramento), and additional comments received from the Corps on February 12, 1997, as well as internal Service review, were used to develop the revised values. Below are the specific assumptions used for the futures of each SI variable:

Northern Oriole Variable 1 (NO-V1)-mean tree height: The criterion in setting futures for this variable is the TY in which the height of the dominant canopy stratum reaches a minimum of 35 feet or otherwise setting a maximum value for pallettes which do not attain this minimum; the more xeric pallettes are assumed to take longer to reach this than the hydric pallettes:

	TY
Willow	43 (maximum of 25')
Cott/Will	53
Mixed	43
Syc/Oak	63
Oak	73

Northern Oriole Variable 2 (NO-V2)-percent deciduous crown cover: Cover values were assumed to increase linearly to a maximum at a given target year:

	TY	max cover(%)
Willow	33	90
Cott/Will	33	90
Mixed	43	90
Syc/Oak	73	80
Oak	103	70

Northern Oriole Variable 3 (NO-V3)-stand width category: All palletes were assumed to be in the category of more than one tree, and less than 300 feet wide at the widest point.

Pacific Coast Flycatcher Variable 1 (PCF-V1)-Tree density: Trees are considered to be at least 5 meters tall. The TY in which there are not trees, the target year in which this height is first attained, the initial planting density, and final density are assumed to vary with pallette (values in trees per acre):

	No trees	Max density at TY:	Final density at TY:
Willow	TY1-13	160 @ TY18	95 @ TY43
Cott/Will	TY1-8	160 @ TY13	95 @ TY43
Mixed	TY1-8	130 @ TY15	80 @ TY53
Syc/Oak	TY1-10	110 @ TY23	65 @ TY73
Oak	TY1-23	100 @ TY33	50 @ TY103

Pacific Coast Flycatcher Variable 2 (PCF-V2)-average diameter at breast height: Due to the SI curve for this variable, the criterion of interest is setting the year at which average tree diameter first exceeds the optimal value of 10 inches:

	TY
Willow	23
Cott/Will	23
Mixed	33
Syc/Oak	43
Oak	53

Rufous-sided Towhee Variable 1 (RST-V1)-% shrub cover: Shrubs are assumed to reach a maximum, then thin out as tree cover increases. Criteria were set for each pallette for the TY of maximum shrub cover, and the TY of final, minimum shrub cover:

	Max % at TY:	Final % at TY:
Willow	90 @ TY13	40 @ TY73
Cott/Will	90 @ TY13	40 @ TY73
Mixed	50 @ TY33	80 @ TY53
Syc/Oak	40 @ TY53	40 @ TY53
Oak	30 @ TY53	30 @ TY53

Rufous-sided Towhee Variable 2 (RST-V2)-shrub height: Due to the SI curve, it is only of interest to know the first TY at which shrub height (independent of density), first exceeds 3 feet. For all pallettes, this is assumed to occur not later than 3 years after planting (i.e., TY6).

Rufous-sided Towhee Variable 3 (RST-V3)-lateral screening class: This variable consists of the combined influence of shrubs and low hanging branches, thus, replacement of shrubs by trees is assumed not to alter the value. The criteria used was the average class (0=low, 0.5=medium, 1.0=high), assumed as if multiple plots were being sampled at the mitigation sites; the maximum value at target year are as follows:

	max at TY:	
Willow	0.8 @ TY23	(note: will and cott/will assumed to experience some loss of lateral screening due to floodflow scour of low benches)
Cott/Will	0.8 @ TY23	
Mixed	0.6 @ TY43	
Syc/Oak	0 throughout	
Oak	0 throughout	

Rufous-sided Towhee Variable 4 (RST-V4)-% tree cover: By assuming no evergreens in the mitigation pallette, this variable becomes equivalent to NO-V2, above.

Rufous-sided Towhee Variable 5 (RST-V5)-% ground cover: This was assumed to be a function of the pallette productivity (both trees and shrubs).

	max % at TY:	
Willow	60 @ TY33	(note: will and cott/will assumed to experience some loss of ground cover due to floodflow scour of low benches, the effect is assumed to be larger than on lateral screening.)
Cott/Will	85 @ TY33	
Mixed	80 @ TY43	
Syc/Oak	75 @ TY103	
Oak	70 @ TY103	

Rufous-sided Towhee Variable 6 (RST-V6)-humus layer thickness: This variable, expressed in inches, was assumed to covary with RST-V5 but was more sensitive to differences in productivity than RST-V5:

	max % at TY:	
Willow	0.5 @ TY33	(note: will and cott/will assumed to experience some loss of ground cover due to floodflow scour of low benches)
Cott/Will	1.7 @ TY33	
Mixed	1.5 @ TY43	
Syc/Oak	1 @ TY103	
Oak	1 @ TY103	

Yellow Warbler Variable 1 (YW-V1)-% deciduous shrub cover: This was set to be equivalent to RST-V1.

Yellow Warbler Variable 2 (YW-V2)-Average height deciduous shrubs: The criterion of interest is knowing the target year in which this attains 2 meters (as opposed to 3 feet for RST-V2):

	TY	
Willow	6	
Cott/Will	6	
Mixed	8	
Syc/Oak	8	(max of 1.5 meters)
Oak	10	(max of 1.5 meters)

Yellow Warbler Variable 3 (YW-V3)-% shrub canopy as hydrophytic shrubs: This is assumed to be a constant percentage throughout the project life. Some non-hydrophytic shrubs are assumed to invade designated willow areas.

	%
Willow	80
Cott/Will	25
Mixed	0
Syc/Oak	0
Oak	0

Yellow Warbler Variable 4 (YW-V4)-% canopy as tall trees (>30 feet): This is an introduced variable which was modified from the 1987 HEP to have a minimum value of 0.5 at 0%, maximum from 50-75%, and 0.75 at 100%. By setting a minimum value of 0.5, absence of such cover decreases the overall HSI by no more than 29%.

Downy Woodpecker Variable 1 (DW-V1)-Basal Area: It was assumed that overall tree basal area would, over time, significantly exceed baseline impact area values. Although the overall average was around 60 square feet per acre for the impact area, values ranged up to 186 square feet per acre in the best sites with minimal disturbance, adequate water, and least bank protection. The futures at TY33 were designed to approximately correspond to undisturbed field conditions, and then, over time, approach optimal values assuming sustained management and appropriate water supplies. Beyond 131 sq ft/ac, the SI was assumed to be constant at 0.5. The target years at which 131 sq ft/ac is first attained are:

	TY
Willow	43
Cott/Will	43
Mixed	73
Syc/Oak	73
Oak	103

Downy Woodpecker Variable 2 (DW-V2)-Snag Density: As with the calculations for the baseline, a single value was calculated from the snag densities of each pallette weighted by the proportion of the pallette in the mitigation area (defined above). The rationale for the futures of each pallette are as follows:

Willow: Assumed maximum of 2.5/acre, less than the baseline and less than cott/will because willow snags rot quickly and are less persistent than cottonwood. Snags are first produced at TY18 and achieve a maximum by TY33.

Cott/will: Assume fast growth and early thinning produces snags by TY13, these snags are more persistent thus the maximum density of 5/acre, and the maximum is achieved later (TY38).

Syc/oak: Fewer snags are produced by thinning owing to reduced planting density and more open cover; this occurs beginning much later (TY33) owing to drier site conditions and slower growth, and is maximized at a lower value (2.5/ac) by TY73.

Oak: Combined slow growth, very long-lived species, and minimal thinning is expected in this pallette resulting in snag production beginning later (TY33) and an even lower maximum value (2/ac) by TY103.

Input Data

Input data consisted of four PAs and four MPs:

PA1: Impact area for the bypass/widening alternative, without project conditions

PA2: Impact area for the widening alternative, without project conditions

PA3: Impact area, bypass/widening alternative, with project conditions without mitigation

PA4: Impactarea, widening alternative, with project conditions without mitigation

MP1: Mitigation area for the bypass/widening alternative, without project conditons

MP2: Mitigation area for the widening alternative, without project conditions

MP3: Mitigation area for the bypass/widening alternative, with project conditons

MP4: Mitigation area for the widening alternative, with project conditions

For the baseline and without project PAs and MPs, both riparian and scrub-shrub components were considered together using a weighted HSI which takes into consideration the existing values of scrub shrub. This was not necessary for the with-project mitigation scenarios (MP3 and MP4), as all mitigation was specified to be riparian forest. These calculations are shown in lines 721-730 of the spreadsheet (Appendix B).

Results

HEP runs were done for both in-kind and equal compensation methods (*see* "Form H" outputs, Appendix D). With in-kind compensation, full mitigation is achieved by setting the mitigation area equal to the maximum area among all evaluation species. In-kind compensation is more conservative, has been applied to other projects by the Sacramento Field Office, and ensures that in-kind values are replaced for all evaluation species. For the bypass/widening alternative, about 20.7 acres is needed to

offset impacts to 11.26 acres of riparian forest and 6.2 acres of riparian scrub-shrub. This can be traced primarily to the downy woodpecker model, which gives greatest value to moderately mature riparian forest. With equal compensation, values may be "traded off" between species; for example, surplus scrub-shrub values are considered equivalent to mature forest values. For the bypass/widening alternative, equal compensation would require about 14.8 acres to offset impacts.

The widening alternative impacts less habitat due to the less extensive construction and siting of mitigation areas mainly within impact areas. However, nearly the same acreage, 19 acres, would be required to offset impacts in-kind. This is due primarily to a modestly higher baseline HSI for four of the five models when applied to the area impacted by the widening alternative versus the bypass/widening alternative (cells M722-N726 of the spreadsheet, Appendix B). Equal compensation would require about 12.3 acres for this alternative.

Discussion

The revised terrestrial HEP addresses several concerns about the original study by evaluating only impact areas specific to the alternatives, including scrub-shrub, slope-correcting impact and mitigation areas, and utilizing standardized cover measures. As with any predictive model, the accuracy of the results is directly related to the assumptions. We applied what we believed are realistic future values for development of a managed riparian mitigation area. However, in order to ensure that these values are attained, we recommend that key tree and shrub cover and growth characteristics be included in a mitigation and monitoring plan, similar to the draft plan developed for the Lower Guadalupe Flood Control Project.

In addition, HEP does not consider important characteristics of the mitigation area geometry and position which could be important in replacing equivalent habitat diversity and corridor functions of the impact area. Much of the impacted habitat is on steep banks close to the river edge; areas which certainly are true "riparia" in that they are supported by shallow groundwater or surface runoff characteristic of the position near the stream channel. At least 30% of the mitigation (the oak and syc/oak pallettes), and possibly more of the overall mitigation area (i.e, the mixed riparian), is located on high benches or areas which are under more limited (if any) influence of the stream channel. Based on information presented at meetings for the Lower Guadalupe Flood Control Project, groundwater depths can increase or decrease significantly during successive years of drought or above-normal precipitation. After initial irrigation has ceased, as is typically done after 3-5 years for most mitigation areas, the mitigation area may be subject to failure due to dropping of groundwater. This is of concern in Reach 10b, owing to anecdotal observations of very dry conditions in the summer of 1993 during the SRA suvey, failed past attempts to mitigate in this area, and its position immediately downstream of the percolation area which would limit both baseflows and urban runoff accretions. The model results for the widening alternative could be significantly altered with a different set of revegetation pallettes than that assumed for the bypass/widening alternative.

The results of the HEP indicate that about 20 acres would be needed to replace all lost riparian values in-kind. This would approximate a 2:1 mitigation ratio (exclusive of scrub-shrub), consistent with our 1993 preliminary recommendation. If all riparian cover-types are considered, the mitigation ratio would be about 1.4-1.5:1, depending on the alternative. Such a mitigation ratio may be considered relatively low for a riparian corridor, but is consistent with the relatively long project life (100 years) and moderate age (about 30 years) for the impact areas.

Recommendations

1. Develop a comprehensive mitigation and monitoring plan to ensure that habitat value objectives are achieved, through monitoring of key vegetative cover and growth characteristics. The plan should include a hydrologic analysis of mitigation sites like Reach 10b, which currently lack surface waters. The Corps should clearly state hydrologic criteria such as soil moisture and depth of the groundwater table which will be maintained in perpetuity through natural flows or, if necessary, upstream releases past streamgage 23b. The biological basis for such criteria should be clearly stated and be consistent with the needs for riparian growth as specified in the mitigation plan. The plan should include specific remedial actions and timetables in the event of mitigation failures, and such actions should be a legally binding responsibility of the local sponsor.

2. Riparian subtypes, equivalent to the "pallettes" of the proposed revegetation plan, should be determined for the impact areas for both alternatives. This will allow an objective evaluation of the ecological equivalence between the impacted sites and mitigation sites. The Corps should further state any differences in mitigation pallette distribution between the bypass/widening and widening alternatives, given apparent differences in the location of mitigation sites for these alternatives.

AQUATIC HEP:

Model

Shaded Riverine Aquatic Cover (Fris and DeHaven 1993): This model was developed for use on the lower Sacramento River, but includes general features characteristic of many watercourses, especially those with vegetative shade and erosive bank cover features. These features were recognized as being particularly important to anadromous fishes, as well as to warmwater native fishes, mammals, and many bird species. Such features are considered key attributes which maintain the diverse resource assemblage on the Guadalupe River, including chinook salmon and steelhead trout. In the preliminary draft of this report, we modified the model to reflect losses of topographic shade in widened areas. Following comments by the Corps, and due to time limitations, we omitted the topographic shade component and applied the model unmodified from the published version.

One important consideration in use of this model to the subject project is that it may not be sensitive to seasonal absence of water. The Sacramento River has perrenial flows whose seasonal variation cause reduced stream width, thus, absence of water at the measurement point (five feet from bank) for water depth (variable V6) receives a minimum value of 0.5. For the Guadalupe River, absence of water at this same point may be construed as a dry streambed. Certain portions of the mitigation site (Reach 10b), have less persistent standing or flowing water than others. While this draft report does not explicitly consider this feature, several runs were done varying the HSI in Reach 10b to evaluate the potential importance of sustaining habitat quality, including perrenial water, in this area.

Baseline Methods

The HEP evaluated conditions for each subreach of stream in its entirety, rather than considering just the impact areas. This differs from the approach used in the terrestrial HEP, which considered just the impact areas. The reasoning in using a different method for the stream was because of the highly corpuscular nature of the construction (e.g., ramps), impacts which affect not only conditions at the

point of impact, but, because of the continuity of stream systems, affect average conditions of the surrounding habitat.

Overhead shade (variable V1) was determined by mapping the projected canopy over water onto blueline maps with the water edge; this was done in March 1993, and applying the reach average shade to the transect data on other variables (Appendix E). In August 1993, the stream was resurveyed for the remaining variables. Ninety-eight transects were distributed in 16 subreaches (of which 14 are in the Federally-funded portion), with a minimum of 4 transects per subreach and minimum distance of 150 feet between transects. Sampling was conducted by the (Steve Schoenberg), a CDFG (Margeret Roper), the local sponsor (Dennis Cheong, Terry Neudorf), and the local sponsor's consultant, Jones and Stokes Associates (Jeff Kozlowski). These data are provided in Appendix C (spreadsheet HEPDATA4.XLS). To estimate the "mean high-water flows" needed as input data, it was decided to use the observed water depth plus one-third the difference between the bankful stage (estimated from deposition/erosion features, equivalent to about the 1.5 year event) and the observed depth. The transect averages were then calculated and applied to the SI curves to obtain the mean SIs (lines 195-210 in the spreadsheet). With one exception (i.e, the downstream portion of Reach 10b), the widths used were the bankful area, as delineated on the 1993 maps; for a portion of Reach 10b the stream exhibited braiding which resulted in artificially high interaction variable scores due to herbaceous vegetation that we expected to be scoured by winter flows. Here, we evaluated the cover for the major low-flow channel only, rather than the full width.

In addition to transect data, continuous data on both banks were taken on the location and lengths of undercut banks throughout the project area. These data, as well as a summary of both undercut losses and natural bank hardening ratios used in the futures, below, are provided in Appendix F (spreadsheet UNDCUTB.XLS).

Future Assumptions

As with the terrestrial HEP, it is assumed that construction of each element of the project will take two years. Although the overall construction may be staggered considerably over time, each element of the project will have a life of 100 years, and a period of analysis is 103 years. We evaluated the project as if construction occurred concurrently in all project reaches. In addition, we assumed the measured, baseline conditions adequately represent the future without the project.

In the aquatic HEP, the impact and mitigation areas were assumed to be represented by a constant, the existing stream area, with the exception of Reach 10b. There, we used an average stream width of 30 feet, which resulted in slightly less area than the baseline area groundtruthed in spring of 1993.

For the aquatic HEP, separate baseline and futures were developed for fourteen subreaches, which differed in existing habitat quality, construction, and/or mitigation methods. Of the six model variables, V5 (substrate composition), and V6 (water depth) were assumed to be constants. Overhead cover (V1) was evaluated individually. The remaining variables, V2 (instream cover quantity), V3 (instream cover quality), and V4 (instream/overhead cover interaction) had futures which were scaled by a reach-specific instream feature correction factor (denoted as CF, below), that is based partially on the ratio of post-project:pre-project natural bank, and partially on any mitigation features (e.g., rock weirs) that would enhance these variables. Overhead shade losses were determined by superimposing the impact and vegetation maps; for a few reaches where 6-foot bench cuts were proposed (e.g., Reach 10a), the local sponsor and consultant reviewed individual trees and provided

estimates of any trees saved. After preparation of the June 1996 revised plans for the bypass/widening alternative, each of about 35 elements of the Federal portions were again re-examined, mapped onto the vegetation maps, and the losses retotalled (Appendix E, spreadsheet OVERHEAC.XLS). The following are assumptions used in calculation of the instream CFs:

Reach Specific Assumptions for Instream Feature Correction Factors:

Bypass/widening Alternative:

Reach 7 (741-753):
Minor shade loss occurs due to a westbank ramp, which is permanent as no mitigation is proposed at the bank edge. Ramp access affects about 10% of the bank (CF = 0.9). Since it is in the bypass reach, we assume reduced maintenance will be done and shade will exceed existing conditions (max =40%)

Reach 7 (753-763):
Some shade is lost due to a westbank ramp and biotechnical bank stabilization near STA 763 (included in entirety in this reach; CF = 0.8 at TY1,). Losses of natural bank are ~10%, but, due to biotechnical features, exceed baseline (CF = 1.0 at TY33). Shade assumed to increase as above.

Reach 7 (763-773):
Ramp downstream of Alma ~10% natural bank loss (CF = 0.9); shade unaffected at impact location.

Reach 7 (773-781):
Ramp upstream of Alma affects ~14% of natural bank (CF = 0.86 TY3-33). Shade losses are not recovered (no mitigation opportunity).

Reach 8:
Bypass entrance features affect 13% of the banklength, and woody vegetation is not allowed there (CF = 0.87 TY1-33).

Widening Alternative:

Reach 7 (741-753):
Larger shade loss occur due toextensive eastbank widening. However, mitigation will cause vegetation to exceed existing conditions. The same access impact is assumed, although not shown explicitly on the plans

Reach 7 (753-763):
Larger shade loss due to extensive eastbank widening (CF = 0.4 at TY3). Mitigation in ruderal scrub area on eastbank will produce same shade/instream features as bypass alternative (CF = 1.0 at TY33).

Reach 7 (763-773):
Same ramp, and eastbank widening leaves 45% of natural bank (CF = 0.45 at TY3); onsite mitigation returns CF to 0.9 at TY33.

Reach 7 (773-781):
Same ramp, plus half of the remaining river is affected by eastbank widening, which recovers due to mitigation (CF = 0.43 at TY3, 0.86 at TY33).

Reach 8:
No streamside work--same as baseline

Bypass/widening Alternative:

Reach 9:
Various gabions for erosion control and the bypass entrance affect 17% of the natural bank length (CF = 0.83). High bench (6 feet) minimizes shade losses, and up to 40% shade returns by TY33 (slightly less than original).

Reach 10a:
One-sided floodway cut reduces values without bank hardening (CF=0.5 at TY3, 1.0 at TY33. Shade returns to baseline.

Reach 10b:
Doubling of V2-V4 due to bankedge plantings and rock weir features. Very high shade (50%) for planted areas, slightly less for gabion plantings.

Reach 10c (888-906):
Floodway construction widening of eastbank reduces instream features by CF = 0.6, less than widening alternative due to lower value next to prune packing plant. TY33 CF returns to 0.96, less 4% hardening features.

Reach 10c (906-913):
Floodway construction and maintenance reduces instream features initially, but gets back to baseline due to one-sided mitigation. (CF=0.5 at TY3, 1.0 at TY33)

Reach 11a:
Excavation of 70% eastbank except for Chard bypass, the net result of impacts is a ~20% increase in riparian forest at expense of scrub-shrub (CF = 0.5 at TY3, 1.2 at TY33).

Reach 11b:
Rampwork, other hardscape results in loss of 30% riparian border, returning 81% of original due to 19% hardscape.

Widening Alternative:

Reach 9:
No Work--same as baseline

Reach 10a:
Same as bypass except slightly higher post-project shade due to bankedge mitigation.

Reach 10b:
Same as bypass.

Reach 10c (888-906):
Widening plan affects half of vegetation, and some of higher quality on westbank (CF=0.5) and assume return to CF=0.96 with similar ramp access as bypass (different location).

Reach 10c (906-913):
Both side widening reduce instream features more, but mitigation on both sides increases instream features beyond baseline (CF=0.1 at TY3, 1.2 at TY33)

Reach 11a:
Excavation less extensive than bypass, but net result of impacts and mitigation about the same (CF=0.7 at TY3, then since about ~20% increase shade, have CF=1.2 for instream features at TY33).

Reach 11b:
More extensive, ~70% impact on riparian border, returning 81% of original due to 19% hardscape.

Bypass/widening Alternative:

Reach 11c:
Westbank excavation, maintained as earthen floodway, results in a loss of about 30% of riparian bank contact, a portion of which is recovered (CF=0.7 at TY3, 0.8 at TY33).

Reach 12:
Restoration of 20% of length due to edge planting improves instream features.

Widening Alternative:

Reach 11c:
Entire east bank is impacted, but more extensive mitigation that achieves preconstruction values (CF=0.4 at TY3, 1.0 at TY33).

Reach 12:
Same as bypass

Results

Two runs were performed: (1) a *standard run* with no scaling between reaches (Reach 10b future HSI of 0.39) and (2) a *modified-10b run* with the future gains in Reach 10b reduced by 50% (i.e., an HSI of 0.345). This modified-10b run is intended to show reduced gains that could result due to the fact that Reach 10b has less seasonally persistent water than the impact reaches, and, as a result, could have lower realized use by aquatic species. For the standard run, the results (Appendix D) indicate that 30% of the loss of habitat value would occur in Reach 9, and another 27% would occur in Reaches 10a and 11a. Only a third of the losses are regained on-site in Reach 9, and the majority of the habitat value gains are achieved through mitigation in Reach 10b. If the future conditions for Reach 10b are met in their entirety, compensation would be adequate for the widening alternative, and slightly inadequate for the bypass/widening alternative, as shown by a compensation area 12% larger than the stream area.

The modified 10b run effectively reduces the management plan gains in that reach by one half. Under this scenario, the mitigation for the widening alternative would still be adequate, while the mitigation for the bypass/widening alternative would grossly undercompensate habitat losses. The difference in compensation needs is largely due to the fact that the widening plan does not affect Reach 9.

The modest HSIs for Reach 10b are, in part, a consequence of future assumptions which cannot consider additional mitigation in this area that may (or may not) be installed in concert with the proposed Lower Guadalupe Flood Control Project (Contract 3), designation of portions of the bank for wetland revegetation which would not provide overhead cover, and hardscape which limits overhead cover in the downstream half of the reach..

Recommendations

1. Incorporate critical performance elements of SRA cover into the mitigation and monitoring plan, such as (a) persistence of surface water in the mitigation sites equivalent to the impact sites, (b) shade cover by vegetation and undercut banks compared to target levels, (c) mitigation of instream temperature impacts to pre-project levels.

2. Investigate additional mitigation opportunities, as outlined in the "modifications" section of this report.

3. Provide information on any overlap in or separate mitigation areas in Reach 10b which may occur due to construction of the Lower Guadalupe River Flood Control Project.

4. Use the modified Reach 10b HEP runs as a conservative scenario for assessing mitigation success and needs.

References

Hays, R.L., C. Summers and W. Seitz. 1981. Estimating Wildlife Habitat Variables. USFWS Biological Report FWS/OBS-81/47. 111 pp.

Schroeder, R.L. 1982a. Habitat Suitability Index Models: Yellow Warbler. USFWS Biological Report FWS/OBS-82/10.17. 7 pp.

Schroeder, R.L. 1982b. Habitat Suitability Index Models: Downy Woodpecker. USFWS Biological Report FWS/OBS-82/10.38. 10 pp.

U. S. Fish and Wildlife Service (USFWS). 1984a. Draft Habitat Suitability Model, Western Flycatcher (Empidonax difficilis). Sacramento Field Office. Unpublished mimeo report. 7 pp.

USFWS. 1984b. Draft Habitat Suitability Model, Rufous-Sided Towhee (Pipilio erythrophthalmus). Sacramento Field Office. Unpublished mimeo report. 8 pp.

USFWS. 1986. Draft Habitat Suitability Model, Northern Oriole (Icterus spurius) Breeding Habitat, Central Valley California. Sacramento Field Office. Unpublished mimeo. 3 pp.

USFWS. 1996. Final Fish and wildlife Coordination Act Report for the Sacramento Bank Protection Project Lower American River contract River Park Site (Site3). September 1996. Sacramento Field Office. ~100 pp.

APPENDIX B: Terrestrial HEP data, futures, and calculations

(Available upon request)

DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, CORPS OF ENGINEERS
333 MARKET ST.
SAN FRANCISCO, CALIFORNIA 94105-2197

December 12, 1997

Planning Branch

Mr. Wayne S. White, Field Supervisor
U.S. Fish and Wildlife Service
Division of Ecological Services, Sacramento Field Office
3310 El Camino Avenue
Sacramento, California 95821-6340

Dear Mr. White:

The San Francisco District Office of the U.S. Army Corps of Engineers is conducting a feasibility study of flood control alternatives for the upper Guadalupe River, California. Your office completed a Revised Draft Coordination Act Report (CAR) in April 1997 for this study. The attachment conveyed with this letter provides the Corps of Engineers comments on the Revised Draft CAR.

If you have any questions regarding these comments, please contact Mr. Bill DeJager of my office at (415) 977-8670.

Sincerely,

for Peter E. LaCivita
Chief, Environmental Planning Section

Attachment

Upper Guadalupe River Feasibility Study

CORPS COMMENTS ON REVISED DRAFT COORDINATION ACT REPORT

Page 1, Last paragraph:

Please change "privately" to "locally".

Page 5, First paragraph:

Construction in reach 6 would be locally-funded and should be included with the discussion of reach A. Mitigation plantings for the channel widening plan would total 12.10 acres without correcting for slope. Please review the mitigation areas depicted in the draft EIR/S to note the changes in reaches 9 and 12.

Page 6, reach 8:

Change wording to "bypass entrance". Reach 9: the Willow Glen Way bridge would be replaced under both alternatives.

Page 7, reach 10b:

Reconfiguration of the low-flow channel should be included.

Page 9:

The reference cited is the only evidence that Coho salmon occurred in the Guadalupe River, and it supplies no documentation. Mr. Ian Gilroy of the National Marine Fisheries Service (NMFS) has indicated in a recent telephone conversation that he does not believe that this species historically occurred here. He also indicated that recent anecdotal accounts of Coho salmon are believed to be misidentification of Chinook salmon. Refer also to San Francisco Estuary Project (1997). Also, update the discussion to include the identification of several juvenile trout, probably steelhead trout, found in reach A in September 1997.

We agree that discharges of cool water from urban basements may have a positive effect on salmonid habitat in the downtown area. However, we question whether air-conditioner or artesian discharges are significant factors. In particular, the aquifer being recharged elsewhere in the valley is confined beneath an impermeable layer in the downtown area.

We disagree with the statement that increased peak flows may be reducing the normal time requirement for stream rearing. Young anadromous fish are well equipped to maintain their position in a stream during flood events by utilizing edge areas where flows are slower. Also, while urban runoff has increased, upstream dams also act to reduce some peak flows, so the overall impact of hydrologic changes on fisheries is uncertain. In any event, there is no evidence,

should juvenile anadromous fish be swept downstream prematurely, that normal requirements for stream rearing could be effectively shortened.

Page 11:

Surveys for the red-legged frog have been completed, and no individuals were found. No impact on this species is expected. Information on steelhead trout reproduction should be updated.

Page 12:

Reach 10b does receive some urban runoff, as there is an outfall in the upper part of the reach. However, this does not seem to provide significant water in the summer. It is not clear that additional water is needed to assure mitigation success. This reach had riparian forest prior to channelization but after upstream percolation began. An analysis by Jones and Stokes indicates that there is adequate water to assure the success of riparian restoration. Also, a recent agreement between the Santa Clara Valley Water District (SCVWD) and the California Department of Fish and Game (CDFG) regarding in-stream flows at gauge 23b may provide a small amount of additional water in this reach. Discussions are under way among local agencies regarding the feasibility of using reclaimed water to enhance flows in various reaches of the Guadalupe River.

Regarding the types of vegetation planned in mitigation areas, most mitigation areas would eventually develop large trees and old-growth attributes such as snags, nest cavities, etc. Some of the existing habitat to be removed is composed of young bushy willows. The areas to be maintained as low, bushy willows will provide currently-existing habitat attributes that would eventually be lost elsewhere as mitigation plantings mature.

Page 15, Table 2:

We question the revetment figures for the channel widening plan. How did the Service derive these figures? They appear to be projections of the revetment figures for the bypass channel plan. No revetments are planned under this alternative; given the low bench heights under this plan, large ramps as in the bypass channel plan should not be needed.

Page17 (aquatic HEP):

The Corps and the SCVWD are concerned over the accuracy of the aquatic HEP. These figures are being re-examined by Jones and Stokes. Compensation for any confirmed minor shortfall of mitigation will be negotiated with the resource agencies during the detailed design phase of the study.

Page 18:

A full planting palette can not be provided at this time. If this alternative is selected for construction, this information would be developed during the detailed design phase. However, based upon the distribution of mitigation areas on low benches, 6.62 acres would be willow plantings. The remainder would be divided among palettes ranging from relatively wet to relatively dry.

Pages 22-24 (project modifications):

Modification 1: All these modifications would add to the cost of the project. The modifications having the greatest benefit would be very expensive, such as a bypass under Almaden Road. Removal of a lane from the Almaden Expressway would not be acceptable to the City of San Jose, as high-occupancy lanes are proposed to be added to this section of road.

Modification 2: This modification is not needed as mitigation for this project. This possibility is being considered as mitigation for SRA impacts associated with the downtown project; if this concept were to be implemented, this cost would be borne by the downtown project.

Modifications 3 and 5: These minor modifications will be considered during the detailed design phase.

Modification 4: This proposal has been referred to the SCVWD for comment.

Modification 6: Items a and c have already been included in the plan. Items b and d will be considered.

Pages 24-26 (acceptability of alternatives):

Widening alternative:

Should this alternative be selected for construction, the issue of bench height would be given consideration during detailed design.

Bypass/widening alternative:

Regarding aquatic mitigation, Jones and Stokes is currently examining the aquatic HEP to determine whether planned mitigation will be adequate. We disagree with the FWS regarding the likely success of mitigation in reach 10b, and we will continue to use the assumption, based upon work by Jones and Stokes, that mitigation in this reach will be fully successful as planned. In the event that any mitigation effort is not fully successful, remedial work would be appropriate.

The statement that "...the habitat value will be redistributed, with impacts in highest quality areas, and mitigation in lowest quality areas." is only partially true. Most high quality areas would not be directly impacted. Impacts would be distributed across the range of habitat values, ranging from poor to very good. Mitigation, by necessity, would have to be placed in locations with seriously deficient habitat values at present. The goal is to improve these habitat values.

Regarding the water supply issue in reach 10b, see answer regarding page 12, above.

Regarding the types of vegetation in impact areas and mitigation areas, both impact areas and mitigation areas would include a cross-section of riparian vegetation types ranging from fairly wet to fairly dry. This alternative has been devised to minimize impacts to lower-bank areas to the extent practical.

There have been no Corps projects constructed on the Guadalupe River prior to the downtown project. The only other possible Federal funding that may have affected the river is transportation funding. With the exception of the two new freeways (State Routes 85 and 87), all other roadway improvements appear to be either locally-funded, or (like the Almaden Expressway in reach 10b) to have occurred prior to the passage of Section 404 of the Clean Water Act, which would have been the basis for mitigation requirements for Federally-permitted actions.

While this alternative reduces impacts at considerable expense, due to cost constraints it does not minimize impacts.

Pages 26-28 (Service recommendations):

1. These concepts have been incorporated to the extent feasible. Additional features suggested here could be incorporated as mitigation for the SRA cover impacts of the downtown project, but no decision has been made yet.

2. a. During the detailed design phrase, the riparian forest palettes will be determined in terms of composition, location, and extent. The planned locations of the various palettes will be based in part upon criteria suggested here.
   b. Existing surveys have been updated incrementally to reflect current conditions. The information requested by the FWS is more detailed than is needed. The parameters mentioned will be considered in devising the detailed mitigation plan.
   c. The winter of 1992-93 was wetter than normal, so SRA cover surveys the following summer should not be disadvantaged. While 1984 was a relatively dry year, if the terrestrial surveys done at that time were done during slightly higher water conditions, the difference would only represent streambank areas lacking in trees and shrubs.
   d. This work has been done for reach 10b. Additional soil testing will be done at other mitigation sites.

e. Thermal modeling will be completed shortly for the upper Guadalupe project. The issue of how to best mitigate the impacts of the downtown project has not yet been resolved; this will require coordination between the two projects. We agree that it is important to clearly distinguish between mitigation areas for the two projects.
f. Jones and Stokes will be conducting thermal modeling for the upper Guadalupe River project shortly.

3. a. We believe that planned mitigation will adequately compensate for impacts. If further analysis indicates that minor modifications are required to improve aquatic mitigation, these modifications will be implemented if practical.
b. This criterion is met.
c. Meeting all these criteria exactly would be nearly impossible. Treating all these criteria as minimum standards would mean that some of them would be exceeded, leading to more mitigation than is required to meet overall mitigation needs.
d. Riparian forest mitigation has been located within 100 feet of the low-flow channel to the maximum extent practical. Some existing riparian forest vegetation is over 20 feet above the channel invert.
e. This will be considered during detailed design.
f. Proposed mitigation would meet the FWS recommendations for terrestrial mitigation acreage under the Bypass/Widening Alternative and aquatic mitigation acreage under the Widening Alternative.

The acreage figures suggested by the FWS for terrestrial mitigation are based upon in-kind compensation. Using equal compensation instead, both alternatives would fully mitigate terrestrial habitat impacts according to the HEP study.

The FWS-recommended figure of 19.0 acres for the Widening Alternative is based upon full in-kind compensation of habitat impacts for the downy woodpecker, according to the HEP. Riparian forest losses under this alternative would total about 8 acres according to the FWS. Riparian scrub-shrub is not good habitat for this species, so it is not relevant to mitigating impacts on this species. Since little riparian forest that would be affected by this alternative is more than 50 years old (with much of it is significantly younger), while the period of analysis is 100 years, it is very surprising that the compensation ratio for this species was determined to be about 2.4:1.

The Corps does not believe that such a high compensation ratio can be justified under these conditions, especially considering that the entire acreage of riparian forest acreage would have habitat values better than current values in the impact area during the entire second half of the evaluation period. A compensation ratio of 2:1 should more than mitigate impacts over this period. Therefore, we suggest that equal compensation is a more appropriate way to determine mitigation needs for this project.

Regarding the adequacy of aquatic mitigation, see comments above.

4. A comprehensive mitigation and monitoring plan will be developed during the detailed design phase.

5. We agree that this is appropriate.

6. Informal Section 7 consultation over the red-legged frog will be completed shortly; this species would not be affected by the project. Formal consultation with the NMFS regarding the steelhead trout is in progress.

Reference

San Francisco Estuary Project (1997) *State of the Estuary 1992-1997*, page 19.