APPENDIX B: Environmental and Regulatory Agreement Documents

B.1: Endangered Species Appendix

Appendix B.1: Common and Scientific Names of Species Appearing in the Text

Species	Scientific Name
Plants	
alder	*Alnus spp*
black walnut	*Juglans californica*
blackberry	*Rubus discolor*
box elder	*Acer negundo*
Butte County (Shippee) meadowfoam	*Limnanthes floccosa ssp californica*
cottonwood	*Populus spp*
elderberry	*Sambucus spp*
Hoover's spurge	*Chamaesyce hooveri*
oak	*Quercus spp*
poison oak	*Toxicodendron diversilobum*
smartweed	*Polygonum amphibium var. stipulaceum*
swamp timothy	*Crypsis schoenides*
sycamore	*Platanus spp*
wild grapes	*Vitus californica*
wild rose	*Rosa wodsii var. ultramontana*
willow	*Salix spp*
Animals	
American shad	*Alosa sapidissima*
Anna's hummingbird	*Calypte anna*
bald eagle	*Haliaetus leucocephalus*
bank swallow	*Riparia riparia*
belted kingfisher	*Ceryle alcyon*
black crappie	*Pomoxis nigromaculatus*
black phoebes	*Sayornis nigricans*
black-headed grosbeak	*Pheucticus melanocephalus*
black-tailed deer	*odocoileus hemionus columbianus*
blacktailed hare	*Lepus californicus*
bluegill	*Lepomis macrochirus*
brown bullhead	*Ameiurus nebulosas*
brown trout	*Salmo trutta*
brush and cottontail rabbits	*Sylvilagus spp*
California newt	*Taricha torosa*
California quail	*Callipepla californica*
California red-legged frog	*Rana aurora draytonii*
Central Valley fall/late fall-run chinook salmon	*Oncorhynchus tshawytscha*
Central Valley spring-run chinook salmon	*Oncorhynchus tshawytscha*
Central Valley steelhead	*Oncorhynchus mykiss*
channel catfish	*Ictalurus punctatus*
chinook salmon	O*ncorhynchus tshawytscha*
common gartersnake	*Thamnophis sirtalis*
Conservancy fairy shrimp	*Branchinecta conservatio*
coyote	*Canis latrans*
deer	*Odocoileus spp*
delta smelt	*Hypomesus transpacificus*
double crested cormorant	*Phalacrocorax auritus*

Species	Scientific Name
egrets	*Egretta spp*
giant garter snake	*Thamnophis gigas*
gray fox	*Urocyon spp*
great egret	*Ardea alba*
greater sandhill crane	*Grus canadensis tabida*
green sturgeon	*Acipenser medirostris*
green sunfish	*Lepomis cyandelus*
heron	*Ardea spp*
house finches	*Carpodacus mexicanus*
king snake	*Lampropetis spp*
largemouth bass	*Micropterus salmoides*
little willow flycatcher	*Empidonax trailii brewsteri*
mink	*Mustela vison*
mourning dove	*Zenaida macroura*
muskrat	*Ondatra zibethicus*
northern oriole	*Icterus gabula*
Nuttall's woodpecker	P*icoides nuttallii*
opossum	*Didelphis virginiana*
osprey	*Pandion haliaetus*
otter	*Lutra lutra*
Pacific lamprey	*Lampetra tridentata*
Pacific tree frog	*Hyla regila*
prickly sculpin	*Cottus asper*
quail	*Callipepla spp*
raccoon	*Procyon lotor,*
rainbow trout	*Oncorhynchus mykiss*
red tail hawk	*Buteo jamaicensis*
red-shouldered hawk	*Buteo lineatus*
ring-necked pheasant	*Phasianus colchicus*
river otters	*lontra canadensis*
rufus sided towhee	*Pipilo erythrphthalmus*
Sacramento perch	*Archoplites interruptus*
Sacramento pike minnow	*Ptychchelius grandis*
Sacramento splittail	*Pogonichthys macrolepidotus*
Sacramento sucker	*Catostomus ccidentalis*
scrub jays	*Aphelocoma coerulescens*
slender salamander	*Batrachoseps attenuatus*
smallmouth bass	*Micropterus dolomieul*
snowy egret	*Egretta thula*
steelhead trout	O*ncorhynchus mykiss*
striped bass	*Morone saxatilis*
striped skunk	*Mephitis mephitis*
Swainson's hawk	*buteo swainsonii*
threespine stickleback	*Gasterosteus aculeatus aculeatus*
Tule perch	*Hysterocarpus traski*
valley elderberry longhorn beetle	*Desmocerus californicus dimorphus*
vernal pool fairy shrimp	*Branchinecta lynchi*
vernal pool tadpole shrimp	*Lepidurus packardi*
western aquatic gartersnake	*Thamnophis couchii*
Western fence lizard	*Sceloporus occidentalis*
western gray squirrel	*Sciurus griseus*
western kingbird	*Tyrannus verticalis*
western toad	*Bufo boreas*
western yellow-billed cuckoo	*Coccyzus americanus occidentalis*

Species	Scientific Name
white catfish	*Ictalurus catus*
white crappie	*Pomoxis annularis*
white pelicans	*Pelecanus erythrorhynchos*
white sturgeon	*Acipenser transmontanus*
Wilson's warbler	*Wilsonia pusilla*
yellow bullhead	*Ameiurus natalis*
yellow warbler	*Dendroica petechia*

Federal Endangered and Threatened Species that may be affected by projects in Glenn County

Database Last Updated: October 21, 2003
Today's Date is: December 16, 2003

Listed Species

Invertebrates

Branchinecta conservatio - Conservancy fairy shrimp (E)

Branchinecta lynchi - vernal pool fairy shrimp (T)

Desmocerus californicus dimorphus - valley elderberry longhorn beetle (T)

Lepidurus packardi - vernal pool tadpole shrimp (E)

Fish

Hypomesus transpacificus - delta smelt (T)

Oncorhynchus kisutch - coho salmon, So OR/No CA (T) (NMFS)

Oncorhynchus mykiss - Central Valley steelhead (T) (NMFS)

Oncorhynchus tshawytscha - Central Valley spring-run chinook salmon (T) (NMFS)

Amphibians

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

Reptiles

Thamnophis gigas - giant garter snake (T)

Birds

Haliaeetus leucocephalus - bald eagle (T)

Strix occidentalis caurina - northern spotted owl (T)

Plants

Chamaesyce hooveri - Hoover's spurge (T)

Orcuttia pilosa - hairy Orcutt grass (E)

Tuctoria greenei - Greene's tuctoria (=Orcutt grass) (E)

Candidate Species

Fish

Acipenser medirostris - green sturgeon (C)

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

Birds

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

Species of Concern

Invertebrates

Anthicus antiochensis - Antioch Dunes anthicid beetle (SC)

Anthicus sacramento - Sacramento anthicid beetle (SC)

Hydroporus leechi - Leech's skyline diving beetle (SC)

Linderiella occidentalis - California linderiella fairy shrimp (SC)

Fish

Lampetra ayresi - river lamprey (SC)

Lampetra tridentata - Pacific lamprey (SC)

Pogonichthys macrolepidotus - Sacramento splittail (SC)

Spirinchus thaleichthys - longfin smelt (SC)

Amphibians

Ascaphus truei - tailed frog (SC)

Rana boylii - foothill yellow-legged frog (SC)

Spea hammondii - western spadefoot toad (SC)

Reptiles

Clemmys marmorata marmorata - northwestern pond turtle (SC)

Birds

Accipiter gentilis - northern goshawk (SC)

Agelaius tricolor - tricolored blackbird (SC)

Amphispiza belli belli - Bell's sage sparrow (SC)

Athene cunicularia hypugaea - western burrowing owl (SC)

Baeolophus inornatus - oak titmouse (SLC)

Botaurus lentiginosus - American bittern (SC)

Branta canadensis leucopareia - Aleutian Canada goose (D)

Buteo regalis - ferruginous hawk (SC)

Buteo Swainsoni - Swainson's hawk (CA)

Carduelis lawrencei - Lawrence's goldfinch (SC)

Elanus leucurus - white-tailed (=black shouldered) kite (SC)

Empidonax traillii brewsteri - little willow flycatcher (CA)

Falco peregrinus anatum - American peregrine falcon (D)

Grus canadensis tabida - greater sandhill crane (CA)

Lanius ludovicianus - loggerhead shrike (SC)

Melanerpes lewis - Lewis' woodpecker (SC)

Numenius americanus - long-billed curlew (SC)

Otus flammeolus - flammulated owl (SC)

Picoides nuttallii - Nuttall's woodpecker (SLC)

Plegadis chihi - white-faced ibis (SC)

Riparia riparia - bank swallow (CA)

Selasphorus rufus - rufous hummingbird (SC)

Toxostoma redivivum - California thrasher (SC)

Mammals

Corynorhinus (=Plecotus) townsendii pallescens - pale Townsend's big-eared bat (SC)

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

Dipodomys californicus eximius - Marysville Heermann's kangaroo rat (SC)

Euderma maculatum - spotted bat (SC)

Myotis ciliolabrum - small-footed myotis bat (SC)

Myotis evotis - long-eared myotis bat (SC)

Myotis thysanodes - fringed myotis bat (SC)

Myotis volans - long-legged myotis bat (SC)

Myotis yumanensis - Yuma myotis bat (SC)

Perognathus inornatus - San Joaquin pocket mouse (SC)

Plants

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

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

Atriplex cordulata - heartscale (SC)

Atriplex depressa - brittlescale (SC)

Atriplex joaquiniana - San Joaquin spearscale (=saltbush) (SC)

Atriplex persistens - vernal pool (=persistent-fruited, Sacramento) saltbush (=smallscale, saltscale) (SC)

Brodiaea coronaria ssp. rosea - Indian Valley brodiaea (CA)

Chamaesyce ocellata ssp. rattanii - Stony Creek spurge (SLC)

Epilobium nivium - Snow Mountain willowherb (SC)

Epilobium oreganum - Grants Pass willowherb (SC)

Eriastrum brandegeae - Brandegee's woolly-star (=eriastrum) (SC)

Eriogonum nervulosum - Snow Mountain buckwheat (SC)

Fritillaria pluriflora - adobe lily (SC)

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

Hesperolinon tehamense - Tehama dwarf-flax (SC)

Layia septentrionalis - Colusa layia (=Colusa tidytips) (SLC)

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

Sidalcea oregana ssp. hydrophila - water-loving checkermallow (=marsh checkerbloom) (SC)

Tropidocarpum capparideum - caper-fruited tropidocarpum (SC)

Species with Critical Habitat Proposed or Designated in this County

Central Valley fall/late fall-run chinook (C)

coho salmon, So OR/No CA (T)

northern spotted owl (T)

vernal pool invertebrates (X)

vernal pool plants (X)

winter-run chinook salmon (E)

Key:

(E) Endangered - Listed (in the Federal Register) as being in danger of extinction.

(T) Threatened - Listed as likely to become endangered within the foreseeable future.

(P) Proposed - Officially proposed (in the Federal Register) for listing as endangered or threatened.

(NMFS) Species under the Jurisdiction of the National Marine Fisheries Service. Consult with them directly about these species.

Critical Habitat - Area essential to the conservation of a species.

(PX) Proposed Critical Habitat - The species is already listed. Critical habitat is being proposed for it.

(C) Candidate - Candidate to become a proposed species.

(CA) Listed by the State of California but not by the Fish & Wildlife Service.

(D) Delisted - Species will be monitored for 5 years.

(SC) Species of Concern/(SLC) Species of Local Concern - Other species of concern to the Sacramento Fish & Wildlife Office.

Our database was developed primarily to assist Federal agencies that are consulting with us. Therefore, our lists include all of the sensitive species that have been found in a certain area *and also ones that may be affected by projects in the area.* For example, a fish may be on the list for a quad if it lives somewhere downstream from that quad. Birds are included even if they only migrate through an area. In other words, we include all of the species we want people to consider when they do something that affects the environment.

This is *not* an official list for formal consultation under the Endangered Species Act. *However, it may be used to update official lists.*

If you have a project that may affect endangered species, please contact the Endangered Species Division, Sacramento Fish and Wildlife Office, U.S. Fish and Wildlife Service.

TABLE B.1-1:
LISTED OR PROPOSED SPECIES POTENTIALLY PRESENT IN THE PROJECT AREA

Species	Status	California Distribution	Habitat Requirements	Occurrence in Project area
Federally-listed Species				
bald eagle	Fed-T CA-E	Nests primarily in Butte, Lassen Lake, Modoc, Siskiyou, Trinity, Shasta, and Plumas Counties; winters in Klamath Basin, Sacramento and San Joaquin Valleys, and along some foothill streams.	Coniferous forests within 1 mile of lakes, reservoirs, rivers, or creeks (nesting and roosting). Requires large, old-growth trees or snags in remote, mixed stands.	Found in area.
giant garter snake	Fed-T CA-T	Sacramento and San Joaquin Valleys from Butte County in the north to Kern County in the south. Extirpated from areas south of Fresno.	Permanent freshwater, especially sloughs, and marshes; requires dense and emergent vegetation for basking sites and small fish and amphibians for prey.	Not in project area.
CA red-legged frog	T	Occurs west of the Sierra-Cascade crest and along the Coast Ranges the entire length of the State, usually below 3,936 feet.	Quiet permanent and semi-permanent water in woods, forest clearings, meadows, and riparian areas. Shorelines with extensive emergent and submergent vegetation.	Not in project area.
critical habitat, winter-run chinook salmon	E	Sacramento River, tributaries, distributaries, and related riparian zones from Keswick Dam downstream to and including SF Bay.	Freshwater rivers and streams.	Found in project area.
winter-run chinook salmon	Fed-E CA-E	Sacramento River and tributaries; SF Bay/Delta estuary and open ocean.	Open ocean and cold (43°-56° F), clean, fast-flowing rivers with gravel bottoms.	Found in project area.
delta smelt	T	Delta estuary from Suisan Bay upstream to the Delta cross channel on the Sacramento River and south along the San Joaquin and Middle Rivers to the south end of Bacon Island.	Delta estuary and freshwater rivers and streams.	Not in project area.
Central Valley steelhead	T	Sacramento River and tributaries; SF Bay/Delta estuary and the open ocean.	Ocean and freshwater rivers and streams.	Found in project area.
Central Valley spring-run chinook salmon	T	Sacramento River and tributaries downstream to and including SF Bay to Golden Gate Bridge.	Ocean and freshwater rivers and streams.	Found in project area.
critical habitat, Central Valley spring-run chinook	T	Sacramento and San Joaquin Rivers and tributaries downstream to and including SF Bay to Golden Gate Bridge.	Ocean and freshwater rivers and streams.	Found in project area.
Sacramento splittail	T	Suisun Bay and the SF Bay-Delta and adjacent Sacramento River.	Requires flooded vegetation for spawning and rearing. Primarily a freshwater species, but can tolerate salinities as high as 10 to 18 parts per thousand (ppt).	Found in project area.

Species	Status	California Distribution	Habitat Requirements	Occurrence in Project area
Conservancy fairy shrimp	E	Found in certain areas of Tehama, Solano, Glenn, Merced, and northern Ventura Counties.	Associated with vernal pools that are large and have high turbidity.	Not in project area.
vernal pool tadpole shrimp	E	Central Valley from Tulare County to Shasta County, Merced and Alameda Counties, and Fremont.	Ephemeral freshwater habitats that contain clear to highly turbid water.	Not in project area.
vernal pool fairy shrimp	T	Shasta, Tulare, Solano, and San Benito Counties. Isolated populations in San Luis Obispo, northern Santa Barbara, and Riverside Counties.	Vernal pools with clear to tea-colored water, most commonly in grass or mud bottomed swales.	Not in project area.
valley elderberry longhorn beetle	T	Sacramento, American, San Joaquin, Kings, Kaweah, and Tule Rivers and their tributaries.	Elderberry scrubs (*Sambucus* spp.) in riparian areas.	Found in project area.
Butte County (Shippee) meadowfoam	E	Siskiyou, Trinity, Shasta, Butte, Lake, and Napa Counties.	Occurs mainly in wetlands in clay soil between 0 – 1000 feet.	Not in the project area.
hairy Orcutt grass	E	Tehama, Glenn, Butte, Stanislaus, Merced, and Madera Counties.	Occurs under vernally-flooded conditions in vernal-pool habitats.	Not in project area.
Greene's tuctoria	E	Shasta, Tehama, Butte, Stanislaus, and Merced Counties.	Vernal pools, valley and foothill grassland.	Not in project area.
Hoover's spurge	T	Tehama, Butte, Glenn, Stanislaus, and Tulare Counties.	Occurs in large, deep vernal pools among the rolling hills, remnant alluvial fans and depositional stream terraces at the base of the Sierra Nevada Foothills.	Not in project area.
State-listed Species				
Western yellow-billed cuckoo	CA-E	Cuckoos are closely associated with broadleaf riparian (i.e., streamside) forests.	Wide, dense riparian forests with a thick understory of willows for nesting sites; sites with a dominant cottonwood overstory are preferred for foraging; may avoid valley oak riparian habitats where scrub jays are abundant.	Found in project area.
bank swallow	CA-T	Banks of rivers, creeks, and lakes; seashores. Originally only nested in steep, sandy riverbanks, but have adapted to humans and now nest in the sides of man-made excavations.	Nests in bluffs or banks, usually adjacent to water, where the soil consists of sand or sandy loam to allow digging.	Found in project area.
Swainson's hawk	CA-T	Riparian habitats. Cottonwoods, oaks, sycamores, and large willow trees. A native grassland community provide foraging habitat.	Nests in oaks or cottonwoods in or near riparian habitats; forages in grasslands, irrigated pastures, and grain fields.	Found in project area.

Endangered Species Table

Valley Elderberry Longhorn Beetle Survey Report

Surveyor's Names and Affiliations: Becky Victorine, USACE
Kim Turner, USFWS

Date: 6/10/03

Site Name: Hamilton City – Dunning Slough

Location: Glenn County, Dunning Slough area, south of the wastewater treatment plant located at the southeastern boundary of Hamilton City.

Length of survey: Approximately 1 mile

Land Uses (includes 1/8 mile radius): Wastewater treatment facility, storage shed facilities (abandoned?), orchard, disturbed ground

Dominant Plant Species Present: Walnut (*Juglans spp*), blue elderberry (*Sambucus mexicana*), poison oak (*Toxicodendron diversilobum*), blackberry (*Rubus discolor*), blessed milk thistle (*Silybum marianum*)

Habitat Description: Very dense corridor of mature elderberry shrubs with numerous branches intermixed with blackberry, walnut, wild grape (*Vitus californica*), and poison oak. Due to the dense nature of vegetation at this site, some estimation was used by the U.S. Fish and Wildlife biologist in surveying this portion of the site. In the southern half of the survey, elderberry shrubs were in distinct clumps with a relatively open canopy.

Elderberry Shrub Count Summary: A total of 66 blue elderberry shrubs were found in this area. A total of 95 1-<3 inch diameter stems, 93 3-<5 inch diameter stems, and 71 5 inch or greater diameter stems were found. 16 shrubs showed the presence of VELB exit holes.

Total Shrubs	**1-<3" stems**	**3-<5" stems**	**5" or greater**	**Shrubs showing presence of VELB exit holes**
66	95	93	71	5

Valley Elderberry Longhorn Beetle Survey Report

Surveyor's Names and Affiliations: Becky Victorine, USACE

Date: 5/21/03

Site Name: Hamilton City – North

Location: Glenn County, slightly northwest of Hamilton City. Eastern bank of the Canal Road levee from just north of Wyo Avenue south to the Southern Pacific Rail Line.

Length of survey: Approximately 1 mile

Land Uses (includes 1/8 mile radius): Agricultural; a walnut orchard, an abandoned walnut orchard, and an ecosystem restoration site

Dominant Plant Species Present: Walnut (*Juglans spp*), blue elderberry (*Sambucus mexicana*), oaks (*Quercus spp*)

Habitat Description: Corridor of mature elderberry shrubs with large and numerous (especially in the upper canopy) branches, with a relatively open, grassy understory. Biologically sensitive area flagged in a section of this area.

Elderberry Shrub Count Summary: A total of 41 blue elderberry shrubs were found in this area. A total of 37 1-<3 inch diameter stems, 36 3-<5 inch diameter stems, and 53 5 inch or greater diameter stems were found. 16 shrubs showed the presence of VELB exit holes.

Total Shrubs	**1-<3" stems**	**3-<5" stems**	**5" or greater**	**Shrubs showing presence of VELB exit holes**
41	37	36	53	16

Hamilton City Elderberry Survey
5/21/03

The area along the eastern bank of the levee (Canal Road) from just north of Wyo Avenue to the Southern Pacific Rail Line was surveyed for habitat for the Valley Elderberry Longhorn Beetle (VELB) (*Desmocerus californicus dimorphus*). A total of 41 blue elderberry (*Sambucus mexicana*) shrubs were found in this area. A total of 37 1-<3 inch stems, 36 3-<5 inch stems, and 53 5 inch or greater stems were found. 16 shrubs showed the presence of VELB exit holes.

The area near the wastewater treatment facility was also surveyed. At this site, a total of 66 shrubs were found. A total of 95 1-<3 inch stems, 93 3-<5 inch stems, and 71 5 inch or greater stems were found. 5 shrubs showed the presence of VELB exit holes. Due to the dense nature of vegetation at this site, some estimation was used by the U.S. Fish and Wildlife biologist in surveying this site.

ELDERBERRY PLANTING AND MONITORING PLAN FOR THE VALLEY ELDERBERRY LONGHORN BEETLE

Hamilton City Flood Damage Reduction and Ecosystem Restoration

U.S. Army Corps of Engineers

March 2004

TABLE OF CONTENTS

1.0 INTRODUCTION

There is a desire by The Reclamation Board to work with Fish and Wildlife Service on a plan that would encourage elderberry plantings along the Sacramento River Corridor that would also allow incidental take of Valley Elderberry Beetle habitat during necessary maintenance of flood control facilities and during flood fights. There is potential with this project to demonstrate how such a plan can be successfully implemented.

The Reclamation Board as a partner in this study is willing to accommodate the plantings if the U.S. Fish and Wildlife service is willing to issue a take permit for the potential future flood fighting that may be required for the setback levee in the future.

Below is a list of generic maintenance and flood fighting requirements that may include vegetation removal, including the removal of elderberry bushes:

- Ability to access the entire length of levee for maintenance and flood fighting;
- Ability to access the entire length of the levee for large equipment to deliver and place flood fighting material, including rock;
- Ability to maintain hydraulic capacity by selective clearing of vegetation;
- Ability to remove vegetation from the levee and within 15 feet of levee toe;
- Ability to access to levee to clear bank and berm of vegetation in order to place rock riprap bank protection when erosion is encroaching into the projected levee slope.

Hamilton City is located in Glenn County, California, along the right bank of the Sacramento River, about 85 miles north of the City of Sacramento. The study area includes Hamilton City and the surrounding rural area. The study area is bounded by the Sacramento River to the East and the Glenn Colusa Canal to the west and extends about two miles north and six miles south of Hamilton City. Hamilton City has a population of about 2,000 people. Surrounding land use is primarily agricultural with fruit and nut orchards being the primary crops.

An existing private levee, constructed by landowners in about 1904 and known as the "J" levee, provides some flood protection to the town and surrounding area. The "J" levee, however, is not constructed to any formal engineering standards and is largely made of silty sand soil. It is extremely susceptible to erosion and flood fighting is necessary to prevent flooding when river levels rise. Since the construction of Shasta Dam in 1945, which significantly reduced the frequency of high flows in the Sacramento River, flooding in the Hamilton City area caused by the Sacramento River has occurred once (1974). In addition, extensive flood fighting has been necessary to avoid flooding in 1983, 1986, 1995, 1997, and 1998. Currently, the Sacramento River is actively eroding into the toe of the levee at the northern end of the study area. Glenn County has built a backup levee, about 1,000 feet in length, to protect the community in the event the toe erosion causes failure at the northern end of the "J" levee.

Native habitat and natural river function in the study area have been altered by construction of the "J" levee and conversion of the floodplain to agriculture and rural development. Construction of the "J" levee and hardening of the river bank and levee in several locations through the years (with rock or rubble) have constrained the ability of the river to erode and overflow its banks and promote propagation and succession of native vegetation. Conversion of the floodplain to agriculture and rural development has reduced the extent of native habitat to remnant patches along the river and in historic oxbows. These alterations to the ecosystem have greatly diminished the abundance, richness, and complexity of riparian, upland, and wetland habitat in the study area and the species dependent upon that habitat.

The objectives of the study are to reduce flood risk and flood damages and restore the riverine ecosystem along the right bank of the Sacramento River in and around Hamilton City.

Maximum area of potential affect for the study area is estimated to be 1,500 acres. Land ownership is currently held by a combination of private, State and Federal entities. Fee title and/or conservation and flood easements would likely be required to implement a selected project.

Given the extensive area of potential restoration, the Resource Agencies working in this area have expressed an interest in seeing native plant restoration to benefit threatened and endangered species including the potential planting of elderberry shrubs (*Sambucus* species) among the riparian and savannah habitat plantings which are planned for the area. Some elderberries do exist within the study area. The total elderberry shrubs located in the study area include for Hamilton City North;

Total Shrubs	**1-<3" stems**	**3-<5" stems**	**5" or greater**	**Shrubs showing presence of VELB exit holes**
41	37	36	53	16

And for Dunning Slough;

Total Shrubs	**1-<3" stems**	**3-<5" stems**	**5" or greater**	**Shrubs showing presence of VELB exit holes**
66	95	93	71	5

Survey summary sheets are attached (see attachment A). The elderberry shrubs in the study area can be avoided with the potential setback levee alignments currently being considered. The elderberry plantings that are proposed are not for mitigation purposes and are only being proposed for the restoration area for the benefit of threatened and endangered species. The potential plantings were formulated based on the following assumptions;

- Elderberry shrubs would be planted outside a 300 foot buffer as measured from the landside toe of the levee to the restoration area;
- Elderberry shrubs would be planted up to 5 every1,800 square feet where appropriate soils are found within the restoration area (maximum of 13,735 shrubs possible);
- Elderberry shrubs would be planted in riparian and savannah restoration areas;
- Elderberry shrubs would be planted in 10% of these restoration areas;
- Elderberry shrubs would be planted at an approximate ratio of 1/1,800 square feet.

Given the assumptions above the following table was developed for potential elderberry shrub plantings for the tentatively recommended alternative:

Alternative 6

Total	Acres			Increase in Habitat Acres	# Potential Elderberry Shrubs
	Without	With	Change		
Riparian	97.1	1,093.7	996.6	996.6	2392
Grassland	84.6	155.1	70.4	70.4	
Savannah	0.0	147.9	147.9	147.9	355
Scrub	0.0	261.2	261.2	261.2	
Orchard	1,476.2	0.0	-1,476.2	-	
Total	**1,657.9**	**1,657.9**	**0.0**	**1,476.2**	**2747**

Currently the Nature Conservancy owns most of the land that will be acquired for the setback levee and the restoration. The Corps will be involved in the restoration, planting, and establishment of the restoration for the first three years of establishment. After the three-year period the restoration responsibility along with a potential funding stream from TNC will be turned over to the non-federal sponsor. The monitoring guidelines in this document were prepared in accordance with the Service's 1999 *Conservation Guidelines for the Valley Elderberry Longhorn Beetle* and under the terms and conditions of the Service's 1999 *Programmatic Formal Consultation Permitting Projects with Relatively Small Effects on the Valley Elderberry Longhorn Beetle Within the Jurisdiction of the Sacramento Field Office, California*.

2.0 Establishment/Maintenance

An establishment and maintenance program will be a critical component of a successful revegetation program.

2.1 Regular Maintenance: The maintenance period for establishing the plants will be for 3 growing seasons after installation. Maintenance items will include: weed control, irrigating plants, planting upkeep, and some minor re-planting efforts. Monitoring and reporting of the project will be required for each year along with three yearly reports. Items to be included are:

2.1.1 Irrigation Program: The following schedule will form the basis of watering, to be adjusted to weather conditions during the establishment phase. It is important to note that irrigation schedules need to be adaptive to current weather conditions and that the following are meant as guidelines.

1. First Season: Start irrigation in April (or when soil moisture levels require irrigation), with twice weekly watering of 2 gallons per watering. Beginning in June (the hot season) increase volume to 3 gallons per watering. At beginning of September (the end of the hot season), reduce watering frequency to reflect lower water needs (e.g., 1 day per week with volume of 6 gallons per irrigation). End irrigation after October 31

2 Second Season: Start irrigation in mid April (when soil moisture levels require irrigation), with weekly watering of 10 gallons per watering. Beginning in June increase volume to 15 gallons per watering. At beginning of September, reduce watering frequency to every other week with volume of 30 gallons per irrigation. End irrigation after October 31.

3 Third Season: Start irrigation in mid April, with watering every other week of 30 gallons per watering. Beginning in June decrease frequency of watering to once every three weeks with a volume of 50 gallons per watering. At beginning of September, reduce watering frequency to once a month with volume of 100 gallons per irrigation. End irrigation after October 31.

Unusually hot, dry and windy weather may require additional irrigation. Maximum plant growth is achieved by limiting water stress on plants; however, deep infrequent watering should be the rule to supply adequate soil moisture in the desired deep root zone. Plant roots do not "seek" water; rather they grow and persist in areas that have adequate moisture, soil and oxygen.

2.1.2. Weed Control: During the establishment phase, a regular weed control program shall be implemented including the appropriate use of herbicides, mechanical, and hand weed control methods. The area immediately around each planting location will be kept free from weeds by herbicide application and by hand weeding.

Weeds in the aisles between the rows and in the rows between the plant locations will be controlled by mowing and by timed nonselective, pre-emergent and selective broadleaf herbicide applications in the first and second growing seasons. Timing is dependant on the growing conditions based on weather. Refer to section 5.5 for timing and and type of weed control measures needed for the various habitat types to be restored.

Alternate methods of weed control in conjunction with delayed planting will be evaluated during the PED phase for potential cost savings and improvement in habitat establishment.

Certain types of herbicides may be restricted in use due to proximity of sensitive crops such as cotton, grapes and pistachios. Also, endangered species restrictions for Valley

Elderberry longhorn beetle could limit herbicide use in certain areas. The following measures as appropriate will be used in areas where herbicide application limitations apply:

1. Use herbicides registered for use near sensitive crops. Application procedures and equipment are also subject to regulations, which must be followed.
2. Use mowing to control weeds. Additional mowing may be needed, up to once a month April through July.
3. Use Disking to control weeds. May be needed on regular basis April through July.
4. Delay seeding native grass seeds until the 3rd year of establishment, thereby allowing use of glyphosphate (Roundup) herbicide for weed control.
5. Utilize pre-emergent herbicides.

Pre- and post-seeding weed control is crucial. The timing of mowing and spraying are critical and usually occur in a very short time frame. For this reason it is desirable that the prime contractor apply the herbicide or perform the mowing rather than a subcontractor so that timing can be controlled. Since this relationship may fall outside of the control of the government, in order to motivate contractors, and provide for the additional weed control necessary if windows are missed, it is strongly recommended that the contract contain liquidated damages for missing herbicide application windows.

2.1.3. Replanting / Replacement: Mortality rates should be measured by planting area and by species. Replacement of plants will be required if mortality rates for any of the above are higher than 15 percent the first season, 25 percent the second season and 35 percent the third season. Replacement planting to original planting quantities will be required if the above mortality rates are exceeded. Species for replanting may be adjusted if mortality rates for individual species indicate they are not suited for certain areas. Past results indicate that an overall survival rate of 80% should be easily met for the entire Project area.

2.1.4. Monthly Maintenance Reports: Monthly records of maintenance activities and project conditions shall be kept. The monthly reports should include general weather and climate conditions, major events such as storms, fire, vandalism, herbivore browse, irrigation scheduling and quantity, weed growth and weed control activities and general description of plant performance. Monthly reports shall be submitted to the Corps on an ongoing monthly basis

2.1.4. Yearly Maintenance Reports: Compilation of monthly records of maintenance activities and project conditions will be required to be submitted to the Corps each December 1 in an annual, year-end report.

2.2. Monitoring: A simplified monitoring program shall be developed and implemented during the 3-year establishment period. All hand planted species in the irrigation rows should be monitored, as well as the grasslands to determine restoration establishment

success. The monitoring program shall be developed and carried out by experienced biologists, and at a minimum consist of the following:

- Mortality rates
- Photographs (Permanent color photograph stations)
- Plant counts (by species and area)
- Sampling Plots and Transects
- Measurement and growth
- Yearly reports

3. Success Criteria
The following success criteria will be targeted:

- Minimum 65% survival of woody plants per "tile" and per species.
- Control of exotic weed species. (Long-term establishment and regeneration of native plants not threatened by exotic weeds)
- Successful introduction of native grasses and herbaceous vegetation. This should be defined as self-sustaining patches of native grass and herbaceous perennials established over a minimum 15% of the site.

Success will be measured by annual plant survival counts during the 3 year plant establishment period.

4. Post Establishment Operations and Maintenance
At the end of the three year establishment period, the Project will be turned over to the State for operations and maintenance for the life of the project. Infrastructure related to the restoration such as gates, locks, fences and maintenance access roads will be maintained in operational condition. Removal of trash and other unnatural debris will be encouraged.

In terms of vegetation management, post establishment operations and maintenance for the restoration aspects of the Project generally consist of benign neglect. Successful restoration is defined as sustained self-sufficiency of the native vegetation, therefore mowing, clearing, weeding and herbicide application will not be allowed unless called for as an adaptive management action to improve project performance or for Public Health and safety.

Yearly reports will be submitted to the USACE Sacramento District Engineer, Environmental Resources Branch and Landscape Architecture Unit. These reports will contain the checklist from the annual spring inspection. The reports will also contain photographs from set photographic monitoring points. Additional monitoring, though useful and is encouraged, will be at the discretion of the State, local sponsor and stakeholders.

Grazing within strict limitations should be allowed to mimic natural herbivore browse. Generally 5-10 years after establishment, the site can be grazed intensely for short

periods of time up to 3 times per decade. Grazing can be managed to help control exotic weeds by carefully timing grazing.

The following uses may be permitted

hiking
bird watching
hunting
fishing
camping within limited designated camp grounds should also be allowed.
Access to the river for a boating (designated boat ramp)

The following uses shall not be permitted:

mountain biking
off road vehicle use

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO, CALIFORNIA 95814-2922

REPLY TO
ATTENTION OF

Environmental Resources Branch

APR 1 2004

Mr. Wayne White, Field Supervisor
U.S. Fish and Wildlife Service
2800 Cottage Way, Suite W2605
Sacramento, California 95825-1846

Dear Mr. White:

This letter is our biological assessment for the Hamilton City Flood Damage Reduction and Ecosystem Restoration Project in Hamilton City, California. As part of the Hamilton City project, the lead agencies have begun informal consultation in accordance with Section 7 of the Endangered Species Act. The lead agencies requested and received a list of endangered, threatened, and proposed species from the U.S. Fish and Wildlife Service. This list was dated April 11, 2001, and updated lists were received on October 21, 2003, and December 16, 2003 (Enclosure 1).

Special status species included on this list, but not found or not likely to be found in the study area, include Conservancy fairy shrimp, vernal pool fairy shrimp, vernal pool tadpole shrimp, delta smelt, California red-legged frog, giant garter snake, greater sandhill crane, little willow flycatcher, Butte County (Shippee) meadowfoam, and Hoover's spurge. Special status species potentially present in the study area include valley elderberry longhorn beetle, Central Valley fall/late fall-run chinook salmon, Central Valley spring-run chinook salmon, Central Valley steelhead, winter-run chinook salmon, bald eagle, bank swallow, Swainson's hawk, and western yellow-billed cuckoo.

Of these species, the bald eagle is a temporary visitor during the winter months. This species is not commonly found in the study area and would not even be potentially present during construction. Therefore, the bald eagle is not considered further in this biological assessment. The other three special status bird species that are potentially present in the study area are State listed only. We are currently consulting with NOAA Fisheries on the four anadromous fish species. The only species considered further in this biological assessment is the valley elderberry longhorn beetle. Information on habitat requirements, distribution, and possible occurrence of the beetle in the project area is included in Enclosure 2.

Hamilton City is located in Glenn County, California, along the right bank of the Sacramento River, about 85 miles north of the city of Sacramento. The study area includes Hamilton City and the surrounding rural area. The study area is bounded by the Sacramento River to the east and the Glenn Colusa Irrigation Canal to the west, and extends about 2 miles north and 6 miles south of Hamilton City. Hamilton City has a population of about 1,800 people Surrounding land use is primarily agricultural with fruit and nut orchards being the primary crops.

The proposed project (Combined Alternative 1) involves ecosystem restoration and flood damage reduction via a setback levee (Enclosure 3). The project features include constructing a setback levee approximately 6 miles long and set back from the river from 50 to 1,700 feet, restoring up to 1,500 acres of native vegetation between the setback levee and the river, and removing the existing levee and allowing the flood plain to flood without endangering the community of Hamilton City. Restored habitat types would include riparian, grassland, oak savannah, and scrub.

Existing elderberry shrubs provide potential habitat for the valley elderberry longhorn beetle. The beetle depends exclusively on the blue elderberry shrub for its habitat. Both the larvae and adults feed on the plant, and much of its 2-year life span is spent as larvae inside the stems of the plant. Elderberry shrubs are frequently found near the Sacramento River. The beetle occurs naturally in small populations. The beetle was recognized as a Federally threatened species because of loss and alteration of its habitat by agricultural expansion into riparian areas and flood control activities. Some elderberry shrubs do exist within the study area The elderberry shrubs in the study area are shown in Table 1.

Table 1. Elderberry Shrubs in the Study Area

Location	Total shrubs	1-<3" stems	3-<5" stems	5" or greater stems	Shrubs showing presence of beetle exit holes
Hamilton City North	41	37	36	53	16
Dunning Slough	66	95	93	71	5

The project could potentially have temporary effects on the valley elderberry longhorn beetle during construction. However, these potential effects would be avoided. The existing levee would be removed and the new levee constructed in a manner that would avoid effects to elderberry shrubs. During construction, vegetation (trees and shrubs) would be fenced and flagged for avoidance. No shrubs would be removed as a part of this project. With the measures taken to avoid effects to the beetle, potential adverse effects during construction would not be significant.

New areas of riparian woodland and savannah would be created within the restoration area. Within 10 percent of each of these habitat types, elderberry shrubs would be planted every 1,800 square feet. For this project, a total of 3,357 elderberry bushes would be planted. Therefore, the long-term effects on the beetle would be beneficial. Since the project would avoid short-term construction effects and long-term effects to the valley elderberry longhorn beetle would be beneficial, no mitigation would be required.

However, future operation and maintenance activities under the project may affect the elderberry shrubs that are planted or otherwise establish during the project's restoration activities. In addition, future flood fighting activities and other emergency work may affect the elderberry shrubs These activities are described in the "Elderberry Planting and Monitoring Plan for the Valley Elderberry Longhorn Beetle" (Enclosure 4).

Although the overall effects to the beetle would be beneficial, it is the Corps' biological assessment that the proposed Hamilton City Flood Damage Reduction and Ecosystem Restoration Project may affect the Federally listed valley elderberry longhorn beetle due to future operation and maintenance and flood fighting activities. Therefore, we request initiation of formal Section 7 consultation for this project. We also request that a take permit for these future activities be included in the Biological Opinion to be prepared by your agency. If you have any questions, please contact Ms. Erin Taylor at (916) 557-6862, e-mail: Erin.A.Taylor@usace army mil

Sincerely,

Mark C Charlton
Chief, Planning Division

Enclosures

Copies furnished with enclosures:
Mr. Richard Kuyper, U.S. Fish and Wildlife Service, 2800 Cottage Way, Suite W2605, Sacramento, California 95825-1846

ENCLOSURE 1 - Federal Endangered And Threatened Species That May Be Affected By Projects In Glenn County	See Appendix B1 - Endangered Species in Project Area
ENCLOSURE 2 - Listed Or Proposed Species Potentially Present In The Project Area	See Appendix B1 - Endangered Species Table
ENCLOSURE 3 - Project Description	See Main Report – Chapter 9 – Tentatively Recommended Plan
ENCLOSURE 4 – Elderberry Planting And Monitoring Plan For The Valley Elderberry Longhorn Beetle	See Appendix B1 - Elderberry Planting and Monitoring Plan for VELB

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO, CALIFORNIA 95814-2922

REPLY TO
ATTENTION OF

Environmental Resources Branch

Mr. Michael Aceituno
National Marine Fisheries Service
Sacramento Area Office
650 Capitol Mall, Suite 8-300
Sacramento, California 95814-4706

APR 1 2004

Dear Mr. Aceituno:

This letter is our biological assessment for the Hamilton City Flood Damage Reduction and Ecosystem Restoration Project in Hamilton City, California. As part of the Hamilton City project, the lead agencies have begun informal consultation in accordance with Section 7 of the Endangered Species Act. The lead agencies requested and received a list of endangered, threatened, and proposed species from the U S. Fish and Wildlife Service. This list was dated April 11, 2001, and updated lists were received on October 21, 2003, and December 16, 2003 (Enclosure 1). This letter includes a table summarizing the special status species, including information on habitat requirements, distribution, and possible occurrence in the project area (Enclosure 2).

Hamilton City is located in Glenn County, California, along the right bank of the Sacramento River, about 85 miles north of the city of Sacramento. The study area includes Hamilton City and the surrounding rural area. The study area is bounded by the Sacramento River to the east and the Glenn Colusa Irrigation Canal to the west, and extends about 2 miles north and 6 miles south of Hamilton City. Hamilton City has a population of about 1,800 people. Surrounding land use is primarily agricultural with fruit and nut orchards being the primary crops.

The proposed project (Combined Alternative 1) involves ecosystem restoration and flood damage reduction via a setback levee (Enclosure 3). The project features include constructing a setback levee approximately 6 miles long and set back from the river from 50 to 1,700 feet, restoring up to 1,500 acres of native vegetation between the setback levee and the river, and removing the existing levee and allowing the flood plain to flood without endangering the community of Hamilton City. Restored habitat types would include riparian, grassland, oak savannah, and scrub. This biological assessment describes potential effects of the project on Federally listed endangered and threatened fish species, as well as candidate fish species, under your agency's jurisdiction in the project area.

The Sacramento River supports four races of chinook salmon: fall-run, late fall-run, winter-run, and spring-run. In the Sacramento River, juvenile chinook salmon belonging to one or more of the four extant runs may be migrating in any month of the year. Of the four chinook salmon runs that use the river, the greatest concern is for the winter-run. In recent years, the winter-run has dwindled from an annual escapement of 80,000 adult fish to about 2,000, with a low of 191 winter-run chinook in 1991. Currently, the winter-run salmon is Federally listed as

endangered, while the spring-run salmon is Federally listed as threatened. The fall/late fall salmon is a Federal candidate species. From December to August, the winter-run chinook salmon migrates to upstream areas where it spawns. From August to December, winter-run juveniles use the shaded riverine aquatic (SRA) cover along the river for feeding, resting, and escaping from predators. The NOAA Fisheries has classified the entire Sacramento River from Keswick Dam to San Francisco Bay as critical habitat for the winter-run chinook salmon.

Central Valley steelhead populations are all considered to be winter-run steelhead that typically spend 2 years rearing in fresh water before out-migrating to the ocean. Similar to chinook salmon, steelhead primarily use habitat in the area during the juvenile rearing period. During the warmer parts of the year, steelhead parr appear to prefer habitat with cover provided by rocky substrates, overhanging vegetation, large woody debris (LWD), and low light intensities. During the winter, when they are believed to be less active, juvenile steelhead use pools with large rocky substrates or LWD cover. In winter and spring when high flows inundate flood plains, backwaters, and side channels, these low-velocity areas may be important feeding areas and velocity refuge habitat for rearing juvenile steelhead and out-migrating smolts Rearing juvenile steelhead and out-migrating smolts may be present in the project area throughout the year. Adult steelhead require deep pools for resting during their upstream spawning migration. Some upstream migrants may use pools in the lower Sacramento River, where available.

Implementation of Combined Alternative 1 could result in short-term adverse effects on fish species present in the study area during construction. For example, orchard removal, infrastructure modification, and grading are construction activities that could result in minor temporary increases in sediment load to the river during a flood event. Increased input of sediment has the potential to increase turbidity, possibly reducing the feeding efficiency of juvenile and adult fish. However, because the Sacramento River is typically a turbid system, additional sediment input from project activity would be comparatively minimal, and would not have any noticeable effect relative to the overall condition of the river. Furthermore, sediment input from construction sites would occur only during storm events.

Long-term effects to anadromous fish could result from the loss of habitat due to implementation of the project. Removal of the existing levee could affect small areas of important habitats such as SRA cover and riparian vegetation. The loss of trees could temporarily adversely affect fish by reducing the amount of shade and potential for instream woody debris. To avoid this loss, levee removal activities would avoid removal of riparian vegetation. Vegetation (trees and shrubs) would be fenced and flagged for avoidance. Construction would also be done in a manner to avoid in-water work. The exception would be the placement of 100 feet of rock riprap below the water surface to protect the Gianella Bridge. This work would have a significant adverse effect on instream habitat for anadromous fish.

Removal of the existing levee would reestablish the natural connectivity between the river and its flood plain, which would greatly benefit anadromous fish by providing access to

flood plain habitat. This improved access would also increase the risk of fish becoming stranded as floodwaters recede. However, the net effect would be beneficial.

Under Combined Alternative 1, the conversion of agricultural lands to riparian areas would result in long-term beneficial effects on fish in the Sacramento River. In this alternative, 1,500 acres of agricultural land would be converted. This alternative would contribute complexity to the aquatic environment, providing cover, food, and other habitat components for fish, including SRA and LWD.

Sacramento River, tributaries, distributaries, and related riparian zones from Keswick Dam downstream to and including San Francisco Bay are classified as critical habitat for the winter-run chinook salmon. From December through August, the winter-run chinook salmon migrates to upstream areas where it spawns. From August to December, winter-run juveniles use the SRA cover and LWD in the river for feeding, resting, and escaping from predators. This alternative would contribute to the sustainable creation of this habitat and would therefore benefit winter-run chinook salmon critical habitat.

Potential short-term effects would require mitigation to minimize these effects. The implementation of best management practices, such as preserving all existing vegetation, where possible, preparing an erosion and sediment control plan, and stabilizing and reseeding all disturbed soils with native grasses, would control sediments and reduce the potential water quality effects to fisheries to less than significant. If construction is conducted that may affect the salmon, it would be conducted within appropriate work windows approved by NOAA Fisheries. Working at these times would minimize potential effects to these species.

Although the overall effect of the Hamilton City Flood Damage Reduction and Ecosystem Restoration Project on anadromous fish would be beneficial, there would initially be some adverse effects to these species and to critical habitat due to the placement of rock under the Gianella Bridge. Therefore, we request initiation of formal Section 7 consultation for these adverse effects to the Federally listed Sacramento River winter-run chinook salmon and its critical habitat, Central Valley spring-run chinook salmon, and Central Valley steelhead.

If you have any questions, please contact Ms. Erin Taylor, Environmental Manager, at (916) 557-6862, e-mail: Erin.A.Taylor@usace.army.mil. Thank you for your cooperation.

Sincerely,

Mark C. Charlton
Chief, Planning Division

Enclosures

ENCLOSURE 1 - Federal Endangered And Threatened Species That May Be Affected By Projects In Glenn County	See Appendix B1 - Endangered Species in Project Area
ENCLOSURE 2 - Special Status Anadromous Fish Species Potentially Present In The Project Area	See Appendix B1 - Endangered Species Table
ENCLOSURE 3 - Project Description	See Main Report – Chapter 9 – Tentatively Recommended Plan

United States Department of the Interior

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

In reply refer to:
1-1-04-F-0145

JUN 30 2004

Mr. Mark C. Charlton
Chief, Planning Division
U.S. Army Corps of Engineers
1325 J Street
Sacramento, California 95814-2922

Subject: Formal Endangered Species Consultation on the Hamilton City Flood Damage Reduction and Ecosystem Restoration Project, Glenn County, California

Dear Mr. Charlton:

This document has been prepared in response to your April 1, 2004, request to initiate formal consultation with the U.S. Fish and Wildlife Service (Service) on the effects of the proposed Hamilton City Flood Damage Reduction and Ecosystem Restoration Project, in Glenn County, California, on the threatened valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) (beetle). Your request was received by the Service on April 2, 2004. This document represents the Service's biological opinion on the effects of the proposed project on the threatened beetle, in accordance with section 7 of the Endangered Species Act of 1973, as amended (Act).

The Service has reviewed the biological information submitted by the U.S. Army Corps of Engineers (Corps). The documentation describes the proposed project's effects on listed species. This biological opinion is in accordance with the standards established in the Service's July 9, 1999, *Conservation Guidelines for the Valley Elderberry Longhorn Beetle* (Conservation Guidelines). Based on our analysis, the Service has determined the proposed project will result in the establishment of a significant amount of habitat for the valley elderberry longhorn beetle that will be of long-term benefit to this listed animal, and any adverse effects will be temporary and relatively minor in nature.

The findings and requirements in this consultation are based on: (1) a site visit by Justin Ly of the Service and Annalena Bronson of the California Department of Water Resources on April 1, 2003; (2) the *Elderberry Planting and Monitoring Plan for the Valley Elderberry Longhorn Beetle- Hamilton City Flood Damage Reduction and Ecosystem Restoration*, dated March, 2004;

(3) the *Hamilton City Flood Damage Reduction and Ecosystem Restoration, California, Draft Feasibility Report and Environmental Impact Statement/Environmental Impact Report*, dated March, 2004; (4) the *Hamilton City Flood Damage Reduction and Ecosystem Restoration, California, Habitat Revegetation Report*, dated December, 2003; and, (5) numerous telephone conversations between the Corps and the Service.

Consultation History

April 1, 2003. A visit to the site by Justin Ly, of the Service and Annalena Bronson, of the California Department of Water Resources.

March 10, 2004. Erin Taylor of the Corps provided the draft Elderberry Planting and Monitoring Plan for the Valley Elderberry Longhorn Beetle-Hamilton City Flood Damage Reduction and Ecosystem Restoration, dated January, 2004, to the Service.

March 19, 2004. Erin Taylor provided the final Elderberry Planting and Monitoring Plan for the Valley Elderberry Longhorn Beetle- Hamilton City Flood Damage Reduction and Ecosystem Restoration, dated March, 2004, to the Service.

April 1, 2004. The Service received the request for formal section 7 consultation from the Corps.

Project Description

Hamilton City is located in Glenn County, California, along the west bank of the Sacramento River, approximately 85 miles north of the City of Sacramento. The proposed project area includes Hamilton City and the surrounding rural area, which comprises approximately 1,500 acres. The proposed action area is bounded by the Sacramento River to the East and the Glenn Colusa Canal to the west and extends approximately two miles north and six miles south of Hamilton City. Surrounding land use is primarily orchards. The objectives of the project are to reduce flood risk and flood damages and to restore the riverine ecosystem along the west bank of the Sacramento River in and around Hamilton City.

Flood protection to Hamilton City and the surrounding area is provided by the "J" levee, which is an existing private levee. Currently, the Sacramento River is actively eroding into the toe of the levee at the northern end of the proposed project area. Glenn County has built a backup levee, approximately 1,000 feet in length, to protect the community in the event the toe erosion causes failure at the northern end of the "J" levee.

Currently, there are approximately 107 elderberry shrubs (*Sambucus* species), with stems one inch or greater at ground level in the proposed action area. Of these 107 elderberry shrubs, 21 shrubs with stems one inch or greater at ground level have beetle exit holes. These elderberry shrubs can be avoided with the potential setback levee alignments currently being considered. However, there is potential for the 107 existing elderberry shrubs to be removed during future flood-fighting activities.

The Reclamation Board has identified the proposed project area as having a high level of potential for restoration. The Reclamation Board is seeking to plant a mix of native riparian vegetation, including a minimum of one elderberry shrub per 1,800 feet (2,747 elderberry shrubs) in order to benefit the listed beetle. The approximate 2,747 or more elderberry shrubs that are proposed for planting are not for mitigation purposes and are only proposed for the benefit of the beetle, and other threatened and endangered species. The Reclamation Board has stated that the addition of elderberry shrubs to the restoration project is dependent on the authorization for incidental take of all elderberry shrubs planted within the 1,500 acre proposed action area. This would include the loss of all elderberry shrub habitat that occurs in the action area in the future. The Reclamation Board is seeking incidental take of all elderberry shrubs that would result from future maintenance and operations activities and potential flood-fighting activities that may be required for the setback levee in the future. Flood-fighting activities have occurred in the project area in 1983, 1986, 1995, 1997, and 1998.

The Corps has indicated in the *Elderberry Planting and Monitoring Plan for the Valley Elderberry Longhorn Beetle- Hamilton City Flood Damage Reduction and Ecosystem Restoration*, dated March, 2004, that the following maintenance and flood-fighting activities may occur within the proposed action area:

1. Maintain ability to access the entire length of levee (approximately 6 miles) for maintenance and flood-fighting;

2. Maintain ability to access the entire length of the levee for large equipment to deliver and place flood-fighting material, including rock;

3. Maintain ability to maintain hydraulic capacity by selective clearing of vegetation;

4. Maintain ability to remove vegetation from the levee and within 15 feet of levee toe;

5. Maintain ability to access the levee to clear bank and berm of vegetation in order to place rock riprap bank protection when erosion is encroaching into the projected levee slope.

The Corps would be involved in the restoration, planting, and establishment for the first three years of restoration. Land ownership would then be turned over to a non-Federal sponsor. The Corps would require that the non-Federal sponsor supply the lands, easements, and rights-of-way for the proposed project. The Reclamation Board is the Corp's non-Federal sponsor for only the flood control component of the project. The Reclamation Board has yet to identify a non-Federal sponsor for the restoration component of the project. Possible non-Federal sponsors include The Nature Conservancy, the California Department of Fish and Game, or CalFed. Maintenance of the restoration area would then become the non-Federal sponsor's responsibility. The Corps will not be able to implement the proposed project without a non-Federal restoration sponsor.

Proposed Conservation Measures

The following measures have been proposed by the Corps:

1. A minimum of one elderberry shrub would be planted per 1,800 square feet (2,747 elderberry shrubs);

2. The Corps would be involved in the restoration, planting, and establishment for the first three years of restoration. Land ownership would be turned over to The Nature Conservancy, the California Department of Fish and Game, CalFed, or another non-Federal sponsor after the first three years. The Corps will attempt to ensure that monitoring will be continued by the non-Federal sponsor after three years in accordance with the Service's 1999 *Conservation Guidelines for the Valley Elderberry Longhorn Beetle.*

3. Flood-fighting activities are expected to occur in the future. If flood-fighting activities occur within the proposed action area, the Corps will restore the areas disturbed during flood-fighting activities with the original vegetation species mix. Flood fighting by the Corps is considered emergency work and falls under PL-84 99, which includes consultation with the Service. This future consultation would require that the previous vegetation be restored.

4. A Service-approved biologist familiar with elderberry shrubs shall be onsite during flood-fighting activities and have the authority to choose access routes. Access routes, staging areas, and all project activities should be chosen in a manner that will cause the least amount of damage to beetle habitat. Removal of elderberry shrubs should be limited to the minimum necessary to achieve the project goal.

Status of the Species

The beetle was listed as a threatened species under the Act on August 8, 1980 (45 **FR** 52803). Critical habitat for the species was designated and published at 50 CFR §17.95. Two areas along the American River in the Sacramento metropolitan area have been designated as critical habitat for the beetle. Critical habitat for this species has been designated along the lower American River at Goethe and Ancil Hoffman parks (American River Parkway Zone) and at the Sacramento Zone, an area about a half mile from the American River downstream from the American River Parkway Zone. In addition, an area along Putah Creek, Solano County, and the area west of Nimbus Dam along the American River Parkway, Sacramento County, are considered essential habitat, according to the Valley Elderberry Longhorn Beetle Recovery Plan (Service 1984). These critical habitat and essential habitat areas within the American River parkway and Putah Creek support large numbers of mature elderberry shrubs with extensive evidence of use by the beetle.

The beetle is dependent on the elderberry, its host plant, which is a locally common component of the remaining riparian forests and savannah areas and, to a lesser extent, the mixed chaparral-

foothill woodlands of the Central Valley. Use of the elderberry shrubs by the animal, a wood borer, is rarely apparent. Frequently but not exclusively, the only exterior evidence of the shrub's use by the beetle is an exit hole created by the larva just prior to the pupal stage. Observations made within elderberry shrubs along the Cosumnes River, in the Folsom Lake area, and near Blue Ravine in Folsom indicate that larval galleries can be found in elderberry stems with no evidence of exit holes; the larvae either succumb prior to constructing an exit hole or are not far enough along in the developmental process to construct an exit hole. Beetle larvae appear to be distributed in stems which are 1.0 inch or greater in diameter at ground level. The Valley Elderberry Longhorn Beetle Recovery Plan (Service 1984) and Barr (1991) contain further details on the valley elderberry longhorn beetle's life history.

Population densities of the beetle are probably naturally low (Service 1984); and it has been suggested, based on the spatial distribution of occupied shrubs (Barr 1991), that the beetle is a poor disperser (Collinger *et al.* 2001). Low density and limited dispersal capability cause the beetle to be vulnerable to the negative effects of the isolation of small subpopulations due to habitat fragmentation.

When the beetle was listed as threatened in 1980, the species was known from less than 10 localities along the American River, the Merced River, and Putah Creek. By the time the Valley Elderberry Longhorn Beetle Recovery Plan was prepared in 1984, additional occupied localities had been found along the American River and Putah Creek. As of 2004, the California Natural Diversity Database (CNDDB) contained 190 occurrences for this species in 44 drainages throughout the Central Valley, from a location along the Sacramento River in Shasta County, southward to an area along Caliente Creek in Kern County (CNDDB 2004). Glenn County has 12 occurrences of the beetle (CNDDB 2004). The beetle continues to be threatened by habitat loss and fragmentation, predation by the non-native Argentine ants (*Linepithema humile*) (Holway 1995; Huxel 2000; Huxel and Hastings 1999; Huxel *et al.* 2001; Ward 1987), and possibly other factors such as pesticide drift, non-native plant invasion, improper burning regimes, off-road vehicle use, rip-rap bank protection projects, wood cutting, and over grazing by livestock (CNDDB 2004).

Environmental Baseline

Riparian forests, the primary habitat for the beetle, have been severely depleted throughout the Central Valley over the last two centuries as a result of expansive agricultural and urban development (Huxel *et al.* 2001; Katibah 1984; Roberts *et al.* 1977; Thompson 1961). Since colonization, these forests have been "...modified with a rapidity and completeness matched in few parts of the United States" (Thompson 1961). As of 1849, the rivers and larger streams of the Central Valley were largely undisturbed. They supported continuous bands of riparian woodland four to five miles in width along some major drainages such as the lower Sacramento River, and generally about two miles wide along the lesser streams (Thompson 1961). Most of the riverine floodplains supported riparian vegetation to about the 100-year flood line (Katibah 1984). A large human population influx occurred after 1849, however, and much of the Central Valley riparian habitat was rapidly converted to agriculture and used as a source of wood for fuel and construction to serve a wide area (Thompson 1961). By as early as 1868, riparian woodland

had been severely affected in the Central Valley, as evidenced by the following excerpt:

> "This fine growth of timber which once graced our river [Sacramento], tempered the atmosphere, and gave protection to the adjoining plains from the sweeping winds, has entirely disappeared - the woodchopper's axe has stripped the river farms of nearly all the hard wood timber, and the owners are now obliged to rely upon the growth of willows for firewood." (Cronise 1868, in Thompson 1961).

The clearing of riparian forests for fuel and construction made this land available for agriculture (Thompson 1977). Natural levees bordering the rivers, once supporting vast tracts of riparian habitat, became prime agricultural land (Thompson 1961). As agriculture expanded in the Central Valley, needs for increased water supply and flood protection spurred water development and reclamation projects. Artificial levees, river channelization, dam building, water diversion, and heavy groundwater pumping further reduced riparian habitat to small, isolated fragments (Katibah 1984). In recent decades, these riparian areas have continued to decline as a result of ongoing agricultural conversion as well and urban development and stream channelization. As of 1989, there were over 100 dams within the Central Valley drainage basin, as well as thousands of miles of water delivery canals and streambank flood control projects for irrigation, municipal and industrial water supplies, hydroelectic power, flood control, navigation, and recreation (Frayer *et al.* 1989). Riparian forests in the Central Valley have dwindled to discontinuous strips of widths currently measurable in yards rather than miles.

Some accounts state that the Sacramento Valley supported approximately 775,000 to 800,000 acres of riparian forest as of approximately 1848, just prior to statehood (Smith 1977; Katibah 1984). No comparable estimates are available for the San Joaquin Valley. Based on early soil maps, however, more than 921,000 acres of riparian habitat are believed to have been present throughout the Central Valley under pre-settlement conditions (Huxel *et al* 2001; Katibah 1984). Another source estimates that of approximately five million acres of wetlands in the Central Valley in the 1850s, approximately 1,600,000 acres were riparian wetlands (Warner and Hendrix 1985; Frayer *et al.* 1989).

Based on a California Department of Fish and Game riparian vegetation distribution map, by 1979, there were approximately 102,000 acres of riparian vegetation remaining in the Central Valley. This represents a decline in acreage of approximately 89 percent as of 1979 (Katibah 1984). More extreme figures were given by Frayer *et al.* (1989), who reported that woody riparian forests in the Central Valley had declined to 34,600 acres by the mid-1980s (from 65,400 acres in 1939). Although these studies have differing findings in terms of the number of acres lost (most likely explained by differing methodologies), they attest to a dramatic historic loss of riparian habitat in the Central Valley. As there is no reason to believe that riparian habitat suitable to the beetle (elderberry shrubs) would be destroyed at a different rate than other riparian habitat, we can assume that the rate of loss for beetle habitat in riparian areas has been equally dramatic.

A number of studies have focused on riparian vegetation losses along the Sacramento River, which supports some of the densest known populations of the beetle. Approximately 98 percent

of the middle Sacramento River's historic riparian vegetation was believed to have been extirpated by 1977 (DWR 1979). The State Department of Water Resources estimated that native riparian habitat along the Sacramento River from Redding to Colusa decreased from 27,720 acres to 18,360 acres (34 percent) between 1952 and 1972 (McGill *et al.* 1975; Conrad *et al.* 1977). The average rate of riparian loss on the middle Sacramento River was 430 acres per year from 1952 to 1972, and 410 acres per year from 1972 to 1977. In 1987, riparian areas as large as 180 acres were observed converted to orchards along this River (McCarten and Patterson 1987).

Barr (1991) examined 79 sites in the Central Valley supporting valley elderberry longhorn beetle habitat. When 72 of these sites were re-examined by researchers in 1997, seven no longer supported valley elderberry longhorn beetle habitat. This loss represents a decrease in the number of sites with valley elderberry longhorn beetle habitat by approximately nine percent in six years.

No comparable information exists on the historic loss of non-riparian valley elderberry longhorn beetle habitat such as elderberry savanna and other vegetation communities where elderberry shrubs also occur (oak or mixed chaparral-woodland, or grasslands adjacent to riparian habitat). However, all natural habitats throughout the Central Valley have been heavily adversely affected within the last 200 years (Thompson 1961), and we can therefore assume that non-riparian beetle habitat also has suffered a widespread decline. This analysis focuses on loss of riparian habitat because the beetle is primarily dependent upon riparian habitat. Adjacent upland areas are also likely to be important for the species (Huxel pers. comm. 2000), but this upland habitat typically consist of oak woodland or elderberry savanna bordering willow riparian habitat (Barr 1991). The riparian acreage figures given by Frayer *et al.* (1989) and Katibah (1984) included oak woodlands concentrated along major drainages in the Central Valley, and therefore probably included lands we would classify as upland habitat for the beetle adjacent to riparian drainages.

Between 1980 and 1995, the human population in the Central Valley grew by 50 percent, while the rest of California grew by 37 percent . The Central Valley's population was 4.7 million by 1999, and it is expected to more than double by 2040. The American Farmland Trust estimates that by 2040 more than 1 million cultivated acres will be lost and 2.5 million more put at risk (Ritter 2000). With this growing population in the Central Valley, increased development pressure is likely to result in continuing loss of riparian habitat.

While habitat loss is clearly a large factor leading to the species' decline, other factors are likely to pose significant threats to the long term survival of the beetle. Only approximately 20 percent of riparian sites with elderberry observed by Barr (1991) and Collinge *et al.* (2001) support beetle populations (Barr 1991, Collinge *et al.* 2001). Jones and Stokes (1988) found 65 percent of 4,800 riparian acres on the Sacramento River have evidence of beetle presence. The fact that a large percentage of apparently suitable habitat is unoccupied suggests that the beetle is limited by factors other than habitat availability, such as habitat quality or limited dispersal ability.

Destruction of riparian habitat in central California has resulted not only in a significant acreage loss, but also has resulted in beetle habitat fragmentation. Fahrig (1997) states that habitat

fragmentation is only important for habitats that have suffered greater than 80 percent loss. Riparian habitat in the Central Valley, which has experienced greater than 90 percent loss by most estimates, would meet this criterion as habitat vulnerable to effects of fragmentation. Existing data suggests that beetle populations, specifically, are affected by habitat fragmentation. Barr (1991) found that small, isolated habitat remnants were less likely to be occupied by beetles than larger patches, indicating that valley elderberry longhorn beetle subpopulations are extirpated from small habitat fragments. Barr (1991) and Collinge *et al.* (2001) consistently found valley elderberry longhorn beetle exit holes occurring in clumps of elderberry bushes rather than isolated bushes, suggesting that isolated shrubs do not typically provide long-term viable habitat for this species. Local populations of organisms often undergo periodic colonization and extinction, while the metapopulation (set of spatially separated groups of a species) may persist (Collinge 1996).

Habitat fragmentation can be an important factor contributing to species declines because: (1) it divides a large population into two or more small populations that become more vulnerable to direct loss, inbreeding depression, genetic drift, and other problems associated with small populations; (2) it limits a species' potential for dispersal and colonization; and (3) it makes habitat more vulnerable to outside influences by increasing the edge:interior ratio (Primack 1998).

Small, isolated subpopulations are susceptible to extirpation from random demographic, environmental, and/or genetic events (Shaffer 1981; Lande 1988; Lande 1993; Primack 1998). While a large area may support a single large population, the smaller subpopulations that result from habitat fragmentation may not be large enough to persist over a long time period. As a population becomes smaller, it tends to lose genetic variability through genetic drift, leading to inbreeding depression and a lack of adaptive flexibility. Smaller populations also become more vulnerable to random fluctuations in reproductive and mortality rates, and are more likely to be extirpated by random environmental factors.

The beetle is a specialist on elderberry plants, and tends to have small population sizes and occurs in low densities (Barr 1991; Collinge *et al.* 2001). Collinge *et al.* (2001) compared resource use and density of exit holes between the beetle and a related subspecies, the California elderberry longhorn beetle (*Desmocerus californicus californicus*). The valley elderberry longhorn beetle tended to occur in areas with higher elderberry densities, but had lower exit hole densities than the California elderberry longhorn beetle. With extensive riparian habitat loss and fragmentation, these naturally-small valley elderberry longhorn beetle populations are broken into even smaller, isolated populations. Once a small valley elderberry longhorn beetle population has been extirpated from an isolated habitat patch, the species may be unable to re-colonize this patch if it is unable to disperse from nearby occupied habitat. Insects with limited dispersal and colonization abilities may persist better in large habitat patches than small patches because small fragments may be insufficient to maintain viable populations and the insects may be unable to disperse to more suitable habitat (Collinge 1996).

Studies suggest that the beetle is unable to re-colonize drainages where the species has been extirpated, because of its limited dispersal ability (Barr 1991; Collinge *et al.* 2001). Huxel and

Hastings (1999) used computer simulations of colonization and extinction patterns based on differing dispersal distances, and found that the short dispersal simulations best matched the 1997 census data in terms of site occupancy. This suggests that dispersal and colonization are limited to nearby sites. At spatial scales greater than 6.2 miles (10 km.), such as across drainages, valley elderberry longhorn beetle occupancy appears to be strongly influenced by regional extinction and colonization processes, and colonization is constrained by limited dispersal (Collinge *et al.* 2001; Huxel and Hastings 1999). Except for one occasion, drainages examined by Barr that were occupied in 1991 remained occupied in 1997 (Collinge *et al.* 2001; Huxel and Hastings 1999). The one exception was Stoney Creek, which was occupied in 1991 but not in 1997. All drainages found by Barr (1991) to be unoccupied in 1991 were also unoccupied in 1997. This data suggests that drainages unoccupied by the valley elderberry longhorn beetle remain so.

Habitat fragmentation not only isolates small populations, but also increases the interface between habitat and urban or agricultural land, increasing negative edge effects such as the invasion of non-native species (Huxel *et al.* 2001; Huxel 2000; Soule 1990) and pesticide contamination (Barr 1991). Several edge effect-related factors may be related to the decline of the beetle.

Project-Related Effects to the Valley Elderberry Longhorn Beetle

The overall effect of this project will result in long-term beneficial effects to the valley elderberry longhorn beetle. The project will restore 1,500 acres of habitat fro the imperiled animal. This addition of habitat in the area will benefit the listed beetle by increasing population numbers and improving the dispersal abilities of the species. The proposed project may result in short-term adverse effects to the valley elderberry longhorn beetle. Maintenance and operations activities and potential flood-fighting activities may remove elderberry shrubs from the proposed actions area. If flood-fighting activities occur within the proposed action area, the Corps will restore these areas with the native riparian vegetation mix used during the original restoration effort. Therefore, these direct effects are expected to be only a short-term disturbance.

Indirect effects may occur if maintenance and flood-fighting activities alter the terrain, such as driplines, which may adversely affect elderberry bushes. Vehicles and construction equipment may leak hazardous substances such as motor oil and antifreeze. Although the quantity leaked by a given vehicle or engine may be minute, these substances can accumulate on roads or in parking lots and then get washed into the adjacent environment by runoff during rain storms. A variety of substances could be introduced during accidental spills of materials.

Cumulative Effects

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed project are not considered in this section, because they require separate consultation pursuant to section 7 of the Act. An undetermined number of future land use conversions and routine agricultural practices are not subject to

Federal authorization or funding and may alter the habitat or increase incidental take of the beetle and are, therefore, cumulative to the proposed project. Most of these future non-Federal projects are considered indirect effects of the proposed action and effects are addressed through an interim process of project approval and habitat conservation plan development.

Many activities affecting the beetle involve effects to elderberry shrubs located within riparian ecosystems adjoining or within jurisdictional wetlands. These projects will be evaluated via formal consultation between the Service and the Corps via the Federal nexus provided by section 404 of the Clean Water Act. However, a number of projects exist for which there is no need to discharge dredged or fill material into waters of the U.S. These projects, for which no section 404 permit is required, may lack a Federal nexus and thus, move forward absent formal consultation. These projects pose a significant threat to the recovery of the valley elderberry longhorn beetle. This loss of habitat negatively affects the environmental baseline and is difficult to quantify.

Conclusion

After reviewing the current status of the beetle, the environmental baseline for the action area, the effects of the proposed Hamilton City Flood Damage Reduction and Ecosystem Restoration project, and the cumulative effects, it is the Service's biological opinion that the project, as proposed, is not likely to jeopardize the continued existence of the beetle. Critical habitat has been designated for the beetle. However, this action does not directly or indirectly affect these areas, and therefore, no destruction or adverse modification of critical habitat is anticipated.

Incidental Take Statement

Section 9(a)(1) of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened fish and wildlife species, respectively, without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Harm is defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by impairing behavioral patterns including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with this Incidental Take Statement.

The measures described below are non-discretionary, and must be implemented by the Corps so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, in order for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps (1) fails to

require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

Amount or Extent of Take

The Service anticipates incidental take of the valley elderberry longhorn beetle will be difficult to detect or quantify. The cryptic nature of these species and their relatively small body size make the finding of a dead specimen unlikely. The species occur in habitats that make them difficult to detect. Due to the difficulty in quantifying the number of beetles that will be taken as a result of the proposed action, the Service is quantifying take in terms of the number of elderberry shrubs with stems one inch or greater in diameter that will become unsuitable for beetles due to direct or indirect effects as a result of the action. The Service anticipates that all valley elderberry longhorn beetles inhabiting elderberry bushes within the 1,500 acre project site will be taken as a result of the proposed project.

Upon implementation of the following reasonable and prudent measures, incidental take associated with the project on the listed valley elderberry longhorn beetle, in the form of harm, harassment, or mortality from habitat loss or direct mortality will become exempt from the prohibitions described under section 9 of the Act for direct and indirect effects. In addition, incidental take in the form of harm, harassment, or mortality associated with the proposed project will be exempt from the prohibitions described under section 9 of the Act.

Effect of the Take

The Service has determined that this level of anticipated take is not likely to result in jeopardy to the valley elderberry longhorn beetle or result in destruction or adverse modification of critical habitat for the valley elderberry longhorn beetle.

Reasonable and Prudent Measure

The proposed action contains all of the measures needed to adequately minimize the impacts of anticipated take on the beetle. For that reason, the Service has no Reasonable and Prudent Measures.

Reporting Requirements

The Sacramento Fish and Wildlife Office is to be notified within one working day of the finding of any listed species or any unanticipated take of species addressed in this biological opinion. The Service contact persons for this are the Chief of the Endangered Species Division (Central Valley) at (916) 414-6600, and the Resident Agent-in-Charge of the Service's Law Enforcement Division at (916) 414-6660.

Any dead or severely injured beetles found (adults, pupae, or larvae) shall be deposited in the

Entomology Department of the California Academy of Sciences. The Academy's contact is the Senior Curator of Coleoptera at (415) 750-7239. All observations of valley elderberry longhorn beetles - live, injured, or dead - or fresh beetle exit holes shall be recorded on California Natural Diversity Data Base (CNDDB) field sheets and sent to California Department of Fish and Game, Wildlife Habitat Data Analysis Branch, 1807 13th Street Room 2002, Sacramento, California 95814.

Conservation Recommendations

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities that can be implemented to further the purposes of the Act, such as preservation of endangered species habitat, implementation of recovery actions, or development of information and data bases.

1. The Corps should work with the Service to address significant, unavoidable environmental impacts approved by local agencies.

2. The Corps should continue to assist the Service in the implementation of recovery efforts for the valley elderberry longhorn beetle.

3. It is recommended that the Corps continue to protect and restore riparian and wetland habitats in the Sacramento River basin, to increase habitat for the valley elderberry longhorn beetle.

4. It is recommended that the Corps ensure that monitoring of the proposed restoration project continue for 10 years in accordance with the Service's 1999 *Conservation Guidelines for the Valley Elderberry Longhorn Beetle.* The Corps could approach private non-profit organizations, government agencies, or universities with the possibility of continuing these monitoring efforts.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting federally-listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

Reinitiation – Closing Statement

This concludes formal consultation on the Hamilton City Flood Damage Reduction and Ecosystem Restoration Project. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical

habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

Please contact Rick Kuyper or Adam Zerrenner, Sacramento Valley Branch Chief, at (916) 414-6645 if you have any questions or comments regarding the Hamilton City Flood Damage Reduction and Ecosystem Restoration Project.

Sincerely,

for Kenneth D. Sanchez
Acting Field Supervisor

cc:

FWS, Regional Office, Portland, Oregon (Attn: L. Salata)
U.S. Army Corps of Engineers, Sacramento, California (Attn: Erin Taylor)
Sacramento National Wildlife Refuge Complex, Willows, California (Attn: Kevin Foerster)
California Department of Fish and Game, Rancho Cordova, California (Attn: Terry Roscoe)
The Reclamation Board, Sacramento, California (Attn: Peter Rabbon and Stephen Bradley)
California Department of Water Resources, Sacramento, California (Attn: Annalena Bronson)

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DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO, CALIFORNIA 95814-2922

REPLY TO
ATTENTION OF

Environmental Resources Branch

AUG 03 2004

Mr. Wayne White, Field Supervisor
U.S. Fish and Wildlife Service
2800 Cottage Way, Suite W2605
Sacramento, California 95825-1846

Dear Mr. White:

This letter transmits revised conservation measures (enclosure) to replace the "Proposed Conservation Measures" in the Service's June 30, 2004, biological opinion (BO) on the effects of the proposed Hamilton City Flood Damage Reduction and Ecosystem Restoration Project in Hamilton City, California. These revised conservation measures were developed in coordination with the Service, the State Reclamation Board, and our Emergency Management Division.

In a phone conversation on August 3, 2004, Mr. Chris Nagano of your staff requested that we transmit these revised conservation measures to the Service and indicated that your agency would then provide the Corps with a letter to supplement the BO. If you have any questions, please contact Mr. Scott Clark at (916) 557-7211 or email: E.Scott.Clark@usace.army.mil. We appreciate your cooperation in expediting the resolution of this issue.

Sincerely,

S. Scott Clark

for Mark C. Charlton
Chief, Planning Division

Enclosure

Conservation Measures

The following conservation measures will be implemented to provide protection for elderberry shrubs planted during restoration activities in the project area:

1. For the purposes of flood-fighting (i.e., placement of flood-fighting material, such as rock), it is permissible to remove any elderberry shrub within the proposed project area. The proposed management for the project includes maintaining the levee and a 300-foot buffer adjacent to the waterside of the levee in a grassland vegetation that is free of elderberry shrubs. Access to this area during flood-fighting would necessarily be via the landside of the levee, which would not include any elderberry plantings. Therefore, any flood-fighting activities on the levee or within the 300-foot buffer that would affect elderberry shrubs that may voluntarily establish within these areas would not require implementation of measures to protect elderberry shrubs. However, for any Corps flood-fighting activities affecting areas on the waterside of the buffer area, a Service-approved biologist familiar with elderberry shrubs shall join the flood-fighting efforts to provide assistance. Access routes, staging areas, and all project activities should be chosen in a manner that will cause the least amount of damage to beetle habitat without adversely affecting the flood-fighting efforts. Removal of elderberry shrubs should be limited to the minimum necessary to achieve the project goal. The biologist will have the authority to coordinate with the onsite engineer to ensure that appropriate consideration is given to avoiding effects to elderberry shrubs. State and local agencies should make similar efforts when flood-fighting without Corps assistance.

2. During Corps emergency flood-fighting activities in the project area on the waterside of the buffer area, a reasonable effort will be made to clearly demarcate access routes and work boundaries. As soon as possible after the initiation of flood-fighting, a Service-approved biologist shall identify sensitive habitat that could be avoided without affecting flood-fighting activities and place adequate high visibility flagging around the avoidance areas to prevent unnecessary encroachment of construction equipment and personnel into beetle habitat during project work activities. Such flagging shall be inspected and maintained daily by a Service-approved biologist until completion of the project, at which time the flagging shall be removed. The Service-approved biologist shall have the authority to recommend alternatives to any action that might result in effects to the avoidance areas. If the Service-approved biologist exercises this authority, the Service shall be notified within one calendar day. State and local agencies should make similar efforts when flood-fighting without Corps assistance.

3. For the purposes of routine maintenance activities, which will be described in an O&M Manual (e.g., levee inspections, vegetation removal from the levee and a 300-foot buffer zone adjacent to the levee, or clearing vegetation within the restoration area to maintain hydraulic capacity of the floodplain), it is permissible to remove any elderberry shrub. If the routine maintenance activity will include vegetation removal, a Service-approved biologist familiar with elderberry shrubs shall be onsite during the activities to ensure that elderberry plants outside of the maintenance area are not disturbed.

4. During routine maintenance activities, elderberry shrubs within the maintenance activity project area that are not required to be removed will be clearly demarcated with adequate high visibility flagging by the Service-approved biologist. Such flagging shall be inspected and maintained daily by a Service-approved biologist until completion of the project, at which time the flagging shall be removed. The Service-approved biologist shall have the authority to recommend alternatives to any action that might result in effects to the avoidance areas. If the Service-approved biologist exercises this authority, the Service shall be notified within one calendar day.

5. Prior to maintenance activities and during Corps flood-fighting activities, all workers shall be informed of the importance of avoiding effects to elderberry shrubs. Workers shall be provided with information on their responsibilities with regard to listed-species and an overview of the life-history of the species and description of the restoration area.

6. After Corps flood-fighting activities take place in areas on the waterside of the buffer area, a report prepared by the monitoring biologist(s) shall be forwarded to the Chief of the Endangered Species Division (Central Valley) at the Sacramento Fish and Wildlife Office within 60 calendar days of the completion of the project. This report shall detail: (1) dates that flood-fighting activities occurred; (2) known project effects on federally-listed species, if any; (3) occurrences of incidental take of federally-listed species, if any; and (4) other pertinent information. State and local agencies should make similar efforts when flood-fighting without Corps assistance.

7. After Corps flood-fighting activities take place on the waterside of the buffer area, the Corps shall revegetate all areas where VELB habitat was removed or similarly affected within the proposed project area with the native riparian species used in the original restoration. Replacement will be at a ratio of 1:1 for effects to VELB habitat in the project area. State and local agencies should make similar efforts when flood-fighting without Corps assistance.

8. During maintenance activities, all fueling and maintenance of vehicles and other equipment, stockpiling of construction materials, and storage of portable equipment, vehicles and supplies, including chemicals, shall be restricted to designated staging areas, which shall be located at least 250 feet from any riparian habitat. The agency responsible for O&M shall ensure that all reasonable measures are taken to avoid contamination of habitat during such operations. All workers shall be informed of the importance of preventing spills and appropriate measures to take should a spill occur. Any spills of hazardous materials shall be cleaned up immediately. Such spills shall be reported in O&M activities reports.

United States Department of the Interior

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

In reply refer to:
1-1-04-F-0257

AUG 03 2004

Mark C. Charlton
Chief, Planning Division
U.S. Army Corps of Engineers
1325 J Street
Sacramento, California 95814-2922

Subject: Amendment to the Biological Opinion for the Hamilton City Flood Damage Reduction and Ecosystem Restoration Project (Service File Number 1-1-04-F-0145), Glenn County, California

Dear Mr. Charlton:

This letter is an amendment to the biological opinion for the Hamilton City Flood Damage Reduction and Ecosystem Restoration Project (Service file number 1-1-04-F-0145) that was issued on June 30, 2004, by the U.S. Fish and Wildlife Service (Service). Your letter was received on August 3, 2004. It is our understanding that the U.S. Army Corps of Engineers (Corps) is proposing to modify the project description. At issue are the adverse effects of the project on the threatened valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*). Our comments are made under the authority of the Endangered Species Act of 1973, as amended (Act).

The Service has reviewed your August 3, 2004, letter which outlines modifications to the proposed conservation measures for the proposed project. The documentation describes the proposed project's effects on listed species. Based on our analysis, the Service has determined that the proposed project, including the modifications to the conservation measures in the Biological Opinion, will result in the establishment of a significant amount of habitat for the valley elderberry longhorn beetle that will be of long-term benefit to this listed animal, and any adverse effects will be temporary and relatively minor in nature. Therefore, the proposed conservation measures, as outlined on page 4 of the Biological Opinion (Service file number 1-1-04-F-0145) are superceded by the proposed conservation measures as described in your August 3, 2004, letter.

The Status of the Species, Environmental Baseline, Effects of the Proposed Action, Cumulative Effects, Conclusion, Incidental Take, Conservation Measures, and the remainder of the Terms

and Conditions and the project description remain the same as in the June 30, 2004, Biological Opinion.

If you have questions regarding this amendment to the Hamilton City Flood Damage Reduction and Ecosystem Restoration Project Biological Opinion, please contact Rick Kuyper or Chris Nagano, of my staff at (916) 414-6630.

Sincerely,

Kenneth D. Sanchez
Acting Field Supervisor

cc:
FWS, Regional Office, Portland, Oregon (Attn: L. Salata)
Sacramento National Wildlife Refuge Complex, Willows, California (Attn: Kevin Foerster)
California Department of Fish and Game, Rancho Cordova, California (Attn: Terry Roscoe)
The Reclamation Board, Sacramento, California (Attn: Peter Rabbon and Stephen Bradley)
California Department of Water Resources, Sacramento, California (Attn: Annalena Bronson)

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

June 23, 2004

In Response Refer To:
151422SWR04SA9096:HLB

Mark Charlton
Chief, Planning Division
U.S. Army Corps of Engineers, Sacramento District
1325 J Street, Room 1560
Sacramento, CA 95814

Dear Mr. Charlton:

This letter responds to your April 1, 2004 letter requesting formal consultation with the National Marine Fisheries Service (NOAA Fisheries) on the effects of the Hamilton City Ecosystem Restoration project on Federally listed endangered Sacramento River winter-run Chinook salmon (*Oncorhynchus tshawytscha*), threatened Central Valley spring-run Chinook salmon (*O. tshawytscha*), threatened Central Valley steelhead (*O. mykiss*), candidate Central Valley fall/late fall-run Chinook salmon (*O. tshawytscha*), and the designated critical habitat of winter-run Chinook salmon or the essential fish habitat (EFH) of Pacific Salmon.

The Hamilton City Ecosystem Restorationp project is located along the Sacramento River near Hamilton City, in Glenn County, California. The Army Corps of Engineers (Corps) proposes to integrate ecosystem restoration and flood control by constructing a 6.8 mile long setback levee, and restoring up to 1,480 acres of native, riparian, and upland vegetation between the levee and the river. Once the setback levee is constructed, the existing levee will be removed and natural connectivity between the Sacramento River and its floodplain will be re-established.

The new setback levee will begin approximately two miles north of Hamilton City by tying into high ground and continue south to the State Route 32 Bridge (Gianella Bridge). Rock riprap will be placed along the levee embankment where it parallels and ties into the approach of the Gianella Bridge. Approximately one hundred feet of rock riprap will be placed in the Sacramento River along the bridge abutments to prevent project-related hydraulic changes from scouring structural components of the bridge. South of State Route 32, the levee alignment generally will follow an existing "J" levee around Dunning Slough before heading south and west of the primary floodplain restoration area. As the levee continues south, it gradually tapers into a training dike in floodable agricultural land.

Native vegetation will be restored on all project lands on the water side of the new setback levee and within Dunning Slough. Existing orchards within the restoration area would be removed and replaced with native vegetation. Approximately 1,000 acres will be restored to riparian conditions, 260 acres will be restored to scrub vegetation, 150 acres will be restored to savannah, and 70 acres will be restored to grassland.

The Sacramento River, in the vicinity of the project area, is a migration corridor and rearing habitat for anadromous salmonids. The action area does not provide adult holding, spawning, or early rearing habitat for salmonids. Federally listed juvenile salmonids may be within the action area from mid-July to early May, and adults may be present from October to June. Potential project-related impacts that may affect Federally listed anadromous salmonids include temporary increases in sediment delivery to the Sacramento River during high flow events, the short-term loss of riparian vegetation related to the removal of the existing levee, and impacts related to the placement of riprap at the Gianella Bridge. Direct effects to salmonids are possible if riprap placement occurs when juvenile salmonids are present within the action area. Indirect effects to juvenile salmonids are possible if riprap actions destroy important constituent elements of anadromous habitat such as shaded riverine aquatic habitat (SRA), shallow-water rearing habitat, or other features that provide cover and food.

The increased input of sediment to the Sacramento River within the action area is not expected to result in any adverse effects that result in the take of anadromous fish because this portion of the river is naturally turbid and the Corps does not expect turbidity levels to increase above regional standards established by the Central Valley Regional Water Quality Control Board (Regional Board). Turbidity levels that are within Regional Board standards generally are accepted to be within levels that do not injure or kill salmonids. Adverse effects to anadromous salmonids from loss of riparian and SRA during levee removal actions will be avoided by keeping equipment out of the water and by flagging and protecting areas that contain large woody debris or riparian vegetation. Additionally, the restoration of 1,000 acres of riparian habitat is expected to improve baseline conditions for SRA elements. Short-term impacts to anadromous fish habitat related to loss of riparian vegetation during new levee construction are expected to be minimal, and not result in take of listed species or adverse modification to critical habitat because the extensive riparian planting in recovered floodplain habitat will result in a greater extent of riparian vegetation throughout the project area and offset any short-term loss. Direct effects to anadromous fish from the placement of in-water riprap can be avoided by constructing during the summer months when juvenile anadromous fish are not present. The Corps proposes to schedule all inwater construction activities for the period of June 1 to July 15, to avoid peak migration periods of anadromous fish.

The Corps initially requested formal consultation based on their determination that the placement of rock riprap would be an adverse effect to anadromous salmonids; however, based on the avoidance, minimization, and restoration measures proposed by the Corps, NOAA Fisheries anticipates that the likelihood of the proposed action causing adverse effects that result in the incidental take of Federally listed anadromous fish is negligible. Therefore, formal consultation is not required.

Provided that the above measures, and the protective measures identified in the biological assessment, and draft Environmental Impact Statement/Environmental Impact Report are adhered to, NOAA Fisheries believes that the Hamilton City Ecosystem Restorationp project is not likely to adversely affect Federally listed anadromous or the designated critical habitat of Sacramento River winter-run Chinook salmon. The proposed project is within the region identified as EFH for Pacific salmon in Amendment 14 of the Pacific Salmon Fishery Management Plan, pursuant

to the Magnuson-Stevens Conservation and Management Act (MSA). NOAA Fisheries has determined that the measures proposed to avoid adverse effects to Federally listed species and designated critical habitat will minimize adverse effects to EFH for Pacific salmon and that additional EFH Conservation Measures are not necessary. This concludes section 7 and EFH consultation for the proposed project; however, should new information indicate that the project may effect these species in an unforseen manner, further consultation may be necessary.

If you have any questions regarding this correspondence or if NOAA Fisheries can provide further assistance to the Comprehensive Study, please contact Mr. Howard Brown in our Sacramento Area Office, 650 Capitol Mall, Suite 8-300, Sacramento, CA 95814. Mr. Brown may be reached by telephone at (916) 930-3608, or by Fax at (916) 930-3629.

Sincerely,

for Rodney R. McInnis
Acting Regional Administrator

cc: NMFS-PRD, Long Beach, CA

B.2: Cultural Resources Appendix

Appendix B.2: Cultural Resources

Regulatory Setting

"Cultural resource" is a term that refers to the imprint of human occupation left on the landscape. This imprint is manifested in the form of prehistoric and historic archeological sites, and historic buildings, structures, and objects. Archeological sites consist of artifacts, plant and faunal remains, trash deposits, and many types of features. Artifacts reflect anything that was manufactured or modified by human hands. Features can include structural remains, fire pits, and storage areas. Prehistoric archeological sites are loci of human activity occurring before European contact, which was first made in the southwest with the Spanish entrada in A.D. 1540. Prehistoric artifacts include: flaked stone tools such as projectile points, knives, scrapers, and chopping tools; ground stone implements like manos and metates; plain and decorated ceramics; and features or facilities that include subterranean and above ground architectural units, hearths, granaries, storage cysts, and trash deposits known as middens.

Historic archeological sites reflect occupation after the advent of written records. Material remaining on historic archeological sites includes refuse dumps, structure foundations, roads, privies, and any other physical evidence of historic occupation. Refuse consists of food waste, bottles, ceramic dinnerware, and cans. In a number of historic archeological situations, privies are important because they often served as secondary trash deposits. There is usually a strong interplay between historic archeological sites and written records. The archeological data is frequently used to verify or supplement historic records. Historic structures minimally include industrial facilities, roadways, bridges, and water transport or detention systems such as canals, ditches, aqueducts, pumps, and dams. Historic buildings include commercial, residential, agricultural, and ecclesiastical buildings.

There are two principal methods of locating cultural resources. Before a project is started, a records and literature search is conducted at any number of repositories of archeological site records. The search may show that an archeological or historical survey may have been conducted and some cultural resources were identified. That information may be enough to proceed with the significance evaluation stage of the project. If a conclusion were reached that (1) no previous survey had been done or (2) a previous survey were either out of date or inadequate, the project cultural resources expert, either a historian or archeologist, will conduct a survey to determine if any cultural resources are within the proposed study area boundaries.

After a cultural resource(s) has been identified during a survey or record and literature search, the appropriate Federal agency oversees a process to determine whether the cultural resource is eligible for listing in the National Register of Historic Places (National Register). Section 106 of the National Historic Preservation Act mandates this process. The Federal regulation that guides the process is 36 C.F.R. 800. For a cultural resource to be determined eligible for listing in the National Register, it must meet certain criteria. The resource has to be at least 50 years old or exhibit exceptional importance.

After meeting the age requirement, cultural resources are evaluated according to the four criteria defined below. The National Register criteria for evaluation as defined in 36 C.F.R. 60.4 are as follows:

> The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and:
> (1) that are associated with events that have made a significant contribution to the broad patterns of our history; or
> (2) that are associated with the lives of persons significant in our past; or
> (3) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
> (4) that have yielded, or may be likely to yield, information important in prehistory or history.

After a cultural resource has been determined eligible for listing in the National Register, it is accorded the same level of protection as any other property that is listed and becomes formally known as a "historic property," regardless of age. The term historic property refers exclusively to National Register eligible or listed properties.

Prehistory, Ethnography, and History References

The study area lies within an archeological sub-region of the Central Valley Region referred to as the Sacramento Valley (Moratto 1984). The potential area of potential effects (APE) for this project crosses the prehistoric territory of the Konkow. Konkow was spoken in a number of dialects along the lower reaches of the Feather River Canyon and in the adjacent parts of the Sacramento Valley. The term Konkow refers only to the Northwestern Maidu whose regional boundaries would have included the lower reaches of the Feather River and adjacent parts of the Sacramento Valley. (Sturtevant 1978). The Konkow territory included part of the Sacramento Valley floor as well as a section of the Sierra foothills east of Chico and Oroville.

Due to dam building in the last fifty years, salvage archeology has come to play a significant role in shaping the known prehistory of several Indian groups. The Maidu, and the Konkow by extension, have been best examined through excavations performed in the 1960s in the Lake Oroville area along the Feather River in the foothills of Butte County. The findings of multiple investigations revealed the development of the Mesilla, Bidwell, Sweetwater, and Oroville complexes through nearly 3,000 years. Choppers, scrapers, hammerstones, and Spire-lopped Olivella beads do not seem to have been greatly altered over time, though other artifacts did vary, and those distinguish the complexes.

The Mesilla Complex is distinguished by Haliotis and Olivella beads, charmstones, bone pins, and spatulae that indicate contact with Sacramento Valley cultures. There is evidence of sporadic or seasonal occupation of the foothills between circa 1000 B.C.

and A.D. 1 by people who hunted, as well as processed their food in bowl mortars and on millingstones.

People of the Bidwell Complex, between A.D. 1 and 800, were more stationary, living in relatively permanent villages and traveling away from permanent village locations for tasks such as hunting, fishing, and acorn and seed gathering.

Olivella bead and Haliotis ornament forms, steatite cups, platters, bowls, and tubular smoking pipes distinguish the Sweetwater Complex, dating from A.D. 800 to 1500. Other artifacts include small, lightweight projectile points of the Eastgate, Rose Spring, and Gunther Barbed types that reveal that the bow and arrow were in use by A.D. 800.

The Oroville Complex dates from A.D. 1500 until the epidemic of 1833, which decidedly marks the invasion of whites and the historic period. Characteristics of this complex include bedrock mortars and other seed-grinding implements and artifacts include bird bone tubes, gorge hooks, gaming bones, and clamshell disk beads. Evidence of several different structures, including dance houses, have been found around Lake Oroville (Moratto 1984).

The Konkow people derive their name from a native term meaning "meadowland" and their diversity to other Maidu groups, such as the Nisenan, is marked by changes in dialect and location of villages and territory. As a kind of division of the Maidu people, the Konkow share many similarities as well as differences. Precontact villages have been estimated at approximately 35 persons, with a gathering of seven houses per village and five persons per house. Several villages may have made up a village-community that probably did not exceed a population of 200. Each village-community owned and defended a known territory and was led by a headman who was the primary spokesman and lived in the central village. Each village was self-sufficient and was not bound under strict political control by the headman, who serves in an advisory capacity. The headman was selected by a shaman who conveyed the wishes of the spirits to the people.

The Konkow and Maidu religion and cosmogony is similar to creation mythology. In mythology, a creator persona, as well as a turtle, helped to create the world, with help from the sun and moon, which took on personalities and acted directly as entities. The devil took on the persona of a coyote, a mythological troublemaker, and was thought to have brought death to the people. Other mythological figures were represented as hummingbirds, lizards, dogs, and rattlesnakes. Spirits and shamans played important roles in Konkow life as advisors. Shamans often served as mediums to the spirits and communicated between spirits and the people. They had important roles in hunting and gathering traditions and served as spiritual advisors to the people.

The climate of the Konkow region was mild, with wet winters and dry summers. The winters had occasional freezing temperatures and fog and rain occurred in varying degrees through the seasons. The Feather, Yuba, Sacramento, and American rivers carved deep, narrow canyons through Konkow territory and created settlement sites situated on ridges, generally high above the rivers. Sites were also located on small flats on the crest of ridges, part way down canyon sides and on top of elevated knolls, sites that were better situated for defensive and attack positions.

During the summer the Konkow journeyed up into the mountains for hunting and down into the valleys for gathering grass seeds. Summer camps were established with structures for housing and ceremonies. The plants and animals that were gathered and hunted had multiple uses. The Konkow utilized flora and fauna to the fullest for specific purposes like food, shelter, clothing, tools, and medicines.

Common plants eaten included nuts from the digger pine, wild mint tea, cider made from manzanita, roots, and berries. Insects were also popular, with yellow jacket larvae, angleworms, locusts, grasshoppers and crickets making up part of the Konkow diet. Fishing with nets or fish traps was common. The first salmon had to be caught by a shaman. It was then cooked, and each man ate a piece before the fishing season could begin. Hunting tools included knives, spears, bows and arrows in order to catch prey. Of the many animals hunted or captured, the Konkow did not eat coyote, dog, wolf, bear or mountain lion.

Clothing during all seasons was scant and nose piercing helped to identify affiliation to secret societies, while tattoos were often worn by most village members. Willow, redbud, and hazelnut shoots were twined together to make baskets that served as both art and for purposes such as seed gathering. The Konkow basket weaving designs are distinctly different from other Maidu groups in terms of both materials used and patterns on the baskets.

Warfare between villages within a village community was more common than that between various native groups. Conflicts between villages were often due to blood revenge. This revenge could often be settled through payment of a sum of money to the offended party. The Konkow fought the Yana, while the Maidu had numerous foreign enemies, including the Washo, Yana, Achumawi and Paiute. Raiding and ambush were common warfare tactics, and the Konkow were known for capturing and torturing prisoners to death. Conflicts between the Konkow and whites began to occur after gold was discovered at Coloma in 1848. Before 1848, there had been little white intrusion into Konkow territory. Previous expeditions led by Gabriel Moraga in 1808, Captain Luis A. Arguello in 1821, and Jedediah Smith in 1828 were either far enough away from Konkow villages or not perceived as threatening by villagers.

In 1844, land grants within Konkow territory were issued and immigrants began to settle in the area. The malaria epidemic of 1833 decimated the Konkow population, along with many native groups, and the continuous discovery of gold hedged the Konkow in. The arrival of livestock and farms led to changes in the ecology that the Konkow could not battle. Their usual food sources became extinct or scarce, and natives countered the loss of their natural environment by killing and eating the settlers' livestock. Retaliation on both sides resulted until 1850 when Congress authorized treaties to place Indians on reservations. The Konkow signed one such treaty and by 1855, Konkow were removed to a reservation called Nome Lackee.

The status of the Konkow after their removal to reservations continued to decline. Like most California Indians, they suffer from high unemployment rates, poor housing and sanitation, and low educational achievement. There has been a renewed interest by Maidu and Konkow descendents in their traditional values and cultural expressions. The annual Maidu Bear Dance in Janesville is an attempt to preserve language, ceremonies, and the art of basket making among the Maidu groups. The pride of native ancestry indicates a continued interest in their cultural and history (Riddell 1978: 370-386).

At the time of Gabriel Moraga's 1808 expedition, there had been little contact between whites and Indians. Moraga set out from the Mission de San Jose with the intention of exploring California's interior for a suitable mission site. A dozen explorers traveled north and explored the San Joaquin, Cosumnes, Mokelumne and American rivers. The expedition was not considered a success since the party could not identify a suitable site and eventually the expansion of the mission system into the central valley was abandoned. In late 1821, Captain Luis Antonio Arguello, Commandant of the Presidio de San Francisco was ordered to conduct a military expedition into northern California to investigate reports of unlawful white settlement. His journal was heavily documented and recorded. Spanish law did not allow foreign settlers and Arguello and his heavily armed troop explored northern California, discovering Patwin tribes and confirming that the rumored white settlers were in fact known Russian settlers on the Pacific coast. Arguello's journal provided information on native groups in the area, and communicated the Spanish goals of securing land. When he and his troop encountered Indian villages, Arguello was clear in his intent to secure territory.

The movement of whites into the area that would become Glenn County began with those Spanish expeditions in 1808 and continued with trappers in the late 1820s before immigrants and farmers began to settle in the gold rush era. Glenn County and Hamilton City were far enough removed from the area occupied by missions to avoid European influences. Earlier Spanish expeditions confirmed that the central valley was not a suitable area for the mission system expansion. As a result, the native groups in the area did not suffer from the forced occupation and religious conversion that the missions brought to coastal and central valley native groups. Starting in 1828, fur trappers began to hunt through the Konkow territory, including Jedediah Smith and trappers from the Rocky Mountain Fur Company and Hudson's Bay Company. Trappers traveled all along the major waterways and smaller streams, introducing the malaria epidemic that decimated native populations in 1833. At least 20,000 Indians in the Central Valley were killed in the epidemic, including Nomlaki, Mechoopda, Konkow and Patwin tribes. The vast number of fur trappers along the rivers exhausted the natural environment and by the mid 1830s the rivers had been almost completely stripped. In addition to the malaria epidemic trappers and incoming settlers killed and enslaved Indians. Indians fought back with battles that were often bloody.

Glenn County was not formed until 1891, when it was separated from Colusa County. Both John Bidwell and Lieutenant John C. Fremont were early settlers to the early Glenn County area. Bidwell was employed by American Consul, Thomas O. Larkin, to scout for land grants in the Sacramento Valley. Bidwell was also employed by John Sutter to oversee commercial activity in Sutter's business concerns. Both Bidwell and Fremont owned land in the vicinity of Glenn County and had a strong interest in the economic development of the area. By 1844, Bidwell was actively searching for gold along the Bear River. His quest was interrupted by commitments as an administrator and manager to John Sutter and a 2-year stint as a Major in the U.S. Army during the Mexican War. After the Bear Flag Revolt and acquisition of the Oregon Territory, settlers began to settle both legally with Mexican land grants and illegally as squatters. In 1848, Bidwell wrote the contract between Sutter and James W. Marshall for construction of the mill on the American River where gold was discovered. Marshall's discovery served as the catalyst for the gold rush. Another early settler, Peter Lassen, worked with Fremont in 1848 to encourage out-of-state immigrants to northern California. Not much encouragement to settle in California was needed after

gold was discovered in 1848.

Transportation to the area and within the territory became a priority to incoming immigrants. The rivers became major thoroughfares to move both people and freight via ferries and all manner of steam-powered boats. Other means of transportation included horseback, wagon, and travel by coach and foot. After 1849, trails and routes to California became more developed and easier to use. Stage lines were established in the 1850s. One of the main northern stage roads went from Sacramento through Hamilton City with thirteen roadhouses and hotels along the way. Stages made daily trips and helped bring settlers and visitors further north (The Nature Conservancy 2003: 39-51).

The railroad reached northern California in the 1860s, bringing an end to major river travel. Railroads were mostly built far away from rivers and waterways to avoid the floodplain and therefore changed the economic systems developed through river travel. River communities diminished and towns began to sprout up along the railroads. Hamilton City was established along a Southern Pacific line, though the railroad was not the original catalyst for the establishment of the city. In 1905, Hamilton City was founded as the site for a large sugar beet factory. Now operated by Holly Sugar Company, the city was originally named for J.G. Hamilton, president of the original sugar company (Hoover, et al 1990: 96).

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DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO, CALIFORNIA 95814-2922

REPLY TO
ATTENTION OF

Environmental Resources Branch

Dr. Knox Mellon
State Historic Preservation Officer
Office of Historic Preservation
P.O. Box 942896
Sacramento, California 94296-0001

AUG 11 2003

Dear Dr. Mellon:

The U.S. Army Corps of Engineers, Sacramento District (Corps), is writing pursuant to 36 CFR 800.3(c)(3) to inform you of the proposed Hamilton City Flood Damage Reduction and Ecosystem Restoration feasibility study near Hamilton City and adjacent to the Sacramento River in Glenn County (enclosure 1). The area of potential effects (APE) is located on the Hamilton City, Foster Island, and Ord Ferry, California, 7.5-minute U.S.G.S. topographic maps, T22N R1W, on non-sectioned land (enclosure 2). In accordance with 36 CFR 800.4(a)(1), we are also requesting that you comment on the APE.

The Corps and The Reclamation Board of the State of California are conducting a feasibility study to develop and evaluate potential alternative plans to reduce flood damages and restore the ecosystem along the Sacramento River near Hamilton City. The feasibility study will be submitted to Congress in 2004 for consideration for Federal authorization to implement the project. State and/or local interests would be responsible for operation and maintenance of any project that is implemented.

The APE of the study area includes Hamilton City and the surrounding rural area. The study area is bounded by the Sacramento River to the east and the Glenn Colusa Canal to the west, and extends about 2 miles north and 6 miles south of Hamilton City. In accordance with 36 CFR 800.4(2), we are using a phased identification and evaluation process for the feasibility study. The proposed project is in the preliminary stage, and the APE may be adjusted as alternatives are considered and identified.

We have completed a records and literature search at the Northwest Information Center at California State University, Chico. We will also check the National Register of Historic Places and the California Historic Bridge Inventory, conduct a field survey, and obtain a list of potentially interested Native Americans from the Native American Heritage Commission.

Comments on the APE may be sent to Ms. Melissa Montag (CESPK-PD-R), U.S. Army Corps of Engineers, 1325 J Street, Sacramento, California 95814-2922. If you have any questions, please contact either Ms. Montag, Historian/Social Scientist, at (916) 557-7907 or

email: melissa.l.montag@usace.army.mil, or Mr. Richard Perry, Archeologist, at (916) 557-5218 or email: richard.m.perry@usace.army.mil. Please contact Mr. Jerry Gianelli, Project Manager, at (916) 557-7828 with any specific project questions.

Sincerely,

Tanis J. Toland

Tanis J. Toland
Chief, Environmental Analysis Section

Enclosures

STATE OF CALIFORNIA – THE RESOURCES AGENCY ARNOLD SCHWARZENEGGER, *Governor*

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
P.O. BOX 942896
SACRAMENTO, CA 94296-0001
(916) 653-6624 Fax: (916) 653-9824
calshpo@ohp.parks.ca.gov
www.ohp.parks.ca.gov

January 22, 2004

REPLY TO: COE030812A

Tanis J. Toland
Chief, Environmental Analysis Section
U.S. Army Corps of Engineers
1325 J Street
Sacramento, CA 95814-2922

Re: Hamilton City Flood Damage Reduction and Ecosystem Restoration Feasibility Study, Hamilton City, Glenn County

Dear Ms. Toland:

Thank you for your August 11, 2003 submittal that initiates consultation with me regarding the undertaking referenced above. You are consulting with me in accordance with 36 CFR Part 800, regulations implementing Section 106 of the National Historic Preservation Act. Specifically, you are requesting my concurrence with the Corps' determination of the Area of Potential Effects (APE) for this undertaking.

Your letter explains the Corps is conducting a feasibility study to develop and evaluate potential alternative plans to reduce flood damages and restore the ecosystem along the Sacramento River near Hamilton City. Your letter explains that the project is in the preliminary stage and the APE may be adjusted as alternatives are considered and identified. As long as all alternatives are contained within the red line depicting the APE you have enclosed with your letter, I do not object to the Corps' APE for this undertaking. I stress that should alternatives be implemented that are outside this area, the Corps should submit a revised APE for my review.

Your letter continues, explaining some of the efforts the Corps will put forth in the identification of historic properties. I look forward to reviewing the Corps compliance efforts pursuant to 36 CFR §800.4(a)-(d). If you have any questions about my comments, please contact staff archaeologist Anmarie Medin at (916) 653-8920 or at amedi@ohp.parks.ca.gov.

Sincerely,

for

Dr. Knox Mellon
State Historic Preservation Officer

DRAFT
January 27, 2004

Socioeconomic Profile of Hamilton City CDP (1)

2000 Population (2)	
Hispanic/Latino	1,533
White	330
American Indian	10
Asian	6
Black/African American	5
Other	19
Total	1,903
1999 Per Capita Income	
Hamilton City (2)	$9,050
Glenn County (3)	$18,015
California (3)	$29,910

(1) CDP = census designated place, which is a densely settled concentration of population that is not within an incorporated place but is locally identified by a name
(2) US Census; CDP data
(3) CA Department of Finance

B.3: Air Quality

GLENN COUNTY

AG COMMISSIONER
P.O. Box 351
Willows, CA 95988
Phone: 530.934.6501/Fax: 530.934.6503
E-mail: Agcommr@countyofglenn.net

AIR POLLUTION OFFICE
P.O. Box 351
Willows, CA 95988
Phone: 530.934.6500/Fax: 530.934.6503
E-mail: Airpollution@countyofglenn.net

Date: 7/9/03

To: JOSH GARCIA

Fax#: 916-557-7856

From: R. STEWARD

Number of pages (including this one): 3

Message:

JOSH,

2 PAGES TO FOLLOW

REGARDING MITIGATION MEASURES FOR SMALL PROJECTS.

RS

SERVER/AG/FORMS
02.06.03

MITIGATION MEASURES
SMALL PROJECTS

CONSTRUCTION PHASE

1. Grading and excavation activities shall be suspended when wind conditions exceed 20 miles per hour.

2. Trucks hauling dirt, sand, gravel, soil, or other loose material shall be covered or shall maintain at least two feet of freeboard in accordance with the requirements of California Vehicle Code §23114. This provision shall be enforced by local law enforcement agencies.

3. Construction sites shall be watered to keep dust movement at a minimum. Dust which is tracked off the construction site onto public roadways or is wind-blown off-site may be deemed a nuisance by the local air district and subject to enforcement action.

4. Incorporate the use of soil stabilizers or palliatives to minimize dust from construction activities.

5. Reestablish ground cover on the construction site through seeding and watering prior to final occupancy.

6. Provide temporary traffic control as appropriate during all phases of construction to improve traffic flow (e.g. flag person).

7. Schedule construction activities that affect traffic flow to off-peak hours.

8. Sweep streets at the end of the day if visible soil materials are carried onto adjacent public paved roads (recommend water sweeper with reclaimed water).

9. Reduce traffic speeds on all unpaved roads surfaces to 15 miles per hour or less.

LAND USE MEASURES

1. Use low-VOC (less than 3.5 pounds of VOC per gallon) architectural coatings.

2. Landscape to provide passive solar benefits.

3. Introduce energy efficient window glazing, wall insulation, and ventilation methods.

4. Incorporate sidewalks, walkways, and bike paths into the development design so that more direct and convenient access for those modes of travel which will encourage their use.

5. Orient buildings for passive solar design.

6. Tree planting in excess of that already required.

7. Landscape with native drought-resistant species to reduce water consumption and to provide passive solar benefits.

TECHNOLOGICAL MEASURES

1. Improve the thermal integrity of building(s) and reduce the thermal load with automated time clocks or occupant sensors.

2. Provide adequate high efficiency lighting for those who walk or ride at night to increase actual and perceived personal safety.

3. Incorporate appropriate high efficiency passive solar design and solar heaters.

4. Provide energy-efficient process systems, such as water heaters, furnaces, and boiler units.

5. All new wood burning devices shall be EPA Phase II certified.

6. Install an electrical outlet at the front and back of all residential units for electrical yard equipment.

TRANSPORTATION/CIRCULATION MEASURES

1. Provide adequate ingress and egress at entrances to project to minimize vehicle idling at curbsides.

2. Provide dedicated turn lanes as appropriate (in cooperation with Public Works and/or Cal Trans),

3. Site design to maximize bicycle and pedestrian access to and within the project.

B.4: Notices

BILLING CODE: 3710-EZ

DEPARTMENT OF DEFENSE

Department of the Army; Corps of Engineers

Intent to Prepare a Joint Environmental Impact Statement and Environmental Impact Report for the Sacramento and San Joaquin River Basins Comprehensive Study, Hamilton City Flood Damage Reduction and Ecosystem Restoration, Glenn County, CA

AGENCY: Department of the Army, U.S. Army Corps of Engineers, DOD.

ACTION: Notice of intent.

SUMMARY: A combined Feasibility Report and joint Environmental Impact Statement/Environmental Impact Report (EIS/EIR) will be prepared to satisfy the requirements of the National Environmental Policy Act and the California Environmental Quality Act. The U.S. Army Corps of Engineers (Corps), Sacramento District, will serve as the Federal lead agency for the EIS with The Reclamation Board of the State of California (the Board), the non-federal sponsor, serving as the State lead agency for the EIR. The combined Feasibility Report and joint EIS/EIR will evaluate the environmental effects of a potential flood damage reduction and ecosystem restoration project at Hamilton City. The Hamilton City Flood Damage Reduction and Ecosystem Restoration is the first site-specific evaluation to be initiated as a result of the Sacramento and San

Joaquin River Basins Comprehensive Study conducted by the Corps and the Board. Concurrently with the release of this notice of intent (NOI), the Board is issuing a notice of preparation (NOP) to initiate the CEQA process.

Scoping and public involvement activities were conducted under the original NOI issued for the Comprehensive Study. A series of scoping and outreach meetings were held in February through May 1998, November through December 1998, February 1999, June 1999, October through November 2001, and August through September 2002. Development of the EIS/EIR for the Comprehensive Study was at a programmatic level with the preliminary site-specific evaluation for Hamilton City Flood Damage Reduction and Ecosystem Restoration packaged as an attachment to the main programmatic document. The Comprehensive Study has since discontinued the environmental documentation effort and therefore this NOI is being submitted to establish that the Feasibility Report and EIS/EIR for Hamilton City Flood Damage Reduction and Ecosystem Restoration will continue as a separate and complete document.

FOR FURTHER INFORMATION CONTACT: Questions about the combined Feasibility Report and joint EIS/EIR can be answered by Erin Taylor at (916) 557-6862 or by mail at U.S. Army Corps of Engineers, Planning Division, ATTN: Erin Taylor, 1325 J Street, Sacramento, CA 95814-2922, or e-mail: Erin.A.Taylor@usace.army.mil

SUPPLEMENTARY INFORMATION:

1. Proposed Action.

The combined Feasibility Report and joint EIS/EIR will evaluate ways to reduce the risk of flooding and restore the Sacramento River's connection with its flood plain, natural flood plain processes, and riparian and associated flood plain habitat.

2. Alternatives.

Alternatives include the no-action, reinforcing the existing levee, several setback levee alignments at some distance from the river, and flood-proofing or relocating structures at risk of flooding, with different habitat configurations and methods of establishment. Maximum area of potential affect is estimated to be 2,600 acres currently held by a combination of private, State, and Federal agencies. Fee title and/or conservation and flood easements would likely be required to implement any project. The Corps will conduct site-specific hydrologic, hydraulic and geotechnical analyses, to determine the most suitable potential levee alignments and the feasibility of repairing the existing levee in place. The Feasibility Study will focus on the economic feasibility and will run a risk analysis of the alternatives. Ecosystem restoration would consist of either planting native habitat or allowing native habitats to establish naturally in the area between any new levee and the river. Selection of a preferred alternative will depend on the result of these studies and the desires of the local community.

3. Scoping Process.

a. This notice re-initiates the scoping process whereby the Corps and the Board will identify the scope of issues to be addressed in the EIS/EIR and identify the significant environmental issues related to the flood damage reduction and ecosystem restoration at Hamilton City. The Corps and the Board have initiated a process of involving Federal, State, and local agencies, and concerned individuals under the Comprehensive Study.

b. Significant issues to be analyzed in depth include; agricultural resources, air quality, biological resources, cultural resources, geology and soils, hazardous, toxic, and radioactive materials, hydrology and water quality, and land use.

4. Public Meeting Scoping.

Community meetings will be held during scoping, after the release of the draft EIS/EIR, and after release of the final EIS/EIR. A public scoping meeting will be held the week of January 6, 2003. The purpose of the meeting is to explain the NOI/NOP, and to solicit suggestions, recommendations, and comments to help refine the issues, measures, and alternatives to be addressed in the EIS/EIR. The public is asked to submit any issues (points of concern, dispute or disagreement) regarding potential effects of the proposed action or alternatives by mail to Corps (see FOR FURTHER INFORMATION CONTACT above for address).

5. Availability.

The draft EIS/EIR is scheduled to be available for public review and comment in August 2003. The comment period on the draft EIS/EIR will be 45 days from the date

the notice of availability is published in the Federal Register by the Environmental Protection Agency. All interested parties should respond to this notice and provide a current address if they wish to be notified of the draft EIS/EIR circulation and future scoping meeting dates.

_____ _____

Date: MICHAEL J. CONRAD JR.
COL, EN
Commanding

BILLING CODE: 3710-EZ

DEPARTMENT OF DEFENSE

Department of the Army; Corps of Engineers

Availability for the Draft Feasibility Report and Environmental Impact Statement/Environmental Impact Report for the Hamilton City Flood Damage Reduction and Ecosystem Restoration, Glenn County, CA

AGENCY: Department of the Army, U.S. Army Corps of Engineers, DoD

ACTION: Notice of availability.

SUMMARY: The U.S. Army Corps of Engineers (Corps), in coordination with The Reclamation Board of the State of California and the Hamilton City Community Services District, have prepared a Draft Feasibility Report and Environmental Impact Statement/Environmental Impact Report (DFR/DEIS-EIR) for the Hamilton City Flood Damage Reduction and Ecosystem Restoration Project, Glenn County, CA.

DATES: The DFR/DEIS-EIR is being made available for a 45-day public comment period. All comments should be submitted on or before May 17, 2004.

ADDRESSES: Send written comments to U.S. Army Corps of Engineers, Sacramento District, ATTN: Ms. Erin Taylor/Environmental Analysis Section, 1325 J Street, Sacramento, CA 95814-2922.

FOR FURTHER INFORMATION CONTACT: To obtain additional information related to this report, interested persons are invited to contact the following: Ms. Erin Taylor, Environmental Manager, U.S. Army Corps of Engineers, 1325 J Street,

Sacramento, CA 95814-2922, (916) 557-5140 or fax (916) 557-7202, email compstudy@usace.army.mil.

SUPPLEMENTARY INFORMATION:

1. Report Availability. Printed copies of the DFR/DEIS-EIR are available for public inspection and review at the following locations:

a. U.S. Army Corps of Engineers, Sacramento District, 1325 J Street, Sacramento, CA 95814-2922.

b. Hamilton City Library, Reference Section, P.O. Box 1055, Hamilton City, CA 95951-1055.

c. Bayliss Library, Reference Section, 7830 County Road 39, Glenn, CA 95943.

d. Corning Library, Reference Section, 740 3rd Street, Corning, CA 96021.

e. Orland City Library, Reference Section, 333 Mill Street, Orland, CA 95963.

f. Willows Public Library, Reference Section, 201 North Lassen Street, Willows, CA 95988.

The entire DFR/DEIS-EIR may also be viewed on the U.S. Army Corps of Engineers, Sacramento District website at the following address: http://www.compstudy.org

2. Commenting. Comments received in response to this report, including names and addresses of those who comment, will be considered part of the public record on this proposed action. Comments submitted anonymously will be accepted and considered. Pursuant to 7 CFR 1.27(d), any person may request the agency to withhold a submission from the public record by showing how the Freedom of Information (FOIA) permits such confidentiality. Persons requesting such confidentiality should be aware that under the

FOIA, confidentiality may be granted in only very limited circumstances, such as to protect trade secrets. The Corps will inform the requester of the agency's decision regarding the request for confidentiality, and where the request is denied, the agency will return the submission and notify the requester that the comments may be resubmitted with or without the name and address.

_____ _____

Date

MICHAEL J. CONRAD, Jr.
COL, EN
Commanding

B.5: Natural Resources Conservation Service (NRCS) Coordination Letters

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO, CALIFORNIA 95814-2922

REPLY TO
ATTENTION OF

September 15, 2003

Environmental Resources Branch

HUE-DANG DOUGHTE

Mr. Phil Hogan
U.S. Natural Resources Conservation Service
Woodland Field Office
221 West Court Street, Suite 5
Woodland, California 95695-3012

David Rose, Willows FO

Dear Mr. Hogan:

We are requesting a Farmland Conversion Impact Rating for our Hamilton City Flood Damage Reduction and Ecosystem Restoration Project. The rating is to help us address the impacts from constructing a setback levee and restoring the ecosystem within the new setback levee alignment and the river channel. There are currently two action alternatives and one no action alternative being considered. We are requesting an assessment of the maximum extent of potential agricultural conversion. The study area has been divided into zones for ease of assessment (attached). A maximum total of 1550 acres could be converted to restoration by this project.

Enclosed are a vicinity map, a regional map, a Farmland Conversion Impact Rating form, and the potential restoration zone map. Of note on this map, there are two areas already being restored that are not a part of this project including the DFG and USFWS property. In addition, the zone B2 is currently not being proposed for restoration.

To meet our project schedule, we would appreciate receiving your impact rating for the proposed project within 30 days. If you have any questions, contact Erin Taylor of our Environmental Resources Branch at (916) 557-6862.

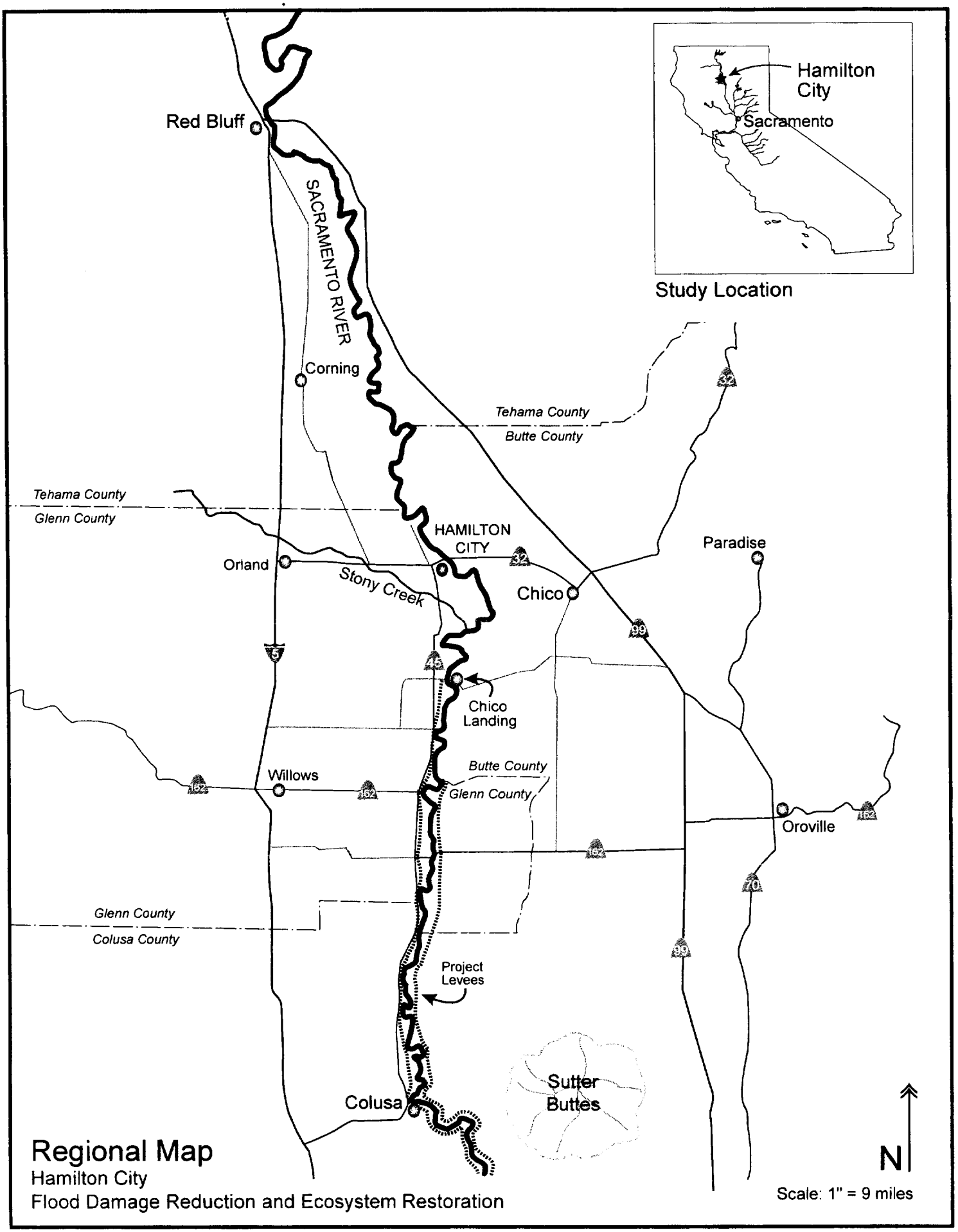
Sincerely,

Tanis J. Toland

Tanis J. Toland
Chief, Environmental Analysis Section

SEP 2003
RECEIVED

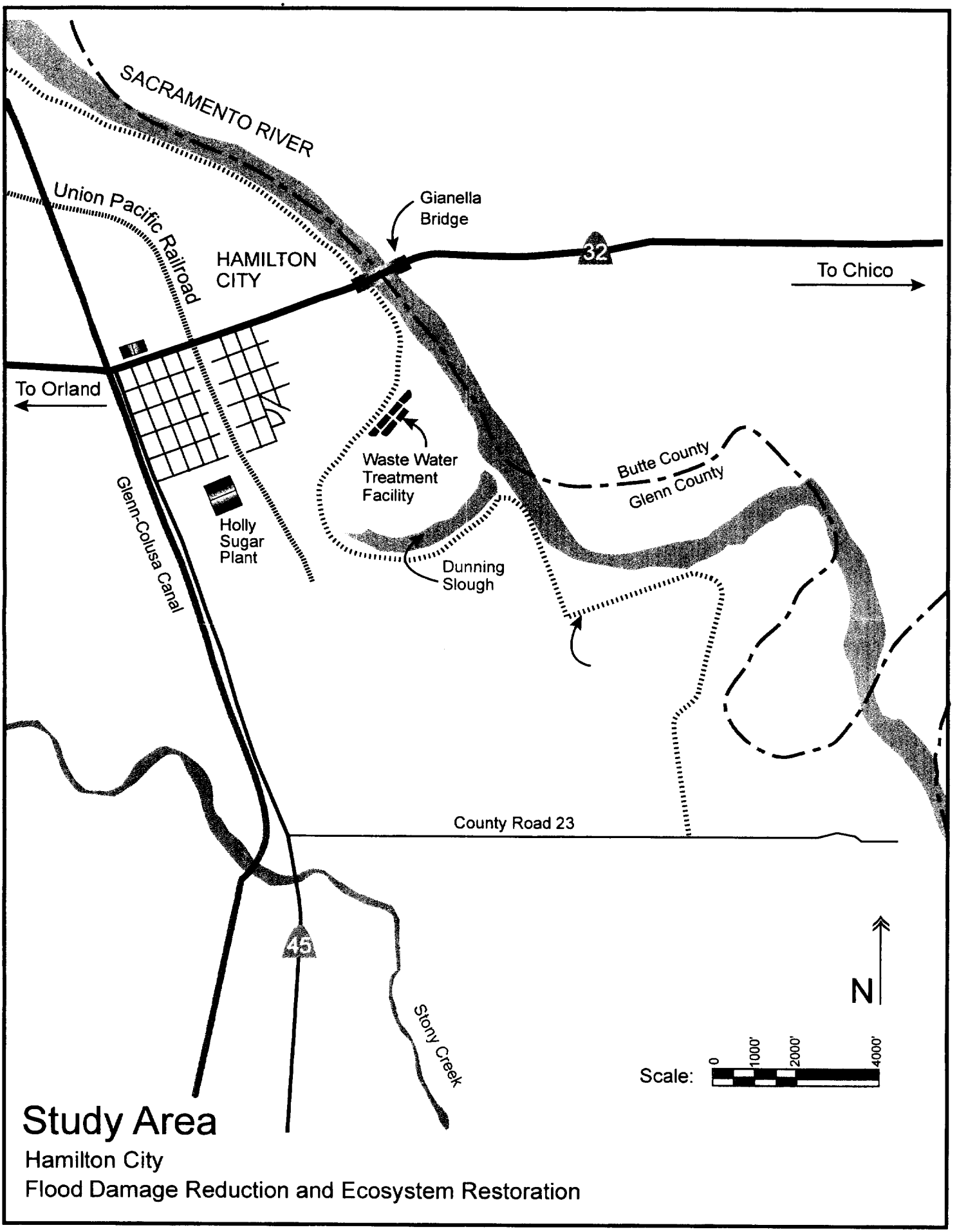
OCT 03 RECD



Regional Map

Hamilton City

Flood Damage Reduction and Ecosystem Restoration



Study Area

Hamilton City

Flood Damage Reduction and Ecosystem Restoration

Erin

USDA United States Department of Agriculture

Natural Resources Conservation Service

132 No. Enright, Suite B
Willows, CA 95988
(530) 934-4601, Ext.3

October 27, 2003

Tanis Toland
US Army Engineering District, Sacramento
Corps of Engineers
1325 J St
Sacramento, CA 95814-2922

RE – Hamilton City Project

Per your request, I have enclosed the Farmland Conversion Impact Rating for the proposed site.

The soil information shows the proposed project location does contain prime, unique, statewide, or local important farmland.

Sincerely,

Vincent Obersinner
Conservationist

Enclosures: Project soils list

10 29 03

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*	Date Of Land Evaluation Request 9/5/03
Name Of Project Hamilton City Flood Damage Reduction and Ecosy	Federal Agency Involved U.S. Army Corps of Engineers
Proposed Land Use Setback levee and Restoration	County And State Glenn County, California
PART II *(To be completed by NRCS)*	Date Request Received By NRCS 9/30/03

Does the site contain prime, unique, statewide or local important farmland? *(If no, the FPPA does not apply -- do not complete additional parts of this form).* Yes ☑ No ☐

Major Crop(s): Rice, alfalfa, pasture	Farmable Land In Govt. Jurisdiction Acres: 451,163 % 53	Acres Irrigated 213,111	Average Farm Size 250
Name Of Land Evaluation System Used: California System	Name Of Local Site Assessment System: N/A	Amount Of Farmland As Defined in FPPA Acres: 212,605 % 25	Date Land Evaluation Returned By NRCS 10/27/03

PART III *(To be completed by Federal Agency)*

	Alternative Site Rating			
	Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly	1,550.0			
B. Total Acres To Be Converted Indirectly	0.0			
C. Total Acres In Site	1,550.0	0.0	0.0	0.0
PART IV *(To be completed by NRCS)* Land Evaluation Information				
A. Total Acres Prime And Unique Farmland	1195			
B. Total Acres Statewide And Local Important Farmland	186			
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted	0.34%			
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value				
PART V *(To be completed by NRCS)* Land Evaluation Criterion Relative Value Of Farmland To Be Converted *(Scale of 0 to 100 Points)*	0 75	0 (Storie Index)	0	0

PART VI *(To be completed by Federal Agency)*

Site Assessment Criteria *(These criteria are explained in 7 CFR 658.5(b)*		Maximum Points					
1. Area In Nonurban Use	15	15	– 90% or more non-urban				
2. Perimeter In Nonurban Use	10	10	– 90% or more perimeter non-urban				
3. Percent Of Site Being Farmed	20	20	– 90% or more farmed for more than 5 of last 10 years				
4. Protection Provided By State And Local Government	20	7	– about ½ of site protected. Score ½ of total				
5. Distance From Urban Builtup Area	15	0	– part of levee less than 750' from town				
6. Distance To Urban Support Services	15	6	– part of levee less than 1.5m from town				
7. Size Of Present Farm Unit Compared To Average	10	7	– 210/250 = .84				
8. Creation Of Nonfarmable Farmland	10	1	– does not impact neighboring farming				
9. Availability Of Farm Support Services	5	5	– area farmed to assume nearby				
10. On-Farm Investments	20	18	– high quality on-farm investments - orchards, irrigation				
11. Effects Of Conversion On Farm Support Services	25	9	– some reduction in demand				
12. Compatibility With Existing Agricultural Use	10	3	– somewhat incompatible				
TOTAL SITE ASSESSMENT POINTS	75	160	0 98	0	0	0	

PART VII *(To be completed by Federal Agency)*

Relative Value Of Farmland *(From Part V)*	100	0 75	0	0	0	
Total Site Assessment *(From Part VI above or a local site assessment)*	160	0 98	0	0	0	
TOTAL POINTS *(Total of above 2 lines)*	260	0 173	0	0	0	

Site Selected: | Date Of Selection | Was A Local Site Assessment Used? Yes ☐ No ☐

Reason For Selection:

T = T/A

(See Instructions on reverse side)

This form was electronically produced by National Production Services Staff

Form AD-1006 (10-83)

GLENN COUNTY SOILS IN PROJECT SITE					
				---FARMLAND--	
SYMBOL	LCC	MAP UNIT	DEPTH	PRIME	STATE WIDE IMPORT
AoA	IIIs4	Arbuckle gravelly loam, 0 to 2 % slopes, grvly lm	60	Y	
CeA	IIIc1	Columbia fine sandy loam, 0 to 2 % slope	60	Y	
CgA	IIIw2	Columbia loamy fine sand, coarse variant, 0-2 % slopes	60	Y	
ChA	IIIw2	Columbia silt loam, 0 to 2 % slopes	60	Y	
ChB	IIIw2	Columbia silt loam, 2 to 8 % slopes	60	Y	
Wn	IIIc1	Wyo silt loam	60	Y	
Cf	IIIw0	Columbia fine sandy loam, moderately deep over sand and gravel, 0 to 2 % slopes	60		Y
Cl	IIIs3	Columbia silt loam, moderately deep, over clay pan, 0 to 1 % slopes	60		Y
Cm	IIIs0	Columbia silt loam, moderately deep over gravel, 0 to 2 % slopes	60		Y
CpB	IIIw3	Columbia silt loam, water table, 1 to 8 % slopes	60		Y

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*		Date Of Land Evaluation Request 9/5/03	
Name Of Project Hamilton City Flood Damage Reduction and Ecosy		Federal Agency Involved U.S. Army Corps of Engineers	
Proposed Land Use Setback levee and Restoration		County And State Glenn County, California	
PART II *(To be completed by NRCS)*		Date Request Received By NRCS 9/30/03	
Does the site contain prime, unique, statewide or local important farmland? *(If no, the FPPA does not apply -- do not complete additional parts of this form).*	Yes ☑ No ☐	Acres Irrigated 213,111	Average Farm Size 250
Major Crop(s) Rice, almonds, prunes	Farmable Land In Govt. Jurisdiction Acres: 451,163 % 53	Amount Of Farmland As Defined in FPPA Acres: 212,005 % 25	
Name Of Land Evaluation System Used California System	Name Of Local Site Assessment System N/A	Date Land Evaluation Returned By NRCS 10/27/03	

PART III *(To be completed by Federal Agency)*	Alternative Site Rating			
	Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly	1,550.0			
B. Total Acres To Be Converted Indirectly	0.0			
C. Total Acres In Site	1,550.0	0.0	0.0	0.0
PART IV *(To be completed by NRCS)* Land Evaluation Information				
A. Total Acres Prime And Unique Farmland	1195			
B. Total Acres Statewide And Local Important Farmland	186			
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted	0.34%			
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value				
PART V *(To be completed by NRCS)* Land Evaluation Criterion Relative Value Of Farmland To Be Converted *(Scale of 0 to 100 Points)*	0 75	0 (Storie INDEX)	0	0

PART VI *(To be completed by Federal Agency)* Site Assessment Criteria *(These criteria are explained in 7 CFR 658.5(b)*	Maximum Points				
1. Area In Nonurban Use					
2. Perimeter In Nonurban Use					
3. Percent Of Site Being Farmed					
4. Protection Provided By State And Local Government					
5. Distance From Urban Builtup Area					
6. Distance To Urban Support Services					
7. Size Of Present Farm Unit Compared To Average					
8. Creation Of Nonfarmable Farmland					
9. Availability Of Farm Support Services					
10. On-Farm Investments					
11. Effects Of Conversion On Farm Support Services					
12. Compatibility With Existing Agricultural Use					
TOTAL SITE ASSESSMENT POINTS	160	0	0	0	0
PART VII *(To be completed by Federal Agency)*					
Relative Value Of Farmland *(From Part V)*	100	0	0	0	0
Total Site Assessment *(From Part VI above or a local site assessment)*	160	0	0	0	0
TOTAL POINTS *(Total of above 2 lines)*	260	0	0	0	0

Site Selected:	Date Of Selection	Was A Local Site Assessment Used? Yes ☐ No ☐

Reason For Selection:

(See Instructions on reverse side)

This form was electronically produced by National Production Services Staff

Form AD-1006 (10-83)

B.6: Water Quality

CLEAN WATER ACT SECTION 404(b)(1) EVALUATION

Hamilton City Flood Damage Reduction and Ecosystem Restoration, California

I. PROJECT DESCRIPTION

A. Location.

The Hamilton City Flood Damage Reduction and Ecosystem Restoration project (Hamilton City project) is located near Hamilton City, California. The project area starts at Country Road 203, 1.5 miles north of Hamilton City, crosses Highway 32, 0.65 miles east of Hamilton City, and ends at Highway 23, 1.8 miles south of Hamilton City. Hamilton City is located 36 miles north of Colusa, California.

B. General Description.

The Hamilton City project would provide Hamilton City with flood protection with a setback levee built to the U.S. Army Corps of Engineers (Corps) requirements. The project would also help reconnect the Sacramento River to portions of the floodplain and restore some of the habitat along the river that was disconnected from the river due to past flood control protection.

C. Description of Dredge or Fill Material.

The proposed fill material would be up to 60 feet of rock riprap placed on and around the Gianella Bridge abutment to protect the bridge from erosion.

D. Alternatives

1. No Action.

Under this alternative the Corps would not construct or restore the levees around Hamilton City. There would be no restoration of the flood plans near the Sacramento River. The "J" levees would continue to be privately maintained and flood fighting would continue to be required during high flow events in the river. The levees would continue to be relatively poor geotechnical condition and erosion at the toe of the levee at the northern end of the "J" levee would continue. Other habitat restoration on DFG and USFWS property and flood control projects would continue in the Hamilton City area.

2. Alternative 1

This alternative would construct a 6.6-mile long and 6-foot tall levee roughly 500 to 7,600 feet from the river. Most of the existing "J" levee would be removed or breached to reconnect the river to the surrounding flood plan. Approximately 1,300 acres of land would be restored.

North of Highway 32, the levee alignment ties to the newly constructed Glenn County backup levee and runs roughly parallel to and approximately 500 feet to the west of the Sacramento River. At Highway 32, the levee would tie into the existing approach to the Gianella Bridge. The highway would not be raised, but approximately 60 feet of rock riprap would be placed on and around the abutment.

South of Highway 32, the alignment would cut across the easternmost section of the Irvine Finch River Access, requiring modifications of the river access entrance and parking lot. The alignment would also cut across a portion of Dunning Slough providing protection to the Hamilton City wastewater treatment ponds, abandoned holding ponds for the Holly Sugar plant, and a lime disposal pile. Approximately 1,500 feet of rock would be placed on the setback levee in Dunning Slough as erosion protection.

All the land on the waterside of the setback levee would be actively restored to riparian, scrub, oak savannah, willow scrub, and grassland habitat. The "J" levee would be breached or removed, except for the portions of the levee that would reduce flow velocities for the established restored habitats.

At the north end of the project, entrenched rock would be buried in a 1,500 foot-long trench parallel to County Road 203 and approximately 200 feet from the toe of the levee. The new levee at the southern end of the project area would be planted to a significant amount to protect the levee from erosion due to water velocities.

3. Alternative 4

This alternative would construct a 4.1-mile long and 6-foot tall levee, set back approximately 500 to 2,700 feet from the river. This alternative would remove most of the existing "J" levee and restore approximately 1,100 acres of habitat. The levee alignment between where the levee ties into the Glenn County backup levee to the southern end of Dunning Slough is the same as Alternative 1. The levee would then wrap around Holly Sugar Plant and tie into the high ground along Highway 45.

The location and amount of riprap and entrenched rock would the same as alternative 1.

4. Alternative 5

This alternative would construct a 5.3-mile long and 6-foot tall levee, remove most of the existing "J" levee to reconnect the river to the surrounding flood plain, and restore 1,600 acres of native vegetation.

The setback levee alignment would begin two miles north of Hamilton City, where the northern end of the levee ties into high ground. The levee would then run southeast along County Road 203 until turning east and run parallel to and about 1,300 feet west of the Sacramento River, following higher ground. On the eastern edge of the

town, the levee would cross Highway 32 and run south along a new housing development. This alignment would require raising Highway 32, protecting the highway and bridge from erosion due to a flood event, and relocate a remnant slough that creates emergent wetland habitat and is used to detain and convey storm water runoff. At the south end of town, the levee would wrap around Dunning Slough and then follow the western edge of The Nature Conservancy property before turning east and ending at the southern end of the "J" levee at Road 23 with a training dyke continuing below that line. This alternative dose not tie into the high ground and would allow for backwater to flood adjacent agriculture land.

On the waterside of the setback levee, approximately 1,600 acres of land would be restored to natural habitat. 1050 acres of riparian, 300 acres of scrub, 150 acres of savannah, and 100 acres of grassland would be restored. The "J" levee would be removed except for the portions that would protect the restoration from water velocities. Native vegetation would restore most of the TNC lands that is in the study area. Restoration would occur on the land directly east of Hamilton City between Highway 32 and Dunning Slough, and land in Dunning Slough. Existing orchards in the project area would be removed and native vegetation would be planted.

Erosion controls would be the same as Alternative 1.

5. Alternative 6

This alternative would construct a 5.7-mile long and 6-foot levee, remove most of the existing "J" levee, and restore 1,500 acres of native vegetation.

North of Highway 32, the levee would tie into the high ground at the northern end of the "J" levee, about two miles north of Hamilton City. The levee would run south along County Road 203 until turning east and run parallel to and about 1,300 feet to the west of the Sacramento River, following higher ground. At Highway 32, the levee would turn east and run parallel to the highway until tying into the approach to Gianella Bridge. The highway would not be raised in this alternative plan, but 1,000 foot of rock riprap would be placed on and around the bridge abutment.

South of Highway 32, the levee would follow the existing "J" levee. Some modifications would be done to the river access entrance and parking lot during the levee construction. The alignment would cross a portion of Dunning Slough providing protection to the Hamilton City wastewater treatment plant, some abandoned holding ponds for the Holly Sugar plant, and a lime disposal pile.

South of Dunning Slough, the levee alignment is same as alternative 4, except that the land directly east of Hamilton City between Highway 32 and Dunning Slough would be restored and the area south of Road 23 would be restored. The levee would continue south of Road 23 in the form of a training dyke.

The re-vegetation would be restored to riparian forest, scrub, oak savannah, willow scrub, and grasslands. The land in the middle of Dunning Slough would be restored to an oak savannah due to the higher elevation. Most of the "J" levee would be removed, except for the portions that would be used to reduce the water velocities of the Sacramento River.

The erosion controls would be the same as Alternative 1.

7. Preferred Alternative.

The preferred alternative has been identified as Alternative 6.

II. FACTUAL DETERMINATIONS.

A. Physical/chemical Characteristics and Anticipated Changes.

1. Suspended Particulates; Turbidity.

Turbidity could affect the water quality of the Sacramento River in the project area during the placement of the rock riprap on and around the Gianella Bridge abutment and during any construction work that may occur near the riverbank. The construction work that would be near the river or the construction that may affect water quality includes restoration work, orchard removal, levee breaching, and placing rock riprap in the river under the Gianella Bridge.

2. Current Patterns and Circulation.

There would be no change to the flow patterns of the Sacramento River.

3. Normal Water Level Fluctuations.

There would be no change to the river's water levels.

4. Water Quality (temperature, salinity patterns, and other parameters).

Temperature and salinity would not be affected by this project. Construction could have a temporary adverse effect on water quality due to heavy equipment operation, exposure of bare soil areas during storm events, breaching of the existing levees. These activities could result in erosion during a storm or flood event, increase turbidity, or sedimentation released into the Sacramento River. The setback levee would be constructed away from the river and would not affect the water quality of the Sacramento River. These effects would be a temporary adverse affect on water quality during the construction of the project. After construction is complete the water quality of the Sacramento River would return to preexisting conditions.

Alternative 5 would place fill material into a drainage ditch utilized by Hamilton City to contain runoff and would not be subject to the 404(b)(1) evaluation for the construction of the setback levee. A total of 45 acres of wetlands would be restored in the restoration area waterside of the setback levee at 3:1 ratio to off set the adverse effects to the ditch/wetland.

5. Flood Control Functions.

The removal of most of the "J" levee and the construction of the setback levee would reconnect the river to the surrounding floodplain. The reconnection to the floodplain would increase the flood capacity of the river near Hamilton City. The setback levee would provide the Hamilton City area with the required flood damage protection.

6. Storm, Wave, and Erosion Buffers.

There are no storm or wave buffers associated with this project.

The restored areas of land on the waterside of the setback levee would help stabilize the banks of the river in the project area. To protect the Gianella Bridge from bank erosion 1,000 feet of rock riprap would be placed on and around the bridge abutment. This would protect the riverbanks under the bridge from erosion due to water velocities during a flood event. Entrenched Rock would be Buried in a 1,500 foot-long trench at the north end of the levee. The trenched rock would be placed parallel to County Road 203 and approximately 200 feet from the toe of the levee. At Dunning Slough 500 feet of rock riprap would be placed along the levee at the bend that would be exposed to overland water flows. At the southern most end of the levee would be planted with significant amounts of vegetation to reduce the water velocities at the levee.

7. Erosion and Accretion Patters.

The erosion of the levee toe at the northern end of the existing "J" levee would be repaired and protected. The construction of the setback levee and the restoration sites would be protected from erosion with plantings. Erosion at the Gianella Bridge would be protected by rock riprap.

8. Actions to Minimize Effects.

Silt fences, wattles, straw mulch, detention ponds and other best management practices as needed would be used to keep sediment and storm water runoff from entering the Sacramento River. Rock riprap would be washed before being placed in the river for erosion protections. Avoid destroying existing vegetation when possible, seed and stabilize all disturbed soils after construction is complete, and the development of an erosion and sediment control plan incorporating a site drainage plan consistent with the Regional Water Quality Control Board would be developed by the contractor to minimize the adverse effects to water quality.

B. Biological Characteristics and Anticipated Changes.

1. Special Aquatic Sites (wetlands, mudflats, coral reefs, pool and riffle areas, vegetated shallows, sanctuaries, and refuges, as defined in 40 CFR 230,40-45).

Fill and discharge would not affect any special aquatic habitats in the project area. Wetlands and other special aquatic habitats as practical would be fenced off to keep construction equipment out of the area.

2. Fish and Aquatic Habitat.

The setback levee would reconnect the river to the surrounding flood plain. The creation of vegetation and trees on the banks of the river would create shaded riverine aquatic habitat, which would moderate the water temperatures, provide a food source habitat, and cover habitat for birds and several fish species. The project would permanently remove 1,000 foot of aquatic habitat from the project area due to the placing of riprap around the abutment of the Gianella Bridge.

3. Special Status Species.

The special status species that could be adversely affect by the project include the valley elderberry longhorn beetle, Central Valley spring-run chinook salmon, Central Valley steelhead, critical habitat for the winter-run chinook salmon, bank swallow, Swainson's hawk, and western yellow-billed cuckoo. The project would temporary adversely affect these species during construction due to equipment operation, noise, vibrations, and the temporary loss of habitat. The restoration of the habitat between the setback levee and the river would benefit the special status species by providing better quality and quantity of habitat in the project area. Planting additional elderberry plants in the project area according to Section 7 consultation for the Endangered Species Act with the U.S. Fish and Wildlife Service would mitigate for the adverse affects to the valley elderberry longhorn beetle.

The placement of the rock riprap at the bridge would temporarily adversely affect the listed fish species due to sediment and turbidity. This would return to preexisting conditions after construction is complete. The restoration would provide more habitat for the listed fish species and the shaded riverine aquatic habitat would help improve the water quality by moderating the water temperatures.

4. Effects on Aquatic Food Chain.

The temporary increase of sediment could increase the difficultly of aquatic species ability to forage in areas where the turbidity has increase. The turbidity would return to preexisting conditions.

5. Other Wildlife.

Wildlife would experience temporary disturbance and displacement due to construction noise, vibrations, temporary habitat loss, and activity during the construction of the project. Displaced wildlife is expected to return to the project area after construction is complete. The increase in quality and quaintly of the habitat in the project area would help increase the populations and diversity of the wildlife in the project area after the restoration has been completed. The creation of wetlands and riparian habitat would provide habitat for amphibians and reptiles.

6. Actions to Minimize Effects.

Construction would be confined to the smallest area as possible. Best management practices would be used to control the amount of sediment entering the river and protection form erosion during a storm or flood event. Consultations with the Regional Water Quality Control Board and other State and Federal agencies would be done to further develop mitigation measures and the application of best management practices to prevent any adverse affect on the water quality of the Sacramento River.

C. Proposed Disposal Site Determinations.

1. Mixing Zone Determination.

Not applicable.

2. Determination of Compliance Application Water Quality Standards.

No water quality standards would be violated. There would be some minor, short-term increase in sediment and turbidity. These adverse effects would be minimized by developing best management practices and mitigation measures that protects the water quality of the river during construction.

D. Human Use Characteristics and Impacts

1. Municipal and Private Water Supply.

This project would survey for any water supple intakes in the project area and apply appropriate mitigation measures to keep sediment and turbidity from entering the intakes.

2. Recreational and Commercial Fisheries.

There would be short-term adverse affects on recreational fisheries in the project area. Access to the recreational facilities could be adversely affected during the construction of the setback levee. Modifications to the access would be conducted as needed to allow the public access to the facility during construction. The project would have long term benefits for recreational fishing by creating addition habitat for fisheries, which would increase the population of fish in the project area. The effects to commercial fisheries would be similar to recreational fisheries.

3. Water Related Recreation.

The adverse affects and long-term benefits would be the same as the recreational and commercial fisheries.

4. Parks, National, Historical Monuments, National Seashores, Wild and Scenic Rivers, Wilderness Areas, and Research Sites.

This project would have no effect on parks, national, historical monuments, national seashore, wild and scenic rivers, wilderness area, and research sites. Historical and cultural sensitive sites would be avoided during construction.

E. Determination of Cumulative Effects on the Aquatic Ecosystem.

This project would have cumulative long-term benefits with other restoration projects near the project area. This project could have an adverse significant affect on agriculture land due to the loss of agriculture land in other parts of Central Valley. The long-term productivity of the agriculture in the project area has been decreasing due to flooding and erosion in the project area. The improved flood protection would contribute to higher long-term productivity on agricultural lands on the landside of the setback levee.

F. Determination of Secondary Effects on Aquatic Ecosystem.

There would be no adverse secondary effects to the water quality and aquatic habitat anticipated from the project construction. There would be some minor, short-term adverse construction effects. Best management practices would be implemented to minimize these adverse effects.

III. FINDINGS OF COMPLIANCE

A. Adaptation of the Section 404(b)(1) Guidelines to this Evaluation.

No significant adoption of the guidelines was made for this evaluation.

B. Evaluation of Availability of Practicable Alternatives to the Proposed Discharge Site, Which Would Have Less Adverse Effect on Aquatic Ecosystem.

There are no other practicable alternatives to the proposed action.

C. Compliance with Applicable State Water Quality Standards.

The proposed fill would not violate any applicable State water quality standards.

D. Compliance with Applicable Toxic Effluent Standard or Prohibition Under Section 307 of the Clean Water Act.

The proposed fill would not violate the toxic effluent standards of Section 307 of the Clean Water Act.

E. Compliance with Endangered Species Act of 1973.

The proposed fill would not have a significant adverse effect on any endangered species or critical habitat.

F. Compliance with Special Protection Measures for Marine Sanctuaries Designated by the Marine Protect, Research, and Sanctuaries Act of 1972.

The project is not located in an area that would affect marine resources.

G. Evaluation of Extent of Degradation of the Waters of the United States.

The proposed fill activities would have minor, short-term adverse effects on sedimentation and turbidity. This project should have some long-term beneficial effect on sedimentation and turbidity.

H. Appropriate and Practicable Steps to Minimize Potential Adverse Effects of the Discharge on the Aquatic Ecosystem.

The project would develop vest management practices and mitigation measures to avoid significant adverse effects on water quality.

I. On the basis of the Guideline, the proposed disposal site for the discharge of fill material is specified as complying with the requirements of these Guidelines.

B.7: Land Evaluation and Site Assessment/Farmland Conversion

SUPPLEMENTAL INFORMATION ON CONVERSION OF AGRICULTURAL LANDS

ASSESSMENT OF EFFECTS OF CONVERSION OF AGRICULTURAL LANDS

The Hamilton City Feasibility Study is an integrated document combining a Feasibility Study with an Environmental Impact Statement/Environmental Impact Report (EIS/EIR). The EIS/EIR is written to comply with the National Environmental Policy Act and the California Environmental Quality Act (NEPA/CEQA). In particular, to comply with CEQA an impacts assessment of resources is required and the significance of any impacts disclosed and minimized to less than significant levels with suitable mitigation measures, if possible.

One resource that is assessed in the EIS/EIR is farmland. In an effort to assess the effect on the environment from the conversion of farmland to other uses, both qualitative and quantitative assessment tools are available. The California Department of Conservation recommended that the Land Evaluation and Site Assessment (LESA) be used for this project. The LESA model is an optional methodology that can be utilized in a CEQA assessment to ensure that significant effects on the environment of agricultural land conversions are quantitatively and consistently considered in the environmental review process. (Section 21095, Public Resource Code). This model was applied experimentally for this restoration project**. The model was found to be an inadequate application for assessing the potential effects of restoration projects for many reasons.** Problems of the model include that it does not allow weighing of the relative benefits and effects of each alternative plan, nor does it consider the future without-project condition. Rather, the model assumes that any action that would change the use of important farmlands away from agricultural use will have an adverse physical effect on soils. The model then quantifies the degree of the effect based on limited factors such as the inherent quality and location of the soils. A soils assessment tool is not a complete assessment of the conversion of agriculture to restoration and should not be considered as such. Many factors should be taken into consideration when assessing impacts of conversion of agriculture to restoration. The fundamental premise of the LESA model is that a change in the use of important farmland may be a significant effect on the soils. A number of factors that the LESA model does not take into consideration are:

- Flood damage reduction benefits to neighboring agricultural land from construction of the levee provided in the tentatively recommended plan (which are benefits the agricultural land owners specifically desire).

- Land was purchased from willing sellers. Local agriculture landowners sold lands near the river that were problematic to farming due to erosion, seepage and scouring flood flows and retained ownership of lands that they anticipated would ultimately be landside of a setback levee which would benefit from the project as a whole which includes the multi-purposes of flood damage reduction and ecosystem restoration.

- The effect on farmland will vary depending upon the use to which it is converted. Conversion of lands to native habitat would actually improve soils.

The LESA model, though being based in soil parameters, does not account for the benefit to soils that would be realized by conversion of agricultural lands to native habitat due to reintroduction of natural organisms to the soil, deposition of sediment, decreased tillage, and reduction of exposure to chemicals used in agricultural production.

- Expenditure of public and private resources to protect existing lands. Public and private resources have been expended for years reinforcing the existing "J" levee, once exhausting Glenn County's entire flood protection budget, protecting the area from flooding. Such expenditure, necessary in emergency situations, are not necessarily cost effective.

- Without a project, agriculture is expected to decline in the area because ongoing erosion, seepage, and flood-related issues will continue, resulting in depreciating land values.

- Benefits to fish and wildlife from contributions to a regional habitat corridor that would be created because the project would connect other public lands in or planned for restoration (USFWS, DFG, CVPIA, CALFED, and SRCAF).

- Benefits due to the reestablishment of floodplain processes to the restoration area, including overbank flooding, localized scouring, and sediment deposition.

Based on the bulleted items, it has been determined that the LESA model is based on assumptions that do assess adverse but not beneficial effects of ecosystem restoration projects. When taking into consideration the bulleted items, conversion of agricultural lands for ecosystem restoration should be considered beneficial to soils.

It should be highlighted that the experimental application of the LESA model identified a significant effect from the conversion of farmland to native habitat. This evaluation was discussed in an earlier administrative draft document for the study. The administrative draft was provided for review to agencies that are partners in funding this study (California Bay-Delta Authority – formerly CALFED, and The Reclamation Board) for their consideration and comment. The administrative document was then provided for review to the State Department of Food and Agriculture for comment. The Reclamation Board determined, with input from other State agencies, that the LESA model was not an appropriate tool to measure the potential effects from the conversion of agricultural land for ecosystem restoration projects

It should be underscored that one of the purposes of this project is to restore the significant natural resources that have been lost over time due to changes in land use, and the potential project would contribute to repairing and restoring that loss. The Federal government has made a preliminary determination that it has an interest in participating in the restoration of those lost natural resources.

CONSISTENCY WITH THE CALFED BAY-DELTA AUTHORITY RECORD OF DECISION

Several state agencies have contributed funds to prior efforts leading up to this project and to the non-Federal funding for this study. CALFED funded half of the funding necessary to complete the study. A CALFED state agency may be the non-Federal sponsor for implementing the project. Accordingly, this project has been developed to be consistent with the CALFED Programmatic Record of Decision (ROD) (August 2000).

The following paragraph from the CALFED ROD describes the relationship between the CALFED Bay-Delta Program Final Programmatic EIS/EIR and projects developed within the purview of the Sacramento and San Joaquin River Basins Comprehensive Study, of which Hamilton City is part. "The following action which was not analyzed in the Final Programmatic EIS/EIR and will, therefore, require additional environmental review; The CALFED Agencies intend that final development and implementation of actions under the Comprehensive Study will be coordinated and consistent with the CALFED Bay-Delta Program." (CALFED ROD p. 38)

Because this project is intended to be consistent with the CALFED ROD, the Corps and The Reclamation Board considered the strategies described in the ROD, Attachment A, in developing the project description and the alternatives. In addition, the agencies considered the programmatic commitments related to implementation of CALFED actions to ensure this project would be consistent with the ROD, which are discussed later in this section. The project would be consistent with the following measures set forward in the ROD:

- **Site and align Program features to avoid or minimize effects on agriculture.**

  The Hamilton City levee alignment is based on floodplain topography, frequency and depth of flooding, hydraulic analyses, location of land available for habitat restoration, input from local landowners, and protection of existing infrastructure, including agricultural operations. A 157-acre parcel of land that is currently owned by TNC is not included in the project because it was not needed based on the above analyses. Some form of permanent agricultural protection for this parcel is under consideration.

- **Examine structural and nonstructural alternatives to achieve project goals in order to avoid effects on agricultural land.**

  The Corps is required to consider non-structural measures in the planning process. The Corps defines non-structural measures as project features that would not significantly alter the nature or extent of flooding, generally by changing the use made of the floodplains, or by accommodating existing uses to the flood hazard. Nonstructural measures were considered as part of the alternative plan formulation process. Most were screened out from further consideration based on lack of local support and because they were not cost-effective.

  A project goal (or objective per Federal planning guidelines) of the project is to reduce damages from flooding in the area. A large portion of the without-

project damages in the area is related to the flooding of agricultural lands. Therefore, part of the intent of the project is to reduce damages to agricultural lands, which includes removal of elements vulnerable to damage from the flooding.

- **Implement features that are consistent with local and regional land use plans.**

  Although this project is designed to stand alone, it complements a set of other projects The Nature Conservancy (TNC) and the Sacramento River Conservation Area Forum (SRCAF) members are developing. Collectively, these projects accomplish habitat protection, habitat restoration, improved ecosystem processes, coordinated floodplain management, and habitat restoration monitoring, thereby addressing many of CALFED Bay Delta Authority Implementation Plan goals, Ecosystem Restoration Program (ERP) Goals 1, 2, 4, 5, and 6, Key CALFED Science Program goals, Sacramento Region Priorities 1, 3, 4, 7 and Central Valley Project Improvement Act (CVPIA) goals and priorities.

- **Involve all affected parties, especially landowners and local communities, in developing appropriate configurations to achieve the optimal balance between resource effects and benefits**.

  Landowners and the local community have been extensively involved in this project and have helped develop the alternative alignments that were analyzed. The project has regularly been discussed at the Hamilton City Community Service District meetings and at the Sacramento River Conservation Area Forum meetings. A public scoping meeting was held in Hamilton City on January 9, 2003, and an additional public workshop, which focused on the development of alternative plans, was held in Hamilton City on June 12, 2003. In addition to the public workshops, a series of plan formulation meetings were held from December 2002 through January 2003 to discuss the problems, opportunities, significant resources, and potential measures and alternatives. The meetings included study team members and representatives from the local community and interested agencies and organizations. Participants in the meetings included:

  - Local Landowners and Residents
  - Hamilton City Community Services District
  - Glenn County Public Works Department
  - Butte County Public Works Department
  - Glenn Colusa Irrigation District
  - U.S. Fish and Wildlife Service
  - NOAA Fisheries
  - The Nature Conservancy
  - California Department of Fish and Game
  - Sacramento River Partners
  - Sacramento River Conservation Area Forum
  - Sacramento River Preservation Trust
  - California Department of Transportation (Caltrans)

- California Department of Parks and Recreation

Members of the study team regularly attended Hamilton City Workgroup meetings to report on the progress of the study, solicit feedback from the workgroup, and answer questions. These meetings were held at the Hamilton City Fire Hall approximately every two months over the course of the study. The Hamilton City Community Services District led the meetings and the Sacramento River Conservation Area Forum helped with meeting facilitation. The purpose of the meetings was to provide a forum to discuss and coordinate water resources related studies, projects, and other issues affecting the Hamilton City area. Local landowners and residents, representatives of local, State, and Federal agencies, representatives from State and Federal elected officials, representatives from non-profit organizations, and others attended the meetings. Information provided by the local and regional interest groups and individuals guided the identification of resources problems and helped formulate the alternative plans to address the problems and identification of the tentatively selected plan. The Hamilton City Feasibility Study has also periodically been discussed at the Sacramento River Conservation Area Forum (SRCAF) Board meetings.

A final public meeting will be held in Hamilton City upon the release of the draft Feasibility Report/EIR/EIS to present the findings of the feasibility study and to provide the public an opportunity to express their views on the results and recommendations of the Hamilton City Feasibility Study.

- **Restore existing degraded habitat as a priority before converting agricultural land.**

  Restoration of about 181 acres of existing degraded habitat in the study area is included as part of the project. Restoration of that land alone was not considered to be a significant contribution to the goals and objectives of the study and project. TNC acquired additional lands from willing sellers using State grant funding[1] that were also included in the project in order to achieve the goals and objectives of the project. These parcels of land experience erosion, seepage, and scouring flood flow problems.

- **If public lands are not available for restoration efforts, focus restoration efforts on acquiring land that can meet ecosystem restoration goals from willing sellers where at least part of the reason to sell is an economic hardship (for example, lands that flood frequently or where levees are too expensive to maintain)**

  The tentatively recommended plan includes native habitat restoration on lands predominantly acquired by The Nature Conservancy from willing sellers. Those lands have been at a frequent risk of flooding and the tentatively recommended plan would alleviate the flood risk for remaining agricultural parcels landside of the new setback levee. The tentatively recommended plan includes a training dike; a short, levee-like structure that, while not preventing

[1] Funding came from the River Protection Program under Proposition 13. The funds were appropriated to Department of Water Resources for allocation to TNC. The agreement goes on to say that TNC would use these funds to acquire lands near the Sacramento River in the Hamilton City Area for the protection and restoration of various riparian habitats and to provide those lands for a future flood damage reduction project.

backwater, would reduce high frequency, damaging flows that currently scour agricultural lands.

- **Use a planned or phased habitat development approach in concert with adaptive management.**

  The restoration plan includes planting the restoration area before the "J" levee is breached and as the setback levee is being built. The restoration plan is based on a vegetative predictive model developed by TNC that determines habitats to be planted based on soils, topography, frequency of flooding, and depth to groundwater. As more information regarding soils and depth to groundwater is developed, the restoration plan will be adapted.

- **Develop buffers and other tangible support for remaining agricultural lands. Vegetation planted on these buffers should be compatible with farming and habitat objectives.**

  The tentatively recommended plan includes a buffer from the landside toe of the levee to the waterside restoration plantings that will be planted with native grasses which is compatible with both farming and habitat restoration objectives. The final buffer distance will be determined during PED. These grasses would require burning or mowing as a part of the O&M manual. This buffer includes the setback levee with a gravel road for maintenance and inspection on top. The planting plan includes limiting the area of planting elderberries on areas adjacent to agricultural fields. The width of the elderberry buffer would be 300 feet, consistent with the current TNC "good neighbor" practices. It is anticipated that the restoration plan will allow the non-Federal sponsor to remove elderberries under 1-inch diameter from the buffer strip, though this is pending issuance of a take permit from the USFWS.

- **Implement erosion control measures to the extent possible during and after project construction activities.**

  Restoration will begin before the "J" levee is breached and as the new levee is being built. Best management practices will be implemented for erosion control as the levee is breached to prevent any water quality degradation. Prior to the start of construction, a National Pollution Discharge Elimination System (NPDES) general permit for construction activities will be obtained from the Central Valley Regional Water Quality Control Board, and a storm water pollution prevention plan (SWPPP) will be developed per the Guidelines of the general permit. The SWPPP will list all best management practices to be implemented during construction activities for control of erosion, siltation, and any other pollutants that could potentially enter storm water or surface waters in the project area.

  Temporary fast growing cover crops will be seeded over all restoration areas. Permanent native vegetative cover will be no till drill seeded into the temporary cover. Areas disturbed by construction of flood control measures will be seeded with an erosion control seed mix and also will receive straw

mulch. Areas disturbed by construction with steeper topography that generate sheet flow will receive appropriate erosion control best management practices, such as straw mulch, bonded fiber matrix hydro mulch, and erosion control fabric. in addition to the vegetative cover. Areas disturbed by construction with topography that concentrates flow or conveys concentrated off site run-on would receive best management practices for erosion control, such straw mulch, bonded fiber matrix hydro mulch, cobble dissipaters and erosion control fabric, in addition to the vegetative cover.

Sedimentation best management practices will consist of straw rolls, silt fences and/or sedimentation ponds, which will be implemented where necessary to prevent discharge of sediment-laden runoff into receiving waters. Additionally, vegetative buffer strips 50 feet in width will be used on the downslope edges of sites bordering receiving waters. These strips may be native grass established before soil disturbing activities or may be existing vegetation left in place.

- **Protect exposed soils with mulches, geotextiles, and vegetative ground covers to the extent possible during and after project construction activities in order to minimize soil loss.**

  The tentatively recommended plan includes a vegetation barrier of 20 feet waterside of the setback levee and vegetation landside of the setback levee where necessary for protection from wave action. Long-term wave wash protection will be provided by the restoration plantings. Areas that will not be protected in the long term may be protected by vegetative barriers, riprap, or by reducing levee slope and planting with suitable erosion control grasses. In addition, a SWPPP will be implemented to reduce erosion and sediment discharges listed under the previous bulleted item.

- **When it appears that land within an agricultural preserve may be acquired from a willing seller by a State CALFED agency for a public improvement as used in Government Code Section 51920, advise the Director of Conservation and the local governing body.**

  There are currently lands covered by Williamson Act and the Farmland Protection Act in the project area. TNC and the non-federal sponsor own most of these lands. The Director of Conservation and the local governing body will be advised of the removal of the lands from these programs.

- **Implement seepage control measures.**

  The levee will be built to Corps engineering standards and includes a training dike and rock revetment to prevent erosion and seepage. The levee would be designed to provide adequate seepage control and interior drainage. The interior drainage will be collected near the water treatment plant and pumped over to the other side.

Further Consistencies. The project also considered the programmatic commitments related to implementation of CALFED actions to ensure this project would be consistent with the ROD. The programmatic commitments are:

- **Local Leadership** – This project was initially developed by leadership within Glenn County and the Hamilton City Community Services District, working in conjunction with TNC and local landowners.
- **Stakeholder Consultation** – Locals have been involved in every step of the development of this project from its conception. The project team conducted two Public Workshops in Hamilton City as well as an information booth at the local levee festival.
- **Environmental Justice** – The primary beneficiaries of the flood damage reduction portion of the proposed project is the Hamilton City community, which is low-income.
- **Tribal Consultation** – Funding for consultation with Tribal representatives would be included in the project budget to enable outreach efforts. Up to 1 percent of the Federal portion of the project first costs would be allocated for cultural resources data recovery.
- **Land Acquisition** - Most of the land required for the project has already been purchased from willing sellers because of the flood-prone nature of the land. The project has been designed to consider third party and redirected impacts such as level of flood protection and hydraulic effects.
- **CALFED Agency Coordination** – This project has been coordinated with CALFED and has been reviewed by the CALFED Independent Review Panel (IRP).
- **Integration of Non-Signatory Agencies** – This project will continue to be coordinated with all affected agencies.
- **Environmental Documentation** –This proposed project is documented in an integrated Feasibility EIS/EIR report.
- **Permit Clearinghouse** – A permit clearinghouse has been established for the CALFED Bay-Delta Program to coordinate and facilitate permit applications and approvals and compliance with CEQA and NEPA. Since this document is not tiered off the CALFED EIR/EIS, but rather is a stand alone EIS/EIR, the Corps and non-federal sponsor will be obtaining all the necessary permits and approvals.
- **Adaptive Management/Science** – The restoration project will be managed to support the vegetative composition that occurs naturally over time.
- **Beneficiaries Pay** – The local sponsors will pay a portion of the project first costs along with ongoing O&M costs.
- **Compliance with Water Rights laws** – the project would use water rights currently associated with the parcels to be restored.
- **Project Operations** – This is not applicable to the Hamilton City project.
- **Coordinated Operation Agreement. -** This is not applicable to the Hamilton City project

Land Evaluation Worksheet

Land Capability Classification (LCC) and Storie Index Scores

A	B	C	D	E	F	G	H
Soil Map Unit (Soil Types)	**Project Acres (total acres of each soil type)**	**Proportion of Project Area (divide each soil type by total acres)**	**LCC (for each soil type)**	**LCC Rating LCC Score (use scoring table below)**	**LCC Score (multiply CxE)**	**Storie Index**	**Storie Index Score(CxG)**
CeA	25.157	1.54%	IIIc1	70	1.08	85	1
ChA	1183.294	72.32%	IIIw2	60	43.39	85	61
ChB	49.173	3.01%	IIIw2	60	1.80	77	2
Ck	32.335	1.98%		70	1.38	95	2
Cm	38.192	2.33%	IIIs0	60	1.40	72	2
CpB	22.41	1.37%	IIIw3	60	0.82	46	1
CrB	48.797	2.98%		60	1.79	55	2
HgA	0.35	0.02%		60	0.01	54	0
Rh	49.409	3.02%		60	1.81	21	1
Wg	0.701	0.04%		60	0.03	77	0
Wn	179.514	10.97%	IIIc1	70	7.68	90	10
no label	6.911	0.42%		60	0.25	0	0
Totals	**1636.243**	**100.00%**			**61.45**		**81**
					link to final score sheet		link to final score sheet

Note: Numbers in blue indicate input.
Number in brown are formulas

*Note: numbers in red are based on professional judgement

LCC Scoring table

LCC Class	I	IIe	IIs,w	IIIe	IIIs,w	IVe	IVs,w	V	VIe,s,w	VIIe,s,w	VIII
	100	90	80	70	60	50	40	30	20	10	0

Site Assessment Worksheet 1

Project Size Score

	I	J	K	
Soil Map Unit	**LCC Class I-II**	**LCC Class III**	**LCC Class IV-VIII**	
CeA		25.157		
ChA		1183.294		
ChB		49.173		
Ck		32.335		
Cm		38.192		
CpB		22.41		
CrB		48.797		
HgA		0.35		
Rh		49.409		
Wg		0.701		
Wn		179.514		
no label		6.911		
Totals		**1636.243**	**0**	**Total Acres**
		100		**Project Size Scores**
		100		**Highest Project Size Score**

Project Size Scoring Table

Class I or II		**Class III**		**Class IV or Lower**	
Acreage	Points	Acreage	Points	Acreage	Points
>80	100	>160	100	>320	100
60-79	90	120-159	90	240-319	80
40-59	80	80-119	80	160-239	60
20-39	50	60-79	70	100-159	40
10,19	30	40-59	60	40-99	20
10<	0	20-39	30	40<	0
		10,19	10		
		10<	0		

Water Resource Availability

A	B	C	D	E
Project Portion	**Water Source**	**Proportion of Project Area**	**Water Availability Score**	**Weighted Availability Score (CxD)**
1	Well Water	1	85	85
2				
3				

Water Resource Availability Scoring Table

	Non-Drought Years RESTRICTIONS			**Drought Years** RESTRICTIONS			
Options	Irrigated Production Feasible	Physical Restrictions ?	Economic Restrictions ?	Irrigated Production Feasible	Physical Restrictions ?	Economic Restrictions ?	Water Resource Score
1	YES	NO	NO	YES	NO	NO	100
2	YES	NO	NO	YES	NO	YES	95
3	YES	NO	YES	YES	NO	YES	90
4	YES	NO	NO	YES	YES	NO	85
5	YES	NO	NO	YES	YES	YES	80
6	YES	YES	NO	YES	YES	NO	75
7	YES	YES	YES	YES	YES	YES	65
8	YES	NO	NO	NO	~	~	50
9	YES	NO	YES	NO	~	~	45
10	YES	YES	NO	NO	~	~	35
11	YES	YES	YES	NO	~	~	30
12	Irrigated production not feasible, but rainfall adequate for dryland production in both drought and non-drought years						25
13	Irrigated production not feasible, but rainfall adequate for dryland production in non-drought years (but not in drought years).						20
14	Neither irrigated nor dryland production feasible						0

Surrounding Agricultural Land Use Score

A	B	C	D	E	F	G
Zone of Influence						
Total Acres	**Acres in Agriculture**	**Acres of Protected Resource Land**	**Percent in Agriculture (A/B)**	**Percent Protected resource land (A/C)**	**Surrounding Agricultural Land Score (from Table)**	**Surrounding Protected resource Land Score (From Table)**
13120.06	8552.80	1396.59	65.19%	10.64%	85	0

Surrounding Agricultural Land Scoring Table

Percent of ZOI in Agriculture	Surrounding Agricultural Land Score
90-100	100
80-89	95
70-79	90
65-69	85
60-64	80
55-59	70
50-54	60
45-49	50
40-44	40
35-39	30
30-34	20
20-29	10
<19	0

Surrounding Protected Resource Land Scoring Table

Percent of ZOI in Agriculture	Surrounding Agricultural Land Score
90-100	100
80-89	95
70-79	90
65-69	85
60-64	80
55-59	70
50-54	60
45-49	50
40-44	40
35-39	30
30-34	20
20-29	10
<19	0

Final LESA Score Sheet

	Factor Scores	Factor Weight	Weighted Factor Scores
LE Factors			
Land Capability Classification	61.45	0.25	15.36
Storie Index	81	0.25	20.37
LE Subtotal		**0.5**	**35.73**
SA Factors			
Project Size	100	0.15	15
Water Resource Availability	85	0.15	12.75
Surrounding Agricultural land	85	0.15	12.75
Protected Resource land	0	0.05	0
SA Subtotal		**0.5**	40.5
			76.23
			Final Score

B.8: Coordination Act Report (CAR)

United States Department of the Interior

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

In reply refer to:
CRC-Flood & Waterway Planning Branch

JUL 9 2004

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

Dear Colonel Conrad:

Enclosed is the U.S. Fish and Wildlife Service's Fish and Wildlife Coordination Act (FWCA) report for the Corps of Engineer's Hamilton City Flood Reduction and Ecosystem Restoration Project, in Glenn County, California. This report has been prepared under the authority of, and in accordance with, the provisions of section 2(b) of the FWCA (48 stat.401, as amended; 16 U.S.C. 661 et seq.).

If you have any questions or comments regarding this report please contact Jennifer Hobbs at (916) 414-6541.

Sincerely,

for David L. Harlow
Acting Field Supervisor

Enclosure
cc:
CNO, Sacramento, CA
CDFG, Region 1, Redding, CA
USCOE, Sacramento, CA (Attn: Erin Taylor)
NMFS, Sacramento, CA

TAKE PRIDE IN AMERICA

EXECUTIVE SUMMARY

The U.S. Fish and Wildlife Service (Service) is assisting the U.S. Army Corps of Engineers (Corps) in the preparation of a Feasibility Study and Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the Hamilton City Flood Damage Reduction and Ecosystem Restoration Project, Glenn County, California. The California Department of Water Resources (DWR) is the project's non-Federal sponsor and Hamilton City is the local sponsor. The objectives of the project include reducing flood damages and reconnecting the Sacramento River to its floodplain and restoring floodplain habitats.

The study area is located along the Sacramento River from just north of Hamilton City to the confluence of Stony Creek and the Sacramento River (about 5 miles south of town). This document evaluates five alternatives including a no-action alternative. The three action alternatives involve setting back the west levee and increasing the floodplain. All of the alternatives would protect Hamilton City from flooding and increase the amount of native cover-types (riparian, grassland, oak savannah, and scrub shrub) on that stretch of the Sacramento River. In addition, all alternatives would allow for some of the river's natural functions to occur such as deposition and erosion along the banks.

A Habitat Evaluation Procedures (HEP) was completed in order to compare the affects of each alternative. The HEP report can be found in Appendix A. All three alternatives provide an increase in Average Annual Habitat Units (AAHUs). The greatest wildlife benefits would result from Alternative 5, with an increase in 937.04 AAHUs. The least number of AAHUs is Alternative 1 with 643.58. Alternative 6 falls in between these numbers. Because of both the high amount of benefits from the HEP and because it also restores the largest amount of land (1,825.1 acres) the Service recommends Alternative 5. Alternatives 2, 3, and 7 were dropped from consideration prior to applying the HEP and Alternative 4 was dropped by the Corps between the draft and the final EIS/EIR.

A biological opinion was issued to the Corps on June 30, 2004 by the Service. The opinion is not for the take of valley elderberry longhorn beetle due to the restoration project, but for potential future take resulting from emergency flood fighting activities in the restoration area.

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INTRODUCTION

This is the U.S. Fish and Wildlife Service's (Service) Fish and Wildlife Coordination Act (FWCA) report for the Hamilton City Flood Damage Reduction and Ecosystem Restoration Project, Glenn County, California. This report is prepared under the authority of, and in accordance with the FWCA, as amended. Funding to initiate this study was provided by the State of California through Assembly Bill 1X-11 and by Congress in the 1998 Energy and Water Development Act. The California Department of Water Resources is the project's non-Federal sponsor and Hamilton City is the project's local sponsor.

The information presented is based primarily upon project planning information made available by the Corps, various reports pertinent to the project area, and application of Habitat Evaluation Procedures (HEP) methodology (Appendix A). Coordination with the National Oceanic and Atmospheric Administration (NOAA) Fisheries and California Department of Fish and Game (CDFG) was accomplished by providing a draft copy of this report for review and comment.

Hamilton City has a history of flooding due to high flows from the Sacramento River. However, completion of Shasta Dam resulted in regulation of peak flows in the Sacramento River. Since completion of Shasta Dam, flooding in the Hamilton City area occurred in 1970 and 1974, when the existing private levee failed, and in 1986 and 1997, when levee overtopping and ultimately failure were prevented only due to flood fighting efforts.

Riparian habitat has decreased drastically along the Sacramento River due to flood control structures, bank protection, and clearing of land for agricultural and urban uses. In addition to direct loss of riparian habitat, the little that remains is highly fragmented, with little connectivity along the Sacramento River system or to other native cover-types.

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

AREA DESCRIPTION

The Sacramento River hydrology has been altered by dams, diversions, and levees. Shasta and Keswick Dams are the two main dams on the system upstream of the project area. The project area is about 100 miles north of Sacramento and 10 miles west of Chico. Hamilton City lies less than 1 mile to the west of the Sacramento River. The project area is bounded on the west by the Glenn-Colusa Irrigation Canal (GCID) and includes the eastern bank of the Sacramento River.

The existing private levee, known as the "J" levee, runs along the west bank of the Sacramento River from the top of the study area to just south of Dunning Slough.

PROJECT DESCRIPTION

A no-action alternative and three restoration alternatives are being evaluated. A description of each alternative is provided below.

No Action

Under the no-action alternative, no action would be taken by the Corps to help reduce the chance of flooding in Hamilton City or to restore native habitat along the Sacramento River. The existing "J" levee would remain in place.

Alternative 1, Locally Developed Setback Levee

This alternative consists of constructing a levee about 6.6 miles long and 6 feet high, set back roughly 500 to 7,600 feet from the river, and removal of most of the existing "J" levee. It includes actively restoring about 1,300 acres of native habitat in Zones A1, A2 and A4, E, G, and B2, waterside of the setback levee. This alternative is shown in Figure 1.

In order to achieve ecosystem restoration, most of the "J" levee would be removed to reconnect the river to the floodplain. While this action would enable ecosystem restoration, it would lower the community's existing flood protection. The Federal and State governments would be obligated to mitigate the effect of removing the private levee that currently protects Hamilton City. To ensure that the replacement levee would have the same possibility of passing a flood as the "J" levee can with flood-fighting, the replacement levee would be the same height as the "J" levee. Entrenched rock would be buried in a 1,500-foot-long trench in Zone G, parallel to County Road 203 and about 200 feet from the toe of the levee. When the river erodes away the bank at the location of the trench, the rock would fall and armor the bank preventing erosion beyond that point.

North of Highway 32, the levee alignment ties into the newly constructed Glenn County backup levee and runs roughly parallel to and about 500 feet west of the Sacramento River. At Highway 32, the levee ties into the existing approach to the Gianella Bridge. The highway would not need to be raised, but measures to protect the highway embankment and bridge from floodwaters would be necessary. Because a replacement levee would be set back from the "J" levee, the northern bridge abutment would be exposed to direct flows, which could scour the abutment. To ensure the bridge is not compromised by the project, 1,000 feet of rock riprap would be placed on and around the abutment.

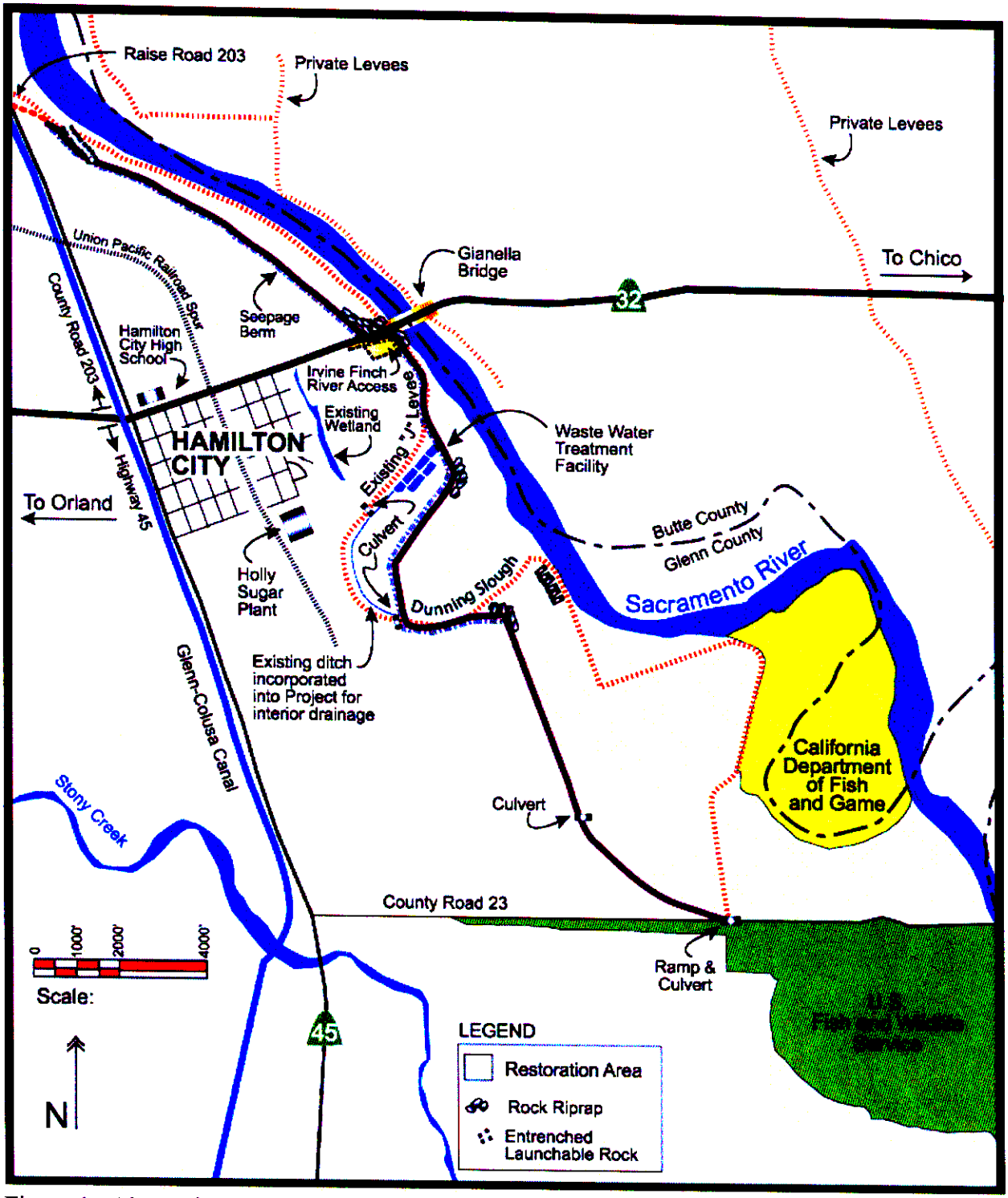

Figure 1. Alternative 1 - Locally Developed Setback Levee

South of Highway 32, the alignment cuts across the easternmost section of the Irvine Finch River Access (just south of the highway), requiring modification of the River Access entrance and parking lot. The alignment also cuts across a portion of Dunning Slough providing protection to the Hamilton City wastewater treatment ponds, some abandoned holding ponds for the old Holly Sugar plant (in which the community would like to expand the treatment plant in the future), and a lime disposal pile. About 1,500 feet of rock would be placed on the setback levee in Dunning Slough as erosion protection. Because a replacement levee would be set back from the "J" levee, a bend in the replacement levee would be exposed to overland flows from multiple angles, which could erode the new levee. In order to ensure that the new levee is not subject to this erosion, 500 feet of rock riprap would be placed along the levee at the bend.

South of Dunning Slough, the alignment roughly follows along the western edge of The Nature Conservancy (TNC) property before turning east toward the southern end of the "J" levee at Road 23. The alignment ends at Road 23, not tying into high ground.

A replacement levee would not affect the existing erosion conditions south of Dunning Slough. It is assumed that the Chico Landing to Red Bluff Project (local site constructed in 1975-1976) would remain authorized and continue to be maintained. For the new levee to perform to the same level as the "J" levee, erosion control at the end of the levee would consist of planting significant amounts of vegetation (about 20 feet or so from the levee toe) to reduce velocities at the levee.

All lands to the waterside of the setback levee would be actively restored with a mixture of riparian, scrub, oak savannah, and grassland habitat (except the CDFG and Service lands, which are assumed to be restored under the without-project condition). The "J" levee would be removed, except for portions where it would serve to reduce velocities of the Sacramento River for establishment of newly planted habitat. Established riparian vegetation waterside of the "J" levee would be avoided wherever possible.

Alternative 5, Intermediate Upstream of Dunning Slough, Locally Developed Downstream of Dunning Slough

This alternative plan consists of actively restoring about 1,600 acres of native vegetation, constructing a setback levee about 5.3 miles long, and 6 feet high, and removing most of the "J" levee. The alternative plan is shown in Figure 2 and includes restoration of Zones A1, A2, and A4, B2, E, F, G, and H, waterside of the setback levee.

The setback levee alignment begins about 2 miles north of Hamilton City, at the point where the northern end of the "J" levee ties into high ground. Entrenched rock would be buried in a 1,500 foot-long trench in Zone G, parallel to County Road 203 and about 200 feet from the toe of the levee. When the river erodes away the bank at the location of the trench, the rock would fall and armor the bank preventing erosion beyond that point. From there, the levee alignment runs

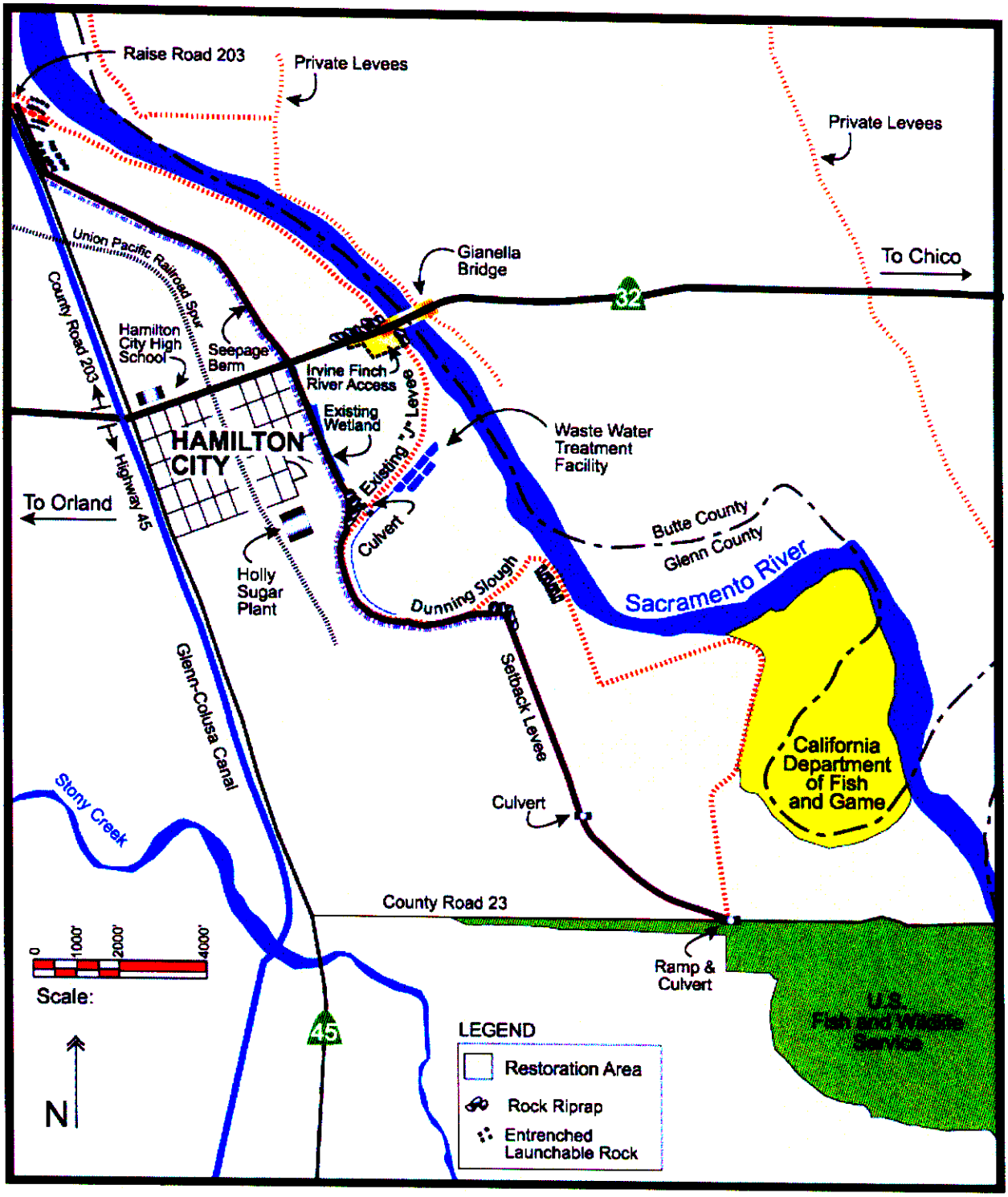

Figure 2. Alternative 5 - Intermediate Setback Upstream of Dunning Slough, Locally Developed Setback Downstream of Dunning Slough

southeast along County Road 203 until turning easterly and running roughly parallel to and about 1,300 feet west of the Sacramento River, following higher ground.

At the eastern edge of town, the levee alignment crosses Highway 32 and runs south alongside a new housing development (Palisades subdivision). This alignment requires raising Highway 32 (with soil embankment), protecting the highway and bridge (and possibly the water treatment plant) from erosion caused by floodwaters, and relocating a remnant slough that provides a small, but significant, emergent wetland habitat and is also used to detain and convey storm water runoff. The northern abutment of the Gianella Bridge would be exposed to direct flows and could scour the abutment. In order to ensure that bridge is not compromised by the project, 1,000 feet of rock riprap would be placed on and around the abutment. At the south end of town, the alignment wraps around Dunning Slough and then roughly follows along the western edge of TNC property before turning east and ending at the southern end of the "J" levee at Road 23. This alignment does not tie into high ground and therefore allows some backwater flooding of agricultural lands, as does the "J" levee.

About 1,500 feet of rock would be placed on the setback levee in Dunning Slough as erosion protection. Because a replacement levee would be set back from the "J" levee, a bend in the setback levee would be exposed to overland flows from multiple angles, which could erode the levee. In order to ensure that the new levee is not subject to this erosion, 500 feet of rock riprap would be placed along the levee at the bend.

Lands waterside of the new levee would be restored to native habitat. About 1,600 acres of native habitat would be restored including: 1,050 acres of riparian, 300 acres of scrub, 150 acres of savannah, and 100 acres of grassland. The "J" levee would be removed, except for portions where it would serve to reduce velocities of the Sacramento River for establishment of newly planted habitat. Established riparian vegetation waterside of the existing "J" levee would be avoided wherever possible. The removal of most of the "J" levee would allow periodic overbank flooding, increasing the ecosystem value of riparian and scrub habitat in the floodplain (periodic flooding was assumed not to affect the value of grassland and oak savannah habitat).

Native vegetation would be restored on most of the TNC lands within the study area. Restoration would also occur on the land directly east of Hamilton City between Highway 32 and Dunning Slough (Zone F) and land within Dunning Slough (Zone A1). Existing orchards in the proposed restoration areas would be removed and native vegetation planted. Some orchard trees may be left to provide interim cover and structure for wildlife species while the planted vegetation matures. The native vegetation would predominantly be riparian species, but some scrub, oak savannah and grassland species would also be included, based on hydrologic, topographic, and soil conditions. The land in the middle of Dunning Slough (Zone A1), is relatively higher elevation than the rest of the restored area, and oak savannah vegetation is anticipated to be more appropriate for these lands.

Alternative 6, Intermediate Upstream of Hwy 32, Locally Developed Downstream of Hwy 32

This alternative plan consists of actively restoring about 1,500 acres of native vegetation, constructing a setback levee about 5.7 miles long, and 6 feet high, and removal of most of the "J" levee. The alternative plan is shown in Figure 3 and includes Zones A1, A2, A4, B2 E, G, and H waterside of the setback levee.

North of Highway 32, the levee alignment ties into high ground at the northern end of the "J" levee, about 2 miles north of Hamilton City. Entrenched rock would be buried in a 1,500-foot long trench in Zone G, parallel to County Road 203 and about 200 feet from the toe of the levee. When the river erodes away the bank at the location of the trench, the rock would fall and armor the bank preventing erosion beyond that point. The levee runs southeast along County Road 203 until turning easterly and running roughly parallel to and about 1,300 feet west of the Sacramento River, following higher ground.

At Highway 32, the levee turns east and runs parallel to the highway until tying into the approach to Gianella Bridge. The highway would not need to be raised in this alternative plan. Because the northern bridge abutment would be exposed to direct flows, the bridge abutment would be exposed to scour. In order to ensure that bridge is not compromised by the potential project, 1,000 feet of rock riprap would be placed on and around the abutment. South of Highway 32, the alignment follows the "J" Levee in order to minimize negative effects to the Irvine Finch River Access (just south of the highway). Some minor modifications to the River Access entrance and parking lot during levee construction may be required. The alignment also cuts across a portion of Dunning Slough providing protection to the Hamilton City wastewater treatment plant, the abandoned holding ponds for the old Holly Sugar plant (in which the community would like to expand the treatment plant in the future), and a lime disposal pile.

Because a replacement levee would be set back from the "J" levee, a bend in the replacement levee would be exposed to overland flows from multiple angles, which could erode a replacement levee. In order to ensure that the replacement levee is not subject to this erosion, 500 feet of rock riprap would be placed along the levee at the bend.

South of Dunning Slough, the alignment would roughly follow along the western edge of TNC property before turning east and merging with the southern end of the "J" levee at Road 23. As the levee turns east, the levee height would gradually decrease from 7 feet to about 2 feet. At this point the new levee would become a "training dike" meant to direct flows rather than control them. This height reduction is to avoid negative hydraulic effects to downstream property owners. The training dike would continue for about a mile south of Road 23, running just west of the Service property boundary. A small ramp with culverts on either side would be constructed over the training dike at Road 23 to maintain the river access. This alignment does not tie into high ground and therefore allows some backwater flooding of agricultural lands, as currently happens with the "J" levee. In fact, the training dike is designed to allow flood waters

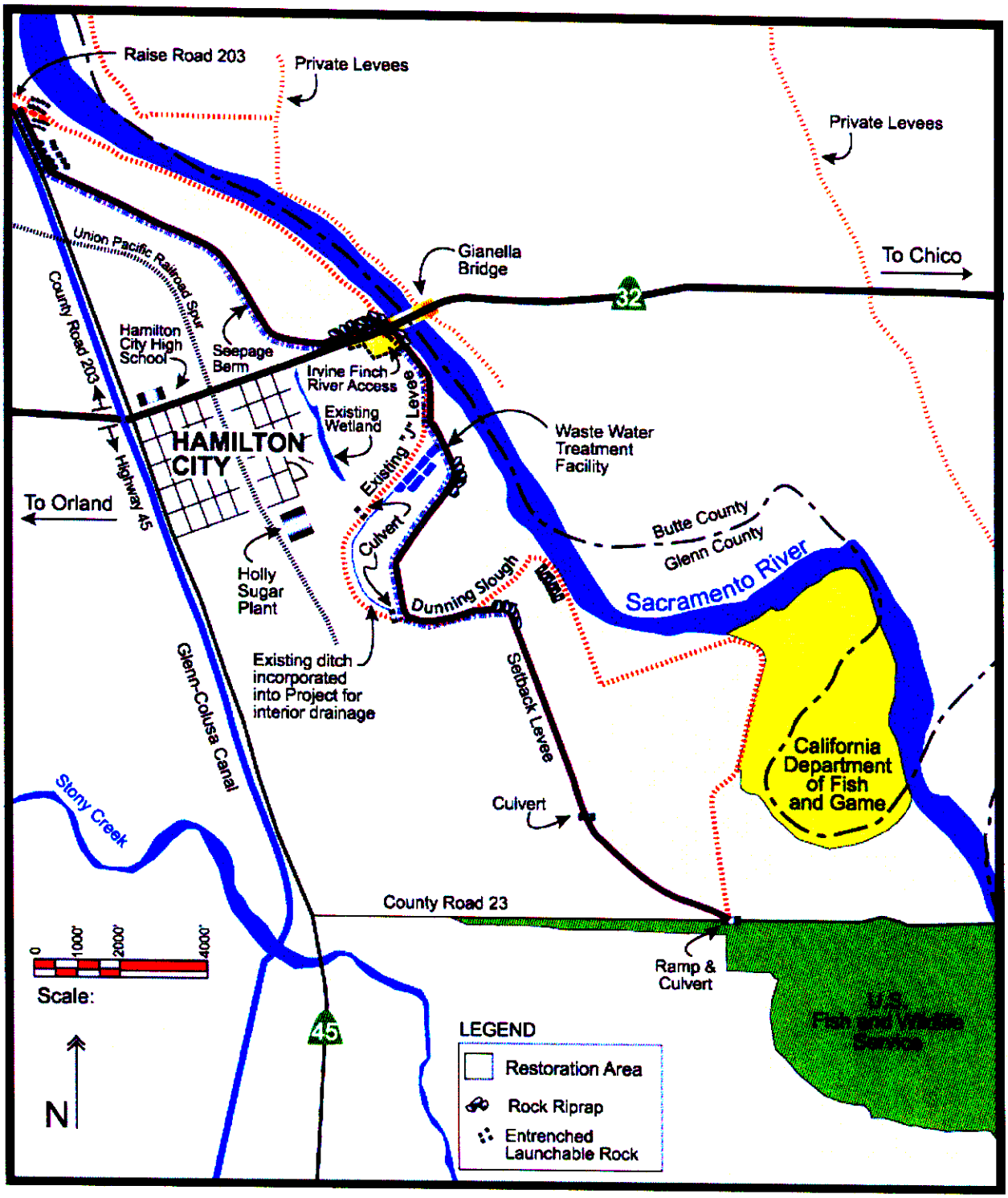

Figure 3. Alternative 6 - Intermediate Setback Upstream of Highway 32, Locally Developed Setback Downstream of Highway 32

to overtop it and spread out into the agricultural areas without the high velocities that cause extensive damage to the orchards.

A setback levee would not affect the existing erosion conditions south of Dunning Slough. It is assumed that the Chico Landing to Red Bluff Project (local site constructed in 1975-1976) would remain authorized and continue to be maintained. For the new levee to perform to the same level as the "J" levee, erosion control at the end of the levee would consist of planting significant amounts of vegetation (about 20 feet or so from the levee toe) to reduce velocities at the levee.

The restored area under this alternative is the same as the previous alternative, except that the land directly east of Hamilton City between Highway 32 and Dunning Slough (Zone F) would not be restored and the area south of Road 23 (Zone B2) would be restored. Existing orchards in the proposed restoration areas would be removed and native vegetation planted. The native vegetation would predominantly be riparian species, but some scrub, oak savannah and grassland species would also be included, based on hydrologic, topographic, and soil conditions. The land in the middle of Dunning Slough (Zone A1), which is relatively higher in elevation than the rest of the restored area, is anticipated to be more appropriate for oak savannah vegetation.

EXISTING BIOLOGICAL RESOURCES

Vegetation

Four cover types can currently be found in the project area: riparian, orchard, grain crop, and grassland.

Riparian forest habitat occurs in the active floodplain along the Sacramento River. Generally, relatively narrow bands of forest grow along channels, but more extensive stands exist in oxbows and back waters that are only periodically connected to the river. The riparian forest is dominated by black willow, with only occasional occurrence of Fremont cottonwood and a few valley oak. Understory species include narrow-leaved willow, red willow, and Oregon ash. Common herbaceous species include mugwort and western goldenrod.

Grassland habitat is found primarily in the Dunning Slough area in the south part of the project area. In addition, small areas of grassland can be found on the private levee and along irrigation canals. Common plant species include annual grasses and forbs.

Orchards are a predominant habitat in the project area. Orchards in the area consist of plum almond, and walnut trees. Herbaceous ground cover under the tree rows typically consists of annual grasses, forbs, or bare soil.

Grain crop habitat consists of hay. This crop is found in the Dunning Slough area. Vegetative growth is highest in the summer and the over-winter management consists of plowing under the hay stubble and leaving the field fallow.

Wildlife

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

Grassland areas located on the levees and margins of agricultural fields provide habitat for granivorous birds such as western meadowlarks, California quail, sparrows, and finches, and for mammals such as voles, mice, and pocket gophers. These areas also provide foraging habitat for hawks.

Fallow agricultural fields support high rodent populations which in turn provide prey for many raptor species in the area. Orchards provide limited value for various bird species for nesting and foraging. In addition, orchards located along rivers where riparian habitat has been reduced and fragmented, can provide cover and act as a migration corridor for some mammal species.

Fisheries

The Sacramento River supports many different fish species, most of which can be found in the project area at some time of the year. Common anadromous species in the area include chinook salmon, steelhead trout, striped bass, and American shad. Common resident species include largemouth bass and other sunfish, catfish, Sacramento sucker, tule perch, and Sacramento pikeminnow.

Many fish populations are declining in the Sacramento River system, in large part because of the long-term degradation of the Sacramento River ecosystem. Riparian and shaded riverine aquatic (SRA) habitat has decreased significantly with the building of dams, levees, and water diversions.

Endangered Species

Appendix B provides a list of Federally listed threatened and endangered species, dated February, 3, 2004, and a summary of a Federal agency's responsibilities under section 7(a) and (c) of the Endangered Species Act (Act) of 1973, as amended. According to this list there are

15 threatened and endangered species or critical habitats that may occur in the project area. Endangered species are the Conservancy fairy shrimp, vernal pool tadpole shrimp, hairy Orcutt grass, and Greene's tuctoria. Threatened species are the bald eagle, northern spotted owl, giant garter snake, California red-legged frog, delta smelt, Central Valley steelhead, Central Valley spring-run chinook salmon, Southern Oregon/Northern California coho salmon, vernal pool fairy shrimp, valley elderberry longhorn beetle, and Hoover's spurge. Also listed is the critical habitat for the winter-run chinook salmon, Central Valley fall/late fall-run chinook, vernal pool invertebrates, and vernal pool plants.

There are also 3 candidate species and 26 species of concern. Although candidate species are not protected under the Act, the 1988 amendments require the Service or NOAA Fisheries to monitor their status. If any of these species decline precipitously during the planning of this project, they could be listed on an emergency basis. NOAA Fisheries has responsibility for most marine fish and wildlife, including anadromous salmonids, and should be consulted on activities which may affect any such listed or proposed species in the project area. The Service has consultation responsibility for the remaining species.

The CDFG has responsibility for State listed species and species of concern. A summary report from the CDFG's RareFind DataBase (February 2004) was retrieved for the project area, specifically for Glenn County (Appendix B). State listed endangered species are Colusa grass, Indian Valley brodiaea, bald eagle, great gray owl, hairy Orcutt grass, palmate-bracted bird's-beak, and western yellow-billed cuckoo. Threatened species are the giant garter snake, bank swallow, and Swainson's hawk. In addition, Tracy's eriasturm is listed as rare by CDFG. The CDFG should be contacted regarding any State listed species or species of concern that may be impacted by project activities.

The Service's biological opinion on the project was completed on June 30, 2004. Conservation measures proposed by the Corps can be found in the opinion in Appendix B.

FUTURE CONDITIONS WITHOUT THE PROJECT

Vegetation

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

Wildlife

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

Fisheries

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

FUTURE CONDITIONS WITH THE PROJECT

Alternative 1, Locally Developed Setback Levee

Vegetation

Table 1 summarizes the acres with and without the project, average annual habitat units (AAHUs) with and without the project, and net change in AAHUs. Vegetation and cover-types would benefit by reconnecting some of the area to the river's floodplain and native vegetation planting. Projected cover-types were determined through evaluation of water table depths, soils, and site elevation in relation to the river. Periodic floodflows on portions of the project area helps restore part of the area the river historically meandered through. It also provides benefits to the new and existing vegetation in the project area by: increasing soil moisture, adding nutrients and organic matter, bringing in seeds and plant material for natural revegetation, and facilitating deposition and removal of sediment. Subjecting more land to the river's erosional and depositional forces would allow native habitats to experience successional change in vegetation composition, instead of artificially keeping the vegetation at one age class. It is fully expected that some of the existing and planted vegetation would erode away and fall into the river creating large woody debris for aquatic species over the life of the project.

Table 1. Summary of cover-types acreages, and AAHUs that would be impacted and created under Alternative 1.

Cover-Type	Alternative 1 Without Project	Alternative 1 With Project	AAHUs without project	AAHUs with project	Net Change in AAHUs
Riparian	97.1	955.7	44.44	889.81	845.37
Grassland	83.7	145.6	85.28	148.56	63.28
Orchard	1198.1	0.0	436.1	16.77	-419.33
Grain crop	89.9	0.0	62.64	2.41	-60.23
Oak savannah	0.0	140.4	0.00	136.86	136.86
Scrub shrub	0.0	227.1	0.00	219.07	219.07
Totals	1468.8	1468.8	628.46	1413.48	785.02

There would be some short-term temporary effects to vegetation in the project area during construction. Effort would be made to avoid removing existing vegetation when breaching or removing the "J" levee. Any loss of vegetation would be made up for by the planting and restoration of the site.

Wildlife

Effects of construction on wildlife in the area include disturbance from construction activity and noise. Wildlife such as birds and mammals, typically respond to this type of activity by leaving the construction area. Construction related effects are planned to be short-term and timed to avoid disrupting wildlife to the greatest extent possible. With the project, wildlife in the area would benefit from an increase in native cover-types, better ecological values, and greater connectivity especially of the riparian areas. The replacement of orchard and grain cover-types with native cover-types would supply higher value to wildlife through higher vegetative and animal diversity, reduction of disturbance due to farming operations, and increased structural diversity.

Fisheries

Fish in the Sacramento River would be adversely affected by the placement of rock around the abutments of Gianella Bridge on Highway 32. Riprap has been shown to halt erosion, arrest meander migration, create a relatively smooth surface, limit lateral mobility of the channel, decrease near-shore roughness, reduce habitat complexity, and impede plant growth at the waterline. While entrenched rock and rock riprap are also proposed along other sections of the new levee, they would have less of an effect than the rock along the bridge because they are setback from the river and would only interface with the water on large events. While the rock placed around the abutments of Gianella Bridge would adversely affect fisheries in the Sacramento River, the overall effect of the project to fisheries is beneficial due to the large amount of bank that would be exposed to erosion (about 18,000 linear feet) and the removal of 11,250 square feet of rock currently located on the "J" levee.

Alternative 5, Intermediate Setback Upstream of Dunning Slough, Locally Developed Setback Downstream of Dunning Slough

Vegetation

Alternative 5 would have similar effects to vegetation as Alternative 1. More area would be restored with this alternative (Table 2) than with Alternative 1.

Table 2. Summary of cover-types, acreages, and AAHUs that would be impacted and created under Alternative 5.

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Riparian	109.8	1162.1	44.44	1073.68	1029.24
Grassland	84.8	163.1	86.40	166.09	79.69
Orchard	1540.6	0.0	561.00	21.57	-539.43
Grain crop	89.9	0.0	62.64	2.41	-60.23
Oak savannal	0.0	153.9	0.00	150.20	150.20
Scrub shrub	0.0	281.2	0.00	277.56	277.56
Totals	1825.1[1]	1767.4[1]	754.48	1691.51	937.03

1. The Corps chose to subtract some of the riparian habitat that would be created in this alternative because the construction of the levee would have affected a wetland area. During the HEP this area was measured using a riparian model because of the woody vegetation growing along one side. The Corps felt that mitigating this loss with riparian habitat would not adequately replace the wetland values and decided to remove 45 acres of riparian habitat from the with project condition.

Grassland habitat would reach the pre-project condition about 5 years after completion of construction and riparian habitat would be of a higher value than pre-project condition after 20 years.

Wildlife

Effects to wildlife under Alternative 5 would be similar to those described in Alternative 1.

Fisheries

Effects to fisheries under Alternative 5 would be similar to those discussed in Alternative 1.

Alternative 6, Intermediate Setback Upstream of Highway 32, Locally Developed Setback Downstream of Highway 32

Vegetation

The acreages of each habitat type that would be available under each alternative are shown in Table 3.

Wildlife

Effects to wildlife under Alternative 6 would be similar to those described in Alternative 1.

Table 3. Summary of cover-types acreages, and AAHUs that would be affected and created under Alternative 6.

Cover Type	Acres Affected without Project	Acres Affected with Project	AAHUs without Project	AAHUs with Project	Net Change in AAHUs
Riparian	97.1	1093.7	44.44	1011.27	966.83
Grassland	84.6	155.1	86.30	158.09	71.79
Orchard	1386.3	0.0	504.82	19.41	-485.41
Grain crop	89.9	0.0	62.64	2.41	-60.23
Oak savannah	0.0	147.9	0.00	144.28	144.28
Scrub shrub	0.0	261.2	0.00	252.05	252.05
Totals	1657.9	1657.9	698.2	1587.51	889.31

Fisheries

Effects to fisheries under Alternative 6 would be similar to those discussed in Alternative 1.

DISCUSSION

Fish and Wildlife Service's Mitigation Policy

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

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

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

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

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

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

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

Resource Categories

Riparian

The **riparian** cover-type occurs along the Sacramento River in a narrow band of deciduous trees and shrubs between the river and the levee slope. It can also be found in lesser quality along a drainage canal from Hamilton City and on the southern end of Dunning Slough. The evaluation species selected for riparian habitat are woodpecker guild and raptor guild. Woody riparian vegetation of the project area provides valuable foraging substrate for woodpeckers, as well as for many passerine bird species. Red-shouldered, Swainson's and red-tailed hawks may nest in

the project area or vicinity, building stick-nests in large riparian trees. Riparian forest and scrub-shrub are of generally high value to the evaluation species, and are today very scarce habitat types in the project area. Therefore, the Service finds that any riparian forest and riparian scrub-shrub habitats that would be effected by the project should have a mitigation goal of "no net loss of in-kind habitat value or acreage," Resource Category 2.

Grassland

Grassland cover-type is found along levee slopes and in patches in the Dunning Slough area. Evaluation species selected for this cover-type is the red-tailed hawk and the western meadowlark. The red-tailed hawk feeds and nests in this habitat, and has high consumptive and, to a lesser degree, non-consumptive human uses (*e.g.*, bird-watching). The meadowlark represents passerine birds that breed within this habitat. Generally, this habitat has medium habitat values. The Service designates the upland habitat in the project area as Resource Category 3. Our associated mitigation planning goal is to "no net loss of habitat value while minimizing loss of in-kind habitat value."

Orchards

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

Grain crop

Grain crop cover-type is limited to the area inside of Dunning Slough. Evaluation species selected for these cover-types the raptor guild (including Swainson's hawks, red-tailed hawks, ferruginous hawks, American kestrel, white-tailed kite, and great horned owl) and passerine ground-foraging birds (including western meadowlark and white-crowned sparrow). The values of these habitats vary according with season and crop, much of the agricultural in the Hamilton City project area provide medium-to-high value foraging habitat for diverse assemblages of birds of prey. Therefore, the Service finds that agricultural lands to be affected by the project, should have a mitigation planning goal of "no net loss of habitat value while minimizing loss of in-kind habitat value," Resource Category 4.

Habitat Evaluation Procedures (HEP)

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

General Methodology

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

For consistency with HEP, we used the standard 0.0 to 1.0 range for each Suitability Index (SI). The impact areas and SIs were estimated using our best professional biological judgment of the physical changes and resource responses anticipated due to the project. These were based on our review of available information about the site and its characteristics. More detailed descriptions of methodologies are given in the HEP (Appendix A).

RESULTS

All alternatives provide benefit to fish and wildlife in the project area by restoring some of the historic floodplain. Benefits to restoring floodplain habitat include habitat complexity, high invertebrate production, and introduction of sediment and nutrients. For fish, floodplain habitat provides a mosaic of habitat structure and low velocity habitat, which have been lost along the Sacramento River due to flood control and water diversion projects. Amphibian and reptile species would benefit from increased wetted areas for breeding and better value upland habitat. The cover-types created with this project would benefit the western pond turtle by providing a mosaic of breeding, basking, and refugia areas. Migratory songbirds and raptors would be able to use the riparian forest and scrub habitat for breeding.

Any of the proposed alternatives would be acceptable to the Service. Alternative 5 would create the greatest amount of restored habitat. The other three alternatives provide less acreage and slightly less habitat value, but still benefit fish and wildlife resources. Based on current project information all alternatives would provide net benefits and therefore, no compensatory mitigation would be needed.

RECOMMENDATIONS

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

1) Due to both the high amount of benefits from the HEP and the large amount of acres restored the Service recommends the Corps choose Alternative 5.

2) Use native grasses when planting grass species.

3) Develop and implement a vegetation monitoring program as part of the project. Monitoring the riparian restoration effort should focus on recording tree survival rates, the quantification of improved habitat values for wildlife (primarily bird species) by measuring percent tree and shrub cover, average height of overstory trees, canopy layering, and total woody riparian vegetation, and developing recommendations for alternative methods of riparian restoration should initial efforts fail. A vegetation monitoring report should be submitted annually for the first 5 years after planting activities, and on the 10^{th}, 15^{th}, and 20^{th} year after planting. The monitoring reports should also identify any shortcomings in the restoration effort and include remedial actions on how to improve restoration efforts. All phases of the revegetation, and monitoring programs should be coordinated with, and approved by, the Service, CDFG, and NOAA Fisheries.

4) Comply with the Conservation Measures in the Service's biological opinion (Appendix B).

5) Complete the appropriate consultation with the CDFG regarding impacts to State listed species, and NOAA Fisheries, as required under section 7 of the Federal Endangered Species Act, for potential impacts to anadromous fish and marine species under NOAA Fishery's jurisdiction.

APPENDIX A
HABITAT EVALUATION PROCEDURES

HAMILTON CITY FLOOD DAMAGE REDUCTION AND ECOSYSTEM RESTORATION PROJECT

MAY 2004

INTRODUCTION

This application of Habitat Evaluation Procedures (HEP) is intended to quantify the affects to fish and wildlife resources that would occur with the construction of the project for the Hamilton City Levee Modification Initial Project. The proposed project is fully described in the "Project Description" section of the accompanying Fish and Wildlife Coordination Act (FWCA) Report. HEP is used to quantify anticipated affects to fish and wildlife and their habitats, and to determine mitigation needs. This particular HEP study addresses the potential benefits of different alignments of set back levees along the Sacramento River adjacent to Hamilton City.

A detailed description of the four ecosystem restoration alternatives can be found in the proceeding report. In general each alternative provides a setback levee which would both protect Hamilton City from flooding and provide an increased amount of area to the floodplain of the Sacramento River and restoring native cover-types (riparian, grassland, oak savannah, and scrub shrub) within the floodplain.

GOALS AND OBJECTIVES OF THIS HEP

A fundamental and critical step in designing any HEP application is the setting of overall goals and objectives. In this HEP application, such goals and objectives were developed based on the overall, long-term resource management goals of the Fish and Wildlife Service (Service). The mitigation policies of the Service (see description within the body of the FWCA Report) were also carefully considered.

1. The primary goal was to evaluate the impacts on fish and wildlife from the two proposed plans so that relative comparisons of benefits could be made.

2. Quantify habitat conditions before project construction.

3. Quantify habitat condition after project construction.

METHODOLOGY

HEP Description

HEP is an impact assessment methodology developed by the Fish and Wildlife Service (Service) and other State and Federal resources agencies which can be used to document the quality and quantity of available habitat for selected wildlife species. HEP provides information for two general types of wildlife habitat comparisons: 1) the relative value of different areas at the same point in time, and 2) the relative value of the same areas at future points in time. By combining the two types of comparisons, the impacts of proposed or anticipated land and water-use changes on wildlife habitat can be quantified. In a similar manner, any compensation needs (in terms of acreage) for the project can also be quantified.

A HEP application is based on the assumption that habitat for selected wildlife species or communities can be described by a model which produces a Habitat Suitability Index (HSI). The HSI, a value from 0.0 to 1.0, is assumed to relate directly to the carrying capacity of the habitat being evaluated. The HSI is multiplied by the area of available habitat to obtain Habitat Units

(HUs). The Average Annual Habitat Units (AAHUs) over the life of the project are then used in the comparisons described above. Species, guild, or community-based models can be used, depending on mitigation objectives.

HSI values are quantified at several points in time over the life of the project. These points in time are known as Target Years (TYs) and are selected for years in which habitat conditions are expected to change and can be reasonably defined. In every HEP analysis, there must be a Target Year 0 (TY0) which represents the baseline conditions, Target Year 1 (TY1) which is the first year habitat conditions are expected to deviate from baseline conditions, and an ending Target Year, which defines the period of analysis. The period of analysis consists of the life of the project, plus the period of construction.

When using HEP, it is necessary to determine HSIs for each evaluation element at selected target years for both with-project and without-project scenarios. Proposed mitigation areas must be treated similarly (with-management is substituted for with-project conditions). Since it is not possible to empirically determine habitat quality and quantity for future years, future HSI values are projected. This is accomplished by increasing or decreasing specific baseline variables and/or HSI values for each evaluation element based on best professional knowledge of performance at other mitigation sites, literature on plant growth, and conditions at reference sites. To predict changes in the HSI for each future scenario, it is necessary to make assumptions regarding baseline and future values within project impact and compensation areas.

The reliability of a HEP application, including the significance of HUs and AAHUs, is directly dependent on the ability of the HEP user to assign a well-defined and accurate HSI to the selected evaluation species or communities. Also, the HEP user must be able to identify and measure (or predict) the area of each distinct cover-type that is utilized by fish and wildlife within the project area. Both the HSIs and cover-type acreages must also be reasonably estimable at various future points in time. The Service has determined that these HEP criteria can be met, or at least reasonably approximated, for the Hamilton City Levee Modification Initial Project; thus HEP was considered to be an appropriate analytical tool.

HEP applications often rely on a team approach to sampling and projecting future values. In this application, HEP team members were: Jennifer Hobbs (Service) and Erin Taylor (Corps of Engineers (Corps)).

The six cover-types identified for evaluation of baseline conditions are: 1) riparian forest; 2) annual grassland; 3) orchard; and 4) grain crop; 5) oak savannah; and 6) scrub shrub. The HSI models and habitat variables measured to generate each HSI are summarized in Table 1.

Table 1. HSI models, cover-types, HSI model variables, and methods used for data collection.

HSI MODEL AND COVER-TYPE	HSI MODEL VARIABLES	DATA COLLECTION METHOD
Riparian forest Riparian forest	V1- average tree height V2- average canopy width of stand V3- tree canopy closure V4- # of tree/shrub species V5- understory vegetative density V6- frequency of floodplain inundation	visual estimation along transect line intercept densiometer line intercept line intercept local data
Grassland Red-tailed hawk	V1- % herbaceous cover V2- % herbaceous cover between 3 - 18 inches tall V3- number of suitable perch sites for hunting per 10 acres V7- number of suitable nest sites per 10 acres	line intercept line intercept line intercept belt transect
Orchard Red-tailed hawk	V4- % tree cover V7- number of suitable nest sites per 10 acres	line intercept belt transect
Grain crop Red-tailed hawk	V3- number of suitable perch sites for hunting per 10 acres V5- over-winter management practices in grain crops V7- number of suitable nest sites per 10 acres	line intercept observation belt transect
Oak savannah Red-tailed hawk	V1- % herbaceous cover V2- % herbaceous cover between 3 - 18 inches tall V4- % tree cover V7- number of suitable nest sites per 10 acres	line intercept line intercept line intercept belt transect
Scrub shrub Scrub shrub	V1- number of tree or shrub species V2- % canopy cover V3- average width of stand V4 - frequency of floodplain inundation	N/A N/A N/A N/A

Prior to field data collection, HSI models were selected to evaluate the cover-types in the project area. The HSI models used in this study are mechanistic models. The term "mechanistic" means that the models define a specific mathematical relationship between measured habitat parameters and their value to the evaluation species. The HSI models define both the habitat variables important in determining the value of the habitat to the species, and the relationships between these variables.

The models selected for use in this HEP application represent an ecological perspective of the area and show a sensitivity to habitat changes: 1) a **riparian forest model** (USFWS 1989) was used to evaluate affects to the native riparian forest; 2) a **red-tailed hawk model** (USFWS 1985) was used to evaluate affects to grassland, orchard, grain crop, and oak savannah cover-types; and 3) a **scrub shrub model** (USFWS 1989) was used to estimate scrub shrub cover-type with the project. All models are in Appendix B-3 of this report.

A variable was added to the riparian and scrub shrub models to account for the additional benefit of enlarging the floodplain. Currently the majority of the riparian habitat is not connected to the river and so does not receive the benefits of the changing hydrograph. With the project all of the

riparian and scrub shrub would be in the floodplain and would be expected to flood at a 5 year flood event.

DATA COLLECTION

Cover-types were mapped on aerial photos provided by the Corps to the Service. Acreage of each cover-type was quantified by the Corps using Arc View. Field data were collected in early September 2001. Using primarily a stratified random sampling scheme, 100-foot-long transects were placed and data was collected every 10 feet. The data collection methods presented in each model were followed. The number of sample sites needed to adequately represent the value of each cover-type for the evaluation species was determined by the HEP team, and based on the acreage and the degree of hetergeneity for the cover-type being sampled.

HEP ANALYSIS PROCEDURES

HSI calculations for each evaluation species were undertaken at the completion of data collection. All SI and HSI values were calculated with the use of a computer spreadsheet using the equations contained in each model. The assumptions used in predicting habitat changes in future Target Years and the predicted future scenarios are contained in Appendix B-1. Baseline and future scenario SI values were developed for each cover-type. A HSI value was then calculated for each evaluation species and used in the HEP accounting software to determine compensation needs. Baseline and future HSI values for each evaluation species are shown in Appendix A-2. The HEP Version 2.2 Accounting Software package was used on an IBM-compatible personal computer to calculate HUs, and AAHUs.

RESULTS

The four restoration alternatives would retain existing native cover-types, riparian and grassland, as well as convert grain and orchard cover-types to riparian, grassland, oak savannah, and scrub shrub The alternatives vary in the amount of acres that would be restored, the following list is ordered by the most acres restored to the least: Alternative 5, 1,767.4 acres; Alternative 6, 1,657.9 acres; and Alternative 1, 1,468.8 acres. Increases in AAHUs correlates to the amount of acres restored. Alternative 5 has the largest net change with 937.03 AAHUs. Under all alternatives native cover-types would benefit from the project by an increase in acreage and habitat quality due to vegetation plantings and maintenance practices.

For more specific information on the individual alternatives refer to Tables 2 through 7 on the following pages.

Table 2. Summary of cover-types acreages, and AAHUs that would be affected and created under Alternative 1.

Cover-type	Acreage	Acreage	AAHUs	AAHUs	Net Change
Riparian	97.1	955.7	44.44	889.81	845.37
Grassland	83.7	145.6	85.28	148.56	63.28
Orchard	1198.1	0.0	436.1	16.77	-419.33
Grain crop	89.9	0.0	62.64	2.41	-60.23
Oak savannah	0.0	140.4	0.00	136.86	136.86
Scrub shrub	0.0	227.1	0.00	219.07	219.07
Totals	1468.8	1468.8	628.46	1413.48	785.02

Table 3. Summary of cover-types, acreages, and AAHUs that would be impacted and created under Alternative 5.

Cover-type	Acreage	Acreage	AAHUs	AAHUs	Net Change
Riparian	109.8	1162.1	44.44	1073.68	1029.24
Grassland	84.8	163.1	86.40	166.09	79.69
Orchard	1540.6	0.0	561.00	21.57	-539.43
Grain crop	89.9	0.0	62.64	2.41	-60.23
Oak savannah	0.0	153.9	0.00	150.20	150.20
Scrub shrub	0.0	281.2	0.00	277.56	277.56
Total	1825.1	1767.4	754.48	1691.51	937.03

Table 4. Summary of cover-types acreages, and AAHUs that would be affected and created under Alternative 6.

Cover-Type	Alternative 6 Without Project	Alternative 6 With Project	AAHUs without project	AAHUs with project	Net Change in AAHUs
Riparian	97.1	1093.7	44.44	1011.27	966.83
Grassland	84.6	155.1	86.30	158.09	71.79
Orchard	1386.3	0.0	504.82	19.41	-485.41
Grain crop	89.9	0.0	62.64	2.41	-60.23
Oak savannah	0.0	147.9	0.00	144.28	144.28
Scrub shrub	0.0	261.2	0.00	252.05	252.05
Totals	1657.9	1657.9	698.2	1587.51	889.31

Table 5. HSIs and acreage for the cover-types for all years for future conditions without the project (TY 0) and future conditions with the project for Alternative 1 for the Hamilton City Flood Damage Reduction and Ecosystem Restoration Project.

Riparian forest	97.1	0.47	97.1	0.47	955.7	0.67	955.7	0.88	955.7	0.88	955.7	0.94	955.7	0.95
Grassland	83.7	0.98	83.7	0.98	145.6	0.98	145.6	1.00	145.6	1.00	145.6	1.00	145.6	1.00
Orchard	1198.1	0.35	0	0.35	0	0.35	0	0.35	0	0.35	0	0.35	0	0.35
Grain crop	89.9	0.67	0	0.67	0	0.67	0	0.67	0	0.67	0	0.67	0	0.67
Oak savanna	0	0.00	0	0.00	140.4	0.83	140.4	0.83	140.4	1.00	140.4	1.00	140.4	1.00
Scrub shrub	0	0.00	0	0.00	227.1	0.72	227.1	0.72	227.1	1.00	227.1	1.00	227.1	1.00

Table 6. HSIs and acreage for the cover-types for all years for future conditions without the project (TY 0) and future conditions with the project for Alternative 5 for the Hamilton City Flood Damage Reduction and Ecosystem Restoration Project.

Riparian forest	109.8	0.47	109.8	0.47	1162.1	0.67	1162.1	0.88	1162.1	0.88	1162.1	0.94	1162.1	0.95
Grassland	84.8	0.98	84.8	0.98	163.1	0.98	163.1	1.00	163.1	1.00	163.1	1.00	163.1	1.00
Orchard	1540.6	0.35	0	0.35	0	0.35	0	0.35	0	0.35	0	0.35	0	0.35
Grain crop	89.9	0.67	0	0.67	0	0.67	0	0.67	0	0.67	0	0.67	0	0.67
Oak savanna	0	0.00	0	0.00	153.9	0.83	153.9	0.83	153.9	1.00	153.9	1.00	153.9	1.00
Scrub shrub	0	0.00	0	0.00	288.2	0.72	288.2	0.72	288.2	1.00	288.2	1.00	288.2	1.00

Table 7. HSIs and acreage for the cover-types for all years for future conditions without the project (TY 0) and future conditions with the project for Alternative 6 for the Hamilton City Flood Damage Reduction and Ecosystem Restoration Project.

SPECIES MODEL/ COVER TYPE	TY 0		TY 1		TY 3		TY 5		TY 10		TY 20		TY 52	
	AREA	HSI	AREA	HSI	AREA	HSI	AREA	HSI	AREA	HSI	AREA	HSI	AREA	HSI
Riparian forest	97.1	0.47	97.1	0.47	1093.7	0.67	1093.7	0.88	1093.7	0.88	1093.7	0.94	1093.7	0.95
Grassland	84.6	0.98	84.6	0.98	155.1	0.98	155.1	1.00	155.1	1.00	155.1	1.00	155.1	1.00
Orchard	1386.3	0.35	0	0.35	0	0.35	0	0.35	0	0.35	0	0.35	0	0.35
Grain crop	89.9	0.67	0	0.67	0	0.67	0	0.67	0	0.67	0	0.67	0	0.67
Oak savanna	0	0.00	0	0.00	147.9	0.83	147.9	0.83	147.9	1.00	147.9	1.00	147.9	1.00
Scrub shrub	0	0.00	0	0.00	261.2	0.72	261.2	0.72	261.2	1.00	261.2	1.00	261.2	1.00

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HEP APPENDIX A-1
ASSUMPTIONS USED IN PREDICTING FUTURE SCENARIOS

HEP APPENDIX A-1
ASSUMPTIONS USED IN PREDICTING FUTURE SCENARIOS FOR THE HAMILTON CITY INITIAL PROJECT HEP

General

1. HEP is a suitable methodology for quantifying project impacts to fish and wildlife.
2. Project life is 50 years.
3. Construction time will only take one year to complete restoration actions, and levee would be breeched or removed at low water.
4. TY (Target Year) 0 is baseline conditions.
5. The data collection methods used to select sample sites were sufficiently random for the purposes of this study.
6. Planted tree species were not considered trees ($\geq$ 16 ft.) in the HSI models until TY 10.
7. Management of existing habitat would remain unchanged in the future.
8. Acreages for each alternative were provided by the Corps in consultation with the Nature Conservancy.
9. The evaluation species selected are good representatives of the habitat quality per each habitat, and the changes in habitat quality relate to each evaluation species.
10. The species selected are sufficient to gauge the extent of impacts from the project.
11. Random stratification for restoration plantings.
12. Vegetation would be planted at maximum densities to ensure greatest habitat value.

Future without the Project (Impact Area)

1. Future land management would not change from current use.

Future with the Project (Impact Area)

GRASSLAND HABITAT

1. Native grass species would be used for grassland.
2. Vegetation would reach maximum density by TY 5.

RIPARIAN

1. At TY 0, 1 there would be trees still existing.
2. Newly planted riparian/upland tree species would have a 70% survival rate.
3. A diverse number of species would be planted (more than four).

OAK SAVANNAH

1. Some orchard trees would be left in place to provide some habitat while native tree plantings become established.
2. Equilibrium would be reached at TY 20.

SCRUB SHRUB

1. A diverse number of species would be planted (more than four).
2. Canopy cover would become maximally beneficial at TY 10.

HEP APPENDIX A-2
DATA ANALYSIS ASSUMPTIONS FOR THE HAMILTON CITY FLOOD DAMAGE REDUCTION AND ECOSYSTEM RESTORATION PROJECT HEP

VARIABLES FOR EACH HSI MODEL AND HSI EQUATIONS

(1) RIPARIAN FOREST, RIPARIAN FOREST MODEL

V1 - average tree height
V2 - average canopy width of the stand
V3 - % tree canopy closure
V4 - # of tree and shrub species
V5 - understory vegetative density
V6 – floodplain inundation

HSI equation: $\frac{(V1 * V3 * V4)^{1/3} + (V2 * V5)^{1/2} + V6}{3}$

(2) GRASSLAND, RED-TAILED HAWK

V1 - % herbaceous cover
V2 - % herbaceous cover between 3 – 18 inches tall
V3 - number of suitable perch sites for hunting per 10 acres
V7 – number of suitable nest sites per 10 acres

Food HSI: $\frac{(V1^2 * V2)^3 + V3)}{2}$

Reproductive HSI: V7

HSI equation: $\frac{2 * \text{Food HSI} + \text{Reproductive HSI}}{3}$

(3) ORCHARD, RED-TAILED HAWK

V4 - % tree cover
V7 - number of suitable nest sites per 10 acres

HSI equation: $\frac{2 * (V4 * 0.6) + V7}{3}$

(4) GRAIN, RED-TAILED HAWK

V3 - number of suitable perch sites for hunting per 10 acres
V5 - over-winter management practices in grain crop
V7 - number of suitable nest sites per 10 acres

HSI equation: $\frac{V7 + 2*\frac{(V3 + V5)}{2}}{3}$

(5) OAK SAVANNAH, RED-TAILED HAWK

V1 - % herbaceous cover
V2 - % herbaceous cover between 3 - 18 inches tall
V4 - % tree cover
V7 - number of suitable nest sites per 10 acres

HSI equation: $\frac{2 * (V1^2 * V2 * V4)^{1/3} + V7}{3}$

(6) SCRUB SHRUB, SCRUB SHRUB

V1 - number of % herbaceous cover
V2 - % canopy cover
V3 - average width of stand
V4 - frequency of floodplain inundation

HSI equation: $(V1 * V2 * V3 * V4)^{1/4}$

HSI CALCULATIONS FOR THE HAMILTON CITY FLOOD DAMAGE REDUCTION AND ECOSYSTEM RESTORATION PROJECT HEP

WITHOUT PROJECT CONDITIONS

(1) RIPARIAN FOREST, RIPARIAN FOREST

Dunning Slough Area
TY0 (34.5 acres) - baseline habitat conditions
V1 = 50 feet; SI = 0.84
V2 = 100 feet; SI = 1.00
V3 = 44%; SI = 0.86
V4 = 3 species; SI = 0.90
V5 = 8%; SI = 0.40
V6 = out of floodplain; SI = 0.0

$HSI = ((0.84*0.86*0.90)^{1/3}+(1.0*0.40^{1/2}+0.0)/3 = 0.50$

Drainage ditch
TY0 (12.7 acres) - baseline habitat conditions
V1 = 26 feet; SI = 0.42
V2 = 30 feet; SI = 0.20
V3 = 41%; SI = 0.70
V4 = 4 species; SI = 1.00
V5 = 23%; SI = 0.70
V6 = out of floodplain; SI = 0.0

$HSI = ((0.42*0.70*1.0)^{1/3}+(0.20*0.70)^{1/2}+0.0)/3 = 0.35$

Weighted HSI = (12.7*0.35+34.5*0.50)/47.2 = 0.46

TY1, TY52 - same as TY0, HSI = 0.46

(2) GRASSLAND, RED-TAILED HAWK

TY0 - baseline habitat conditions
V1 = 94%; SI = 1.0
V2 = 45%; SI = 0.84
V3 = 1 perch site; SI = 1.0
V7 = 1 nest site; SI = 1.0

Food HSI: $\frac{(1.0^2 * 0.84)^{-3} + 1.0)}{2} = 0.96$
Reproductive HSI: 1.0

HIS = $\frac{2 * 0.97 + 1.0}{3} = 0.98$

TY1, TY52 - same as TY0, HSI = 0.98

(3) ORCHARD, RED-TAILED HAWK

TY0 - baseline habitat conditions
V4 = 76%; SI = 0.51
V7 = 0.2 nest sites; SI = 0.03

HSI = $\frac{2*(0.51 * 0.6) + 0.03}{3} = 0.35$

TY1, TY52 - same as TY0, HSI = 0.35

(4) GRAIN, RED-TAILED HAWK

TY0 - baseline habitat conditions
V3 = 1 perch site; SI = 1.0
V5 = A fall plowing; no residual food or cover available; SI = 0.0
V7 = 2 nest sites; SI = 1.0

HSI = $1.0 + \frac{2*(1.0 + 0)}{3} = 0.67$
$\frac{\quad 2 \quad}{}$

TY1, TY52 - same as TY0, HSI = 0.67

(5) OAK SAVANNAH, RED-TAILED HAWK

TY0 - baseline habitat conditions, cover-type does not currently exist HSI = 0.0

TY1, TY52 - same as TY0, HSI = 0.0

(6) SCRUB SHRUB, SCRUB SHRUB

TY0 - baseline habitat conditions, cover-type does not currently exist HSI = 0.0

TY1, TY52 - same as TY0, HSI = 0.0

WITH PROJECT CONDITIONS - ALTERNATIVE 1

(1) RIPARIAN FOREST, RIPARIAN FOREST
TY0 (97.1 acres) - baseline habitat conditions
Same as TY0, without the project, HSI = 0.47

TY1 (97.1 acres) – baseline habitat conditions for existing riparian, planting begins on new riparian, HSI = 0.47

TY3 (955.7 acres) – riparian restoration completed
V1 = 40 feet; SI = 0.63
V2 = 70 feet; SI = 1.0
V3 = 15%; SI = 0.28
V4 = 4 species; SI = 1.0
V5 = 10%; SI = 0.2
V6 = floodplain restored; SI = 1.0

$HSI = ((0.63*0.28*1.0)^{1/3}+(1.0*0.2)^{1/2}+1.0)/3 = 0.67$

TY5 (955.7 acres) – vegetation becomes established

V1 = 40 feet; SI = 0.63
V2 = 70 feet; SI = 1.0
V3 = 30% ; SI = 0.64
V4 = 4 species; SI = 1.0
V5 = 20%; SI = 0.75
V6 = floodplain restored; SI = 1.0

$HSI = ((0.63*0.64*1.0)^{1/3}+(1.0*0.75)^{1/2}+1.0)/3 = 0.88$

TY20 (955.7 acres) – values improve

V1 = 45 feet; SI = 0.75
V2 = 75 feet; SI = 1.0

V3 = 70%; SI = 1.0
V4 = 4 species; SI = 1.0
V5 = 25%; SI = 0.82
V6 = floodplain restored; SI = 1.0

$HSI = ((0.75*1.0*1.0)^{1/3}+(1.0*0.82)^{1/2}+1.0)/3 = 0.94$

TY52 (955.7 acres) – end of period of analysis

V1 = 50 feet; SI = 0.84
V2 = 70 feet; SI = 1.0
V3 = 70%; SI = 1.0
V4 = 4 species; SI = 1.0
V5 = 25%; SI = 0.82
V6 = floodplain restored; SI = 1.0

$HSI = ((0.84*1.0*1.0)^{1/3}+(1.0*0.82)^{1/2}+1.0)/3 = 0.95$

(2) GRASSLAND, RED-TAILED HAWK
TY0 (83.7 acres) - baseline habitat conditions
Same as TY0, without the project, HSI = 0.98

TY1 (83.7 acres) - baseline habitat conditions for existing grassland, planting begins on new grassland, HSI = 0.98

TY3 - TY52 (145.6 acres) - restoration complete grassland established

V1 = 95%; SI = 1
V2 = 75%; SI = 1
V3 = 1 perch site; SI = 1
V4 = 2 nest sites; SI = 1

Food HSI: $\frac{(1.0^2 * 1.0)^{1/3} + 1.0)}{2} = 1.0$
Reproductive HSI: 1.0

$HSI = \frac{2 * 1.0 + 1.0}{3} = 1.0$

(3) ORCHARD, RED-TAILED HAWK
TY0 (1198.1 acres) - baseline habitat conditions
Same as TY0, without the project, HSI = 0.35

TY1 – TY52 (0.0 acres) - first year of construction, orchards converted to native cover-types
HSI = 0

(4) GRAIN, RED-TAILED HAWK

TY0 - (89.9 acres) - baseline habitat conditions
Same at without project conditions for TY0, HSI = 0.67

TY1 – TY52 (0.0 acres) - first year of construction, grain not planted.
HSI = 0

(5) OAK SAVANNAH, RED-TAILED HAWK

TY0 (0 acres) – baseline habitat conditions
Same as without project conditions for TY0, HSI = 0.0

TY1 - (0 acres) - restoration begins.

TY3 (140.4 acres) - restoration complete

V1 = 50%; SI = 1.0
V2 = 50%; SI = 1.0
V4 = 15% ; SI = 1.0
V7 = 1 nest site; SI = 0.5

$HSI = 2*(1.0^2*1.0*1.0)^{1/4}+0.5/3 = 0.83$

TY10 - TY 52 - (140.4 acres) - values have established.
V1 = 50%; SI = 1.0
V2 = 50%; SI = 1.0
V4 = 15%; SI = 1.0
V7 = 1 nest site; SI = 1.0

$HSI = 2*(1.0^2*1.0*1.0)^{1/4}+1.0/3 = 1.0$

(6) SCRUB SHRUB, SCRUB SHRUB

TY0 (0 acres) - baseline habitat conditions
Same as without project conditions for TY0, HSI = 0.0

TY1 - (0.0 acres) - restoration begins.

TY3 - (291.3 acres) - restoration complete
V1 = 4 species; SI = 1.0
V2 = 10%; SI = 0.2
V3 = 25 feet; SI = 0.4
V4 = in the floodplain; SI = 1.0

$HSI = (1.0*0.2*0.4*1.0)^{1/4}$

TY10 - TY52 (291.3 acres) - values have established
V1 = 4 species; SI = 1.0

V2 = 40%; SI = 1.0
V3 = 50 feet; SI = 1.0
V4 = in the floodplain; SI = 1.0

$HSI = (1.0*1.0*1.0*1.0)^{1/4}$

WITH PROJECT CONDITIONS - ALTERNATIVE 5

(1) RIPARIAN FOREST, RIPARIAN FOREST
TY0 (109.8 acres) - baseline habitat conditions
Same as TY0, without the project, HSI = 0.47

TY1 (109.8 acres) – baseline habitat conditions for existing riparian, planting begins on new riparian, HSI = 0.47

TY3 (1215.8 acres) – riparian restoration completed
V1 = 40 feet; SI = 0.63
V2 = 70 feet; SI = 1.0
V3 = 15%; SI = 0.28
V4 = 4 species; SI = 1.0
V5 = 10%; SI = 0.2
V6 = floodplain restored; SI = 1.0

$HSI = ((0.63*0.28*1.0)^{1/3}+(1.0*0.2)^{1/2}+1.0)/3 = 0.67$

TY5 (1215.8 acres) – vegetation becomes established

V1 = 40 feet; SI = 0.63
V2 = 70 feet; SI = 1.0
V3 = 30% ; SI = 0.64
V4 = 4 species; SI = 1.0
V5 = 20%; SI = 0.75
V6 = floodplain restored; SI = 1.0
$HSI = ((0.63*0.64*1.0)^{1/3}+(1.0*0.75)^{1/2}+1.0)/3 = 0.88$

TY20 (1215.8 acres) – values improve

V1 = 45 feet; SI = 0.75
V2 = 75 feet; SI = 1.0
V3 = 70% ; SI = 1.0
V4 = 4 species; SI = 1.0
V5 = 25%; SI = 0.82
V6 = floodplain restored; SI = 1.0

$HSI = ((0.75*1.0*1.0)^{1/3}+(1.0*0.82)^{1/2}+1.0)/3 = 0.94$

TY52 (1215.8 acres) – end of period of analysis

V1 = 50 feet; SI = 0.84
V2 = 70 feet; SI = 1.0
V3 = 70%; SI = 1.0
V4 = 4 species; SI = 1.0
V5 = 25%; SI = 0.82
V6 = floodplain restored; SI = 1.0

$HSI = ((0.84*1.0*1.0)^{1/3}+(1.0*0.82)^{1/2}+1.0)/3 = 0.95$

(2) GRASSLAND, RED-TAILED HAWK
TY0 (84.8 acres) - baseline habitat conditions
Same as TY0, without the project, HSI = 0.98

TY1 (84.8 acres) - baseline habitat conditions for existing grassland, planting begins on new grassland, HSI = 0.98

TY3 - TY52 (163.4 acres) - restoration complete grassland established

V1 = 95%; SI = 1
V2 = 75%; SI = 1
V3 = 1 perch site; SI = 1
V4 = 2 nest sites; SI = 1

Food HSI: $\frac{(1.0^2 * 1.0)^{1/3} + 1.0)}{2} = 1.0$
Reproductive HSI: 1.0

$HSI = \frac{2 * 1.0 + 1.0}{3} = 1.0$

(3) ORCHARD, RED-TAILED HAWK
TY0 (1540.6 acres) - baseline habitat conditions
Same as TY0, without the project, HSI = 0.35

TY1 – TY52 (0.0 acres) - first year of construction, orchards converted to native cover-types
HSI = 0

(4) GRAIN, RED-TAILED HAWK
TY0 - (89.9 acres) - baseline habitat conditions
Same at without project conditions for TY0, HSI = 0.67

TY1 – TY52 (0.0 acres) - first year of construction, grain not planted.
HSI = 0

(5) OAK SAVANNAH, RED-TAILED HAWK

TY0 (0 acres) – baseline habitat conditions
Same as without project conditions for TY0, HSI = 0.0

TY1 - (0 acres) - restoration begins.

TY3 (154.6 acres) - restoration complete

V1 = 50%; SI = 1.0
V2 = 50%; SI = 1.0
V4 = 15% ; SI = 1.0
V7 = 1 nest site; SI = 0.5

$HSI = 2*(1.0^2*1.0*1.0)^{1/4}+0.5/3 = 0.83$

TY10 - TY 52 - (154.6 acres) - values have established.
V1 = 50%; SI = 1.0
V2 = 50%; SI = 1.0
V4 = 15%; SI = 1.0
V7 = 1 nest site; SI = 1.0

$HSI = 2*(1.0^2*1.0*1.0)^{1/4}+1.0/3 = 1.0$

(6) SCRUB SHRUB, SCRUB SHRUB

TY0 (0 acres) - baseline habitat conditions
Same as without project conditions for TY0, HSI = 0.0

TY1 - (0.0 acres) - restoration begins.

TY3 - (291.3 acres) - restoration complete
V1 = 4 species; SI = 1.0
V2 = 10%; SI = 0.2
V3 = 25 feet; SI = 0.4
V4 = in the floodplain; SI = 1.0

$HSI = (1.0*0.2*0.4*1.0)^{1/4}$

TY10 - TY52 (291.3 acres) - values have established
V1 = 4 species; SI = 1.0
V2 = 40%; SI = 1.0
V3 = 50 feet; SI = 1.0
V4 = in the floodplain; SI = 1.0

$HSI = (1.0*1.0*1.0*1.0)^{1/4}$

WITH PROJECT CONDITION - ALTERNATIVE 6

(1) <u>RIPARIAN FOREST, RIPARIAN FOREST</u>

TY0 (97.1 acres) - baseline habitat conditions
Same as TY0, without the project, HSI = 0.47

TY1 (97.1 acres) – baseline habitat conditions for existing riparian, planting begins on new riparian, HSI = 0.47

TY3 (1093.7 acres) – riparian restoration completed
V1 = 40 feet; SI = 0.63
V2 = 70 feet; SI = 1.0
V3 = 15%; SI = 0.28
V4 = 4 species; SI = 1.0
V5 = 10%; SI = 0.2
V6 = floodplain restored; SI = 1.0

$HSI = ((0.63*0.28*1.0)^{1/3}+(1.0*0.2)^{1/2}+1.0)/3 = 0.67$

TY5 (1093.7 acres) – vegetation becomes established

V1 = 40 feet; SI = 0.63
V2 = 70 feet; SI = 1.0
V3 = 30% ; SI = 0.64
V4 = 4 species; SI = 1.0
V5 = 20%; SI = 0.75
V6 = floodplain restored; SI = 1.0

$HSI = ((0.63*0.64*1.0)^{1/3}+(1.0*0.75)^{1/2}+1.0)/3 = 0.88$

TY20 (1093.7 acres) – values improve

V1 = 45 feet; SI = 0.75
V2 = 75 feet; SI = 1.0
V3 = 70% ; SI = 1.0
V4 = 4 species; SI = 1.0
V5 = 25%; SI = 0.82
V6 = floodplain restored; SI = 1.0

$HSI = ((0.75*1.0*1.0)^{1/3}+(1.0*0.82)^{1/2}+1.0)/3 = 0.94$

TY52 (1093.7 acres) – end of period of analysis

V1 = 50 feet; SI = 0.84

V2 = 70 feet; SI = 1.0
V3 = 70%; SI = 1.0
V4 = 4 species; SI = 1.0
V5 = 25%; SI = 0.82
V6 = floodplain restored; SI = 1.0

$HSI = ((0.84*1.0*1.0)^{1/3}+(1.0*0.82)^{1/2}+1.0)/3 = 0.95$

(2) GRASSLAND, RED-TAILED HAWK
TY0 (84.6 acres) - baseline habitat conditions
Same as TY0, without the project, HSI = 0.98

TY1 (84.6 acres) - baseline habitat conditions for existing grassland, planting begins on new grassland, HSI = 0.98

TY3 - TY52 (155.1 acres) - restoration complete grassland established

V1 = 95%; SI = 1
V2 = 75%; SI = 1
V3 = 1 perch site; SI = 1
V4 = 2 nest sites; SI = 1

Food HSI: $\frac{(1.0^2 * 1.0)^{1/3} + 1.0)}{2} = 1.0$
Reproductive HSI: 1.0

$HSI = \frac{2 * 1.0 + 1.0}{3} = 1.0$

(3) ORCHARD, RED-TAILED HAWK
TY0 (1386.3 acres) - baseline habitat conditions
Same as TY0, without the project, HSI = 0.35

TY1 – TY52 (0.0 acres) - first year of construction, orchards converted to native cover-types
HSI = 0

(4) GRAIN, RED-TAILED HAWK
TY0 - (89.9 acres) - baseline habitat conditions
Same at without project conditions for TY0, HSI = 0.67

TY1 – TY52 (0.0 acres) - first year of construction, grain not planted.
HSI = 0

(5) OAK SAVANNAH, RED-TAILED HAWK
TY0 (0 acres) – baseline habitat conditions
Same as without project conditions for TY0, HSI = 0.0

TY1 - (0 acres) - restoration begins.

TY3 (147.9 acres) - restoration complete

V1 = 50%; SI = 1.0
V2 = 50%; SI = 1.0
V4 = 15% ; SI = 1.0
V7 = 1 nest site; SI = 0.5

$HSI = 2*(1.0^2*1.0*1.0)^{1/4}+0.5/3 = 0.83$

TY10 - TY 52 - (147.9 acres) - values have established.
V1 = 50%; SI = 1.0
V2 = 50%; SI = 1.0
V4 = 15%; SI = 1.0
V7 = 1 nest site; SI = 1.0

$HSI = 2*(1.0^2*1.0*1.0)^{1/4}+1.0/3 = 1.0$

(6) <u>SCRUB SHRUB, SCRUB SHRUB</u>
TY0 (0 acres) - baseline habitat conditions
Same as without project conditions for TY0, HSI = 0.0

TY1 - (0.0 acres) - restoration begins.

TY3 - (261.2 acres) - restoration complete
V1 = 4 species; SI = 1.0
V2 = 10%; SI = 0.2
V3 = 25 feet; SI = 0.4
V4 = in the floodplain; SI = 1.0

$HSI = (1.0*0.2*0.4*1.0)^{1/4}$

TY10 - TY52 (261.2 acres) - values have established
V1 = 4 species; SI = 1.0
V2 = 40%; SI = 1.0
V3 = 50 feet; SI = 1.0
V4 = in the floodplain; SI = 1.0

$HSI = (1.0*1.0*1.0*1.0)^{1/4}$

HEP APPENDIX A-3
HABITAT SUITABILITY INDEX MODELS

COMMUNITY-BASED
HABITAT SUITABILITY INDEX MODEL
FOR RIPARIAN FOREST COVER-TYPE

Adapted from a model used by the HEP team evaluating impacts of proposed riprap bank protection along the lower Sacramento River

As Revised
June 2003

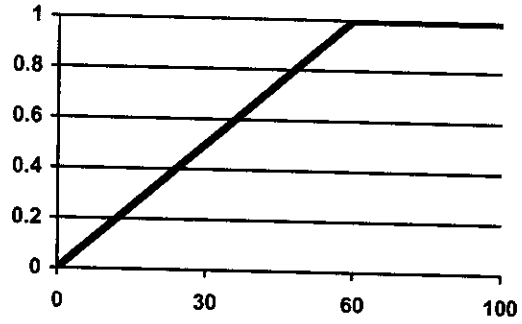
BACKGROUND: The cover-type model described here is for Riparian Forest Cover. This cover-type is defined as a stand of woody vegetation composed of primarily trees greater than 20-feet-tall. The Riparian Forest cover-type model identifies and quantifies characteristics of this cover type which are important to a wide array of wildlife. The model does not attempt to portray exactly the needs of any one species, but rather it broadly portrays the needs of many species or species groups of riparian zones.

For example, many birds, including nesting raptors such as red-tailed hawks and re-shouldered hawks require tall trees, and thus tree height, with taller trees being more favorable, has been included as a key model variable. Also, many songbirds, such as the northern oriole and least Bell's vireo, require relatively dense canopies, thus canopy closure, with greater closure providing greater value, is included as a model variable. Similarly, riparian water birds such as herons an egrets have specific needs relating to canopy closure, width of stand, and density of vegetative understory, so these needs have been met as much as possible with the appropriate model variables.

The single Habitat Suitability Index (HSI) value which is derived using the Riparian Forest cover-type model is therefore, not an exact measure of the habitat value of any single wildlife species. Instead, the HSI indicates the overall, broad quality of the cover-type to a broad array of the most important species which inhabit the creek's riparian zone. As such, the use of this single HSI value in the HEP process is assumed to provide the same results (i.e., estimates of relative impacts and compensation needs) as if the HEP were completed using a number of individual wildlife species models. Past comparisons using actual HSI data collected from Riparian Forest Cover along the Sacramento River suggest the validity of this assumption.

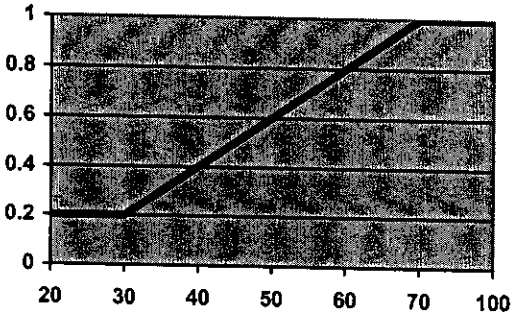
VARIABLE

V_1 – Average tree height.
V_2 – Average canopy width of the stand.
V_3 – Tree canopy closure.
V_4 – Number of tree or shrub species.
V_5 – Understory vegetative density.
V_6 – Area inundated by floodplain.
V_1 – Average tree height. Assumptions: For most wildlife species of concern, the taller the trees, the better the habitat value. Nesting raptors in particular require relatively tall trees. A tree height, on average, of about 60 feet or greater is optimum.



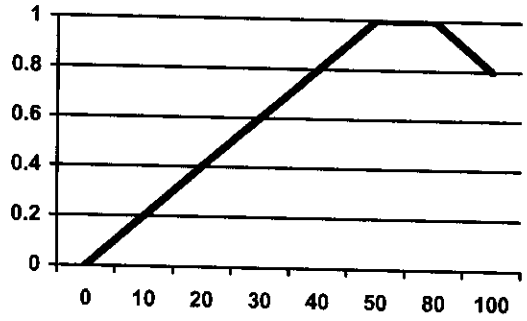
V_1 – Average Tree Height (Ft.)

V_2 – Average canopy width of the stand. Assumptions: Generally, the wider the stand, the better the values for most key fish and wildlife. Stands less than 30-feet-wide have relatively low values; stands over 70 feet in width are best.



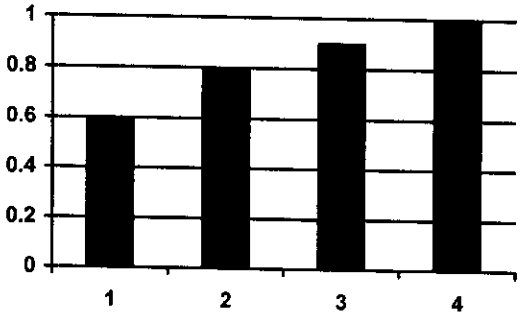
V_2 – Average Canopy Width of the Stand (Ft.)

V_3 – Tree canopy closure. Assumptions: In general, the greater the forest density, as determined by percent of canopy closure, the greater the values of the forest. However, if the stand becomes too dense, habitat values frequently decline. The optimal condition is with percent canopy closure of 50 to 80 percent.



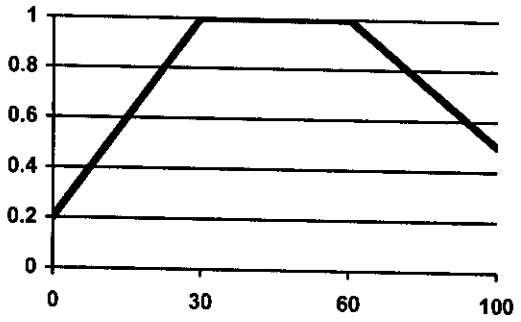
V_3 – Tree Canopy Closure (Percent)

V_4 – Number of tree or shrub species. Assumptions: The greater the habitat diversity, as indicated by the number of tree or shrub species making up the stand(s), the greater the values to fish and wildlife. Four or more species of trees or shrubs are considered the optimal condition.



V_4 – Number of Tree or Shrub Species

V_5 – Understory vegetative density. Suitability Index (SI) determination. Assumptions: The best Riparian Forest habitat occurs when both overstory and understory canopies are relatively dense. The understory should generally have a moderate density of vegetation at various elevations. By estimating the understory of the forest for the horizontal planes at 2, 6, and 14 feet above ground, and then averaging these three figures (i.e., the three estimates of percent vegetative cover), a good index of overall understory density can be derived.



V_5 – Average Understory Vegetative Density (%)
(At 2. 6. and 14 Feet Above Ground)

V_6 – Floodplain inundation. Assumptions: Riparian habitat that experiences flooding provides additional structure and food for wildlife and fish.

Area in floodplain	1.0
Area outside of floodplain	0.0

HABITAT SUITABILITY INDEX (HSI): Average canopy width and understory density are believed to be slightly more important variables than the other three variables. The five variables are thus combined as follows:

$$HSI = \frac{(V_1 \times V_3 \times V_4)^{1/3} + (V_2 \times V_5)^{1/2} + V_6}{3}$$

COMMUNITY-BASED
HABITAT SUITABILITY INDEX MODEL
FOR THE SCRUB-SHRUB COVER-TYPE

Adapted from a model used by the HEP team evaluating impacts of proposed riprap bank protection along the lower Sacramento River

As Revised
June 2003

BACKGROUND: The cover-type model described here is for Scrub Shrub Cover. This cover-type is defined as a stand of woody trees or shrubs averaging less than 20-feet-tall. The Scrub-Shrub community model identifies and quantifies characteristics of this cover type which are important to a wide array of wildlife. Thus, the model may not portray exactly the needs of any one species, but rather it broadly portrays the needs of many species or species groups of riparian zones.

Among the species whose needs were considered in developing this model were the following; songbirds, such as the yellow warbler, and least Bell's vireo; gamebirds, such as the pheasant and California quail; the heron and egret family; and furbearing aquatic mammals.

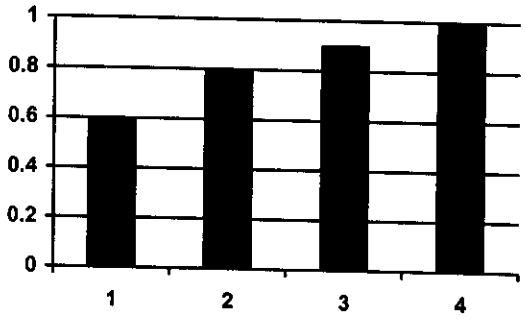
The single Habitat Suitability Index (HSI) value which is derived using the Scrub-Shrub cover-type model is therefore, not an exact measure of the habitat value of any single wildlife species. Instead, the HSI indicates the overall, broad quality of the cover-type to a broad array of the most important species which inhabit the creek's riparian zone. As such, the use of this single HSI value in the HEP process is assumed to provide the same results (i.e., estimates of relative impacts and compensation needs) as if the HEP were completed using a number of individual wildlife species models. Past comparisons using actual HSI data collected from Riparian Forest Cover along the Sacramento River suggest the validity of this assumption.

AREA OF APPLICABILITY: Riparian Scrub-Shrub Cover along the Sacramento River.

VARIABLE

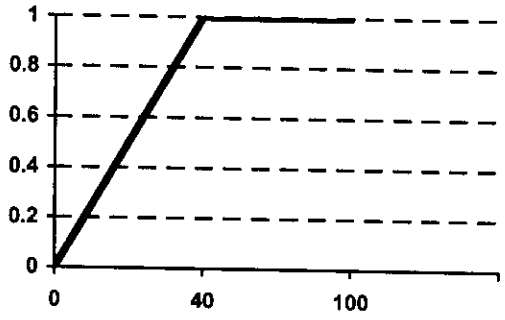
V_1 – Number of tree or shrub species.
V_2 – Percent of canopy closure.
V_3 – Average width of stand(s).
V_4 – Area inundated by floodplain.

V_1 – Number of tree or shrub species. Suitability Index (SI) determination. Assumptions: The greater the habitat diversity, as indicated by the number of tree or shrub species making up the stand(s), the greater the values to fish and wildlife. Four or more species of trees or shrubs are considered the optimal condition.



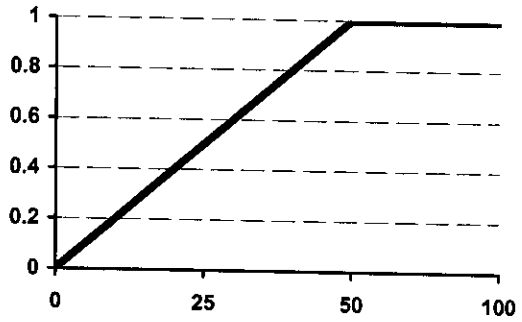
V_1 – Number of Tree or Shrub Species

V_2 – Percent of canopy closure. Suitability Index (SI) determination. Assumptions: In general, the greater the Scrub-Shrub density, as measured by percentage of canopy closure of the trees or shrubs, the greater the values for fish and wildlife. For relatively narrow stands, optimal canopy closure is 40-100 percent; for wider stands, optimal closures is 40-75 percent.



V_2 – Canopy Closure (Percent)

V_3 – Average width of stand(s). Suitability Index (SI) determination. Assumptions: The wider the stand, the greater the values for fish and wildlife. Stands at least 50-feet-wide are considered optimal.



V_3 – Average Width of Stand (Feet)

V_4 – Floodplain inundation. Assumptions: Riparian scrub shrub habitat that experiences flooding provides additional structure and food for wildlife and fish.

Area in floodplain	1.0
Area outside of floodplain	0.0

HABITAT SUITABILITY INDEX (HSI): The four variable are closely related and about equally important in determining the HSI. Variables are generally measured or estimated during periods of maximum vegetative leaf-out.

$$HSI = (V_1 \times V_2 \times V_3 \times V_4)^{1/4}$$

APPENDIX B

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

APPENDIX B

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

SECTION 7(a) Consultation/Conference

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

SECTION 7(c) Biological Assessment–Major Construction Activity[1]

Requires Federal agencies or their designees to prepare a Biological Assessment (BA) for major construction activities. The BA analyzes the effects of the action[2] on listed and proposed species. The process begins with a Federal agency requesting from FWS a list of proposed and listed threatened and endangered species. The BA should be completed within 180 days after its initiation (or within such a time period as is mutually agreeable). If the BA is not initiated within 90 days of receipt of the list, the accuracy of the species list should be informally verified with our Service. No irreversible commitment of resources is to be made during the BA process which would foreclose reasonable and prudent alternatives to protect endangered species. Planning, design, and administrative actions may proceed; however, no construction may begin.

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

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

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

United States Department of the Interior

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

In reply refer to:
1-1-04-F-0145

JUN 30 2004

Mr. Mark C. Charlton
Chief, Planning Division
U.S. Army Corps of Engineers
1325 J Street
Sacramento, California 95814-2922

Subject: Formal Endangered Species Consultation on the Hamilton City Flood Damage Reduction and Ecosystem Restoration Project, Glenn County, California

Dear Mr. Charlton:

This document has been prepared in response to your April 1, 2004, request to initiate formal consultation with the U.S. Fish and Wildlife Service (Service) on the effects of the proposed Hamilton City Flood Damage Reduction and Ecosystem Restoration Project, in Glenn County, California, on the threatened valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) (beetle). Your request was received by the Service on April 2, 2004. This document represents the Service's biological opinion on the effects of the proposed project on the threatened beetle, in accordance with section 7 of the Endangered Species Act of 1973, as amended (Act).

The Service has reviewed the biological information submitted by the U.S. Army Corps of Engineers (Corps). The documentation describes the proposed project's effects on listed species. This biological opinion is in accordance with the standards established in the Service's July 9, 1999, *Conservation Guidelines for the Valley Elderberry Longhorn Beetle* (Conservation Guidelines). Based on our analysis, the Service has determined the proposed project will result in the establishment of a significant amount of habitat for the valley elderberry longhorn beetle that will be of long-term benefit to this listed animal, and any adverse effects will be temporary and relatively minor in nature.

The findings and requirements in this consultation are based on: (1) a site visit by Justin Ly of the Service and Annalena Bronson of the California Department of Water Resources on April 1, 2003; (2) the *Elderberry Planting and Monitoring Plan for the Valley Elderberry Longhorn Beetle- Hamilton City Flood Damage Reduction and Ecosystem Restoration*, dated March, 2004;

(3) the *Hamilton City Flood Damage Reduction and Ecosystem Restoration, California, Draft Feasibility Report and Environmental Impact Statement/Environmental Impact Report*, dated March, 2004; (4) the *Hamilton City Flood Damage Reduction and Ecosystem Restoration, California, Habitat Revegetation Report*, dated December, 2003; and, (5) numerous telephone conversations between the Corps and the Service.

Consultation History

April 1, 2003. A visit to the site by Justin Ly, of the Service and Annalena Bronson, of the California Department of Water Resources.

March 10, 2004. Erin Taylor of the Corps provided the draft Elderberry Planting and Monitoring Plan for the Valley Elderberry Longhorn Beetle-Hamilton City Flood Damage Reduction and Ecosystem Restoration, dated January, 2004, to the Service.

March 19, 2004. Erin Taylor provided the final Elderberry Planting and Monitoring Plan for the Valley Elderberry Longhorn Beetle- Hamilton City Flood Damage Reduction and Ecosystem Restoration, dated March, 2004, to the Service.

April 1, 2004. The Service received the request for formal section 7 consultation from the Corps.

Project Description

Hamilton City is located in Glenn County, California, along the west bank of the Sacramento River, approximately 85 miles north of the City of Sacramento. The proposed project area includes Hamilton City and the surrounding rural area, which comprises approximately 1,500 acres. The proposed action area is bounded by the Sacramento River to the East and the Glenn Colusa Canal to the west and extends approximately two miles north and six miles south of Hamilton City. Surrounding land use is primarily orchards. The objectives of the project are to reduce flood risk and flood damages and to restore the riverine ecosystem along the west bank of the Sacramento River in and around Hamilton City.

Flood protection to Hamilton City and the surrounding area is provided by the "J" levee, which is an existing private levee. Currently, the Sacramento River is actively eroding into the toe of the levee at the northern end of the proposed project area. Glenn County has built a backup levee, approximately 1,000 feet in length, to protect the community in the event the toe erosion causes failure at the northern end of the "J" levee.

Currently, there are approximately 107 elderberry shrubs (*Sambucus* species), with stems one inch or greater at ground level in the proposed action area. Of these 107 elderberry shrubs, 21 shrubs with stems one inch or greater at ground level have beetle exit holes. These elderberry shrubs can be avoided with the potential setback levee alignments currently being considered. However, there is potential for the 107 existing elderberry shrubs to be removed during future flood-fighting activities.

The Reclamation Board has identified the proposed project area as having a high level of potential for restoration. The Reclamation Board is seeking to plant a mix of native riparian vegetation, including a minimum of one elderberry shrub per 1,800 feet (2,747 elderberry shrubs) in order to benefit the listed beetle. The approximate 2,747 or more elderberry shrubs that are proposed for planting are not for mitigation purposes and are only proposed for the benefit of the beetle, and other threatened and endangered species. The Reclamation Board has stated that the addition of elderberry shrubs to the restoration project is dependent on the authorization for incidental take of all elderberry shrubs planted within the 1,500 acre proposed action area. This would include the loss of all elderberry shrub habitat that occurs in the action area in the future. The Reclamation Board is seeking incidental take of all elderberry shrubs that would result from future maintenance and operations activities and potential flood-fighting activities that may be required for the setback levee in the future. Flood-fighting activities have occurred in the project area in 1983, 1986, 1995, 1997, and 1998.

The Corps has indicated in the *Elderberry Planting and Monitoring Plan for the Valley Elderberry Longhorn Beetle- Hamilton City Flood Damage Reduction and Ecosystem Restoration*, dated March, 2004, that the following maintenance and flood-fighting activities may occur within the proposed action area:

1. Maintain ability to access the entire length of levee (approximately 6 miles) for maintenance and flood-fighting;

2. Maintain ability to access the entire length of the levee for large equipment to deliver and place flood-fighting material, including rock;

3. Maintain ability to maintain hydraulic capacity by selective clearing of vegetation;

4. Maintain ability to remove vegetation from the levee and within 15 feet of levee toe;

5. Maintain ability to access the levee to clear bank and berm of vegetation in order to place rock riprap bank protection when erosion is encroaching into the projected levee slope.

The Corps would be involved in the restoration, planting, and establishment for the first three years of restoration. Land ownership would then be turned over to a non-Federal sponsor. The Corps would require that the non-Federal sponsor supply the lands, easements, and rights-of-way for the proposed project. The Reclamation Board is the Corp's non-Federal sponsor for only the flood control component of the project. The Reclamation Board has yet to identify a non-Federal sponsor for the restoration component of the project. Possible non-Federal sponsors include The Nature Conservancy, the California Department of Fish and Game, or CalFed. Maintenance of the restoration area would then become the non-Federal sponsor's responsibility. The Corps will not be able to implement the proposed project without a non-Federal restoration sponsor.

Proposed Conservation Measures

The following measures have been proposed by the Corps:

1. A minimum of one elderberry shrub would be planted per 1,800 square feet (2,747 elderberry shrubs);

2. The Corps would be involved in the restoration, planting, and establishment for the first three years of restoration. Land ownership would be turned over to The Nature Conservancy, the California Department of Fish and Game, CalFed, or another non-Federal sponsor after the first three years. The Corps will attempt to ensure that monitoring will be continued by the non-Federal sponsor after three years in accordance with the Service's 1999 *Conservation Guidelines for the Valley Elderberry Longhorn Beetle.*

3. Flood-fighting activities are expected to occur in the future. If flood-fighting activities occur within the proposed action area, the Corps will restore the areas disturbed during flood-fighting activities with the original vegetation species mix. Flood fighting by the Corps is considered emergency work and falls under PL-84 99, which includes consultation with the Service. This future consultation would require that the previous vegetation be restored.

4. A Service-approved biologist familiar with elderberry shrubs shall be onsite during flood-fighting activities and have the authority to choose access routes. Access routes, staging areas, and all project activities should be chosen in a manner that will cause the least amount of damage to beetle habitat. Removal of elderberry shrubs should be limited to the minimum necessary to achieve the project goal.

Status of the Species

The beetle was listed as a threatened species under the Act on August 8, 1980 (45 **FR** 52803). Critical habitat for the species was designated and published at 50 CFR §17.95. Two areas along the American River in the Sacramento metropolitan area have been designated as critical habitat for the beetle. Critical habitat for this species has been designated along the lower American River at Goethe and Ancil Hoffman parks (American River Parkway Zone) and at the Sacramento Zone, an area about a half mile from the American River downstream from the American River Parkway Zone. In addition, an area along Putah Creek, Solano County, and the area west of Nimbus Dam along the American River Parkway, Sacramento County, are considered essential habitat, according to the Valley Elderberry Longhorn Beetle Recovery Plan (Service 1984). These critical habitat and essential habitat areas within the American River parkway and Putah Creek support large numbers of mature elderberry shrubs with extensive evidence of use by the beetle.

The beetle is dependent on the elderberry, its host plant, which is a locally common component of the remaining riparian forests and savannah areas and, to a lesser extent, the mixed chaparral-

foothill woodlands of the Central Valley. Use of the elderberry shrubs by the animal, a wood borer, is rarely apparent. Frequently but not exclusively, the only exterior evidence of the shrub's use by the beetle is an exit hole created by the larva just prior to the pupal stage. Observations made within elderberry shrubs along the Cosumnes River, in the Folsom Lake area, and near Blue Ravine in Folsom indicate that larval galleries can be found in elderberry stems with no evidence of exit holes; the larvae either succumb prior to constructing an exit hole or are not far enough along in the developmental process to construct an exit hole. Beetle larvae appear to be distributed in stems which are 1.0 inch or greater in diameter at ground level. The Valley Elderberry Longhorn Beetle Recovery Plan (Service 1984) and Barr (1991) contain further details on the valley elderberry longhorn beetle's life history.

Population densities of the beetle are probably naturally low (Service 1984); and it has been suggested, based on the spatial distribution of occupied shrubs (Barr 1991), that the beetle is a poor disperser (Collinger *et al.* 2001). Low density and limited dispersal capability cause the beetle to be vulnerable to the negative effects of the isolation of small subpopulations due to habitat fragmentation.

When the beetle was listed as threatened in 1980, the species was known from less than 10 localities along the American River, the Merced River, and Putah Creek. By the time the Valley Elderberry Longhorn Beetle Recovery Plan was prepared in 1984, additional occupied localities had been found along the American River and Putah Creek. As of 2004, the California Natural Diversity Database (CNDDB) contained 190 occurrences for this species in 44 drainages throughout the Central Valley, from a location along the Sacramento River in Shasta County, southward to an area along Caliente Creek in Kern County (CNDDB 2004). Glenn County has 12 occurrences of the beetle (CNDDB 2004). The beetle continues to be threatened by habitat loss and fragmentation, predation by the non-native Argentine ants (*Linepithema humile*) (Holway 1995; Huxel 2000; Huxel and Hastings 1999; Huxel *et al.* 2001; Ward 1987), and possibly other factors such as pesticide drift, non-native plant invasion, improper burning regimes, off-road vehicle use, rip-rap bank protection projects, wood cutting, and over grazing by livestock (CNDDB 2004).

Environmental Baseline

Riparian forests, the primary habitat for the beetle, have been severely depleted throughout the Central Valley over the last two centuries as a result of expansive agricultural and urban development (Huxel *et al.* 2001; Katibah 1984; Roberts *et al.* 1977; Thompson 1961). Since colonization, these forests have been "...modified with a rapidity and completeness matched in few parts of the United States" (Thompson 1961). As of 1849, the rivers and larger streams of the Central Valley were largely undisturbed. They supported continuous bands of riparian woodland four to five miles in width along some major drainages such as the lower Sacramento River, and generally about two miles wide along the lesser streams (Thompson 1961). Most of the riverine floodplains supported riparian vegetation to about the 100-year flood line (Katibah 1984). A large human population influx occurred after 1849, however, and much of the Central Valley riparian habitat was rapidly converted to agriculture and used as a source of wood for fuel and construction to serve a wide area (Thompson 1961). By as early as 1868, riparian woodland

had been severely affected in the Central Valley, as evidenced by the following excerpt:

> "This fine growth of timber which once graced our river [Sacramento], tempered the atmosphere, and gave protection to the adjoining plains from the sweeping winds, has entirely disappeared - the woodchopper's axe has stripped the river farms of nearly all the hard wood timber, and the owners are now obliged to rely upon the growth of willows for firewood." (Cronise 1868, in Thompson 1961).

The clearing of riparian forests for fuel and construction made this land available for agriculture (Thompson 1977). Natural levees bordering the rivers, once supporting vast tracts of riparian habitat, became prime agricultural land (Thompson 1961). As agriculture expanded in the Central Valley, needs for increased water supply and flood protection spurred water development and reclamation projects. Artificial levees, river channelization, dam building, water diversion, and heavy groundwater pumping further reduced riparian habitat to small, isolated fragments (Katibah 1984). In recent decades, these riparian areas have continued to decline as a result of ongoing agricultural conversion as well and urban development and stream channelization. As of 1989, there were over 100 dams within the Central Valley drainage basin, as well as thousands of miles of water delivery canals and streambank flood control projects for irrigation, municipal and industrial water supplies, hydroelectic power, flood control, navigation, and recreation (Frayer *et al.* 1989). Riparian forests in the Central Valley have dwindled to discontinuous strips of widths currently measurable in yards rather than miles.

Some accounts state that the Sacramento Valley supported approximately 775,000 to 800,000 acres of riparian forest as of approximately 1848, just prior to statehood (Smith 1977; Katibah 1984). No comparable estimates are available for the San Joaquin Valley. Based on early soil maps, however, more than 921,000 acres of riparian habitat are believed to have been present throughout the Central Valley under pre-settlement conditions (Huxel *et al* 2001; Katibah 1984). Another source estimates that of approximately five million acres of wetlands in the Central Valley in the 1850s, approximately 1,600,000 acres were riparian wetlands (Warner and Hendrix 1985; Frayer *et al.* 1989).

Based on a California Department of Fish and Game riparian vegetation distribution map, by 1979, there were approximately 102,000 acres of riparian vegetation remaining in the Central Valley. This represents a decline in acreage of approximately 89 percent as of 1979 (Katibah 1984). More extreme figures were given by Frayer *et al.* (1989), who reported that woody riparian forests in the Central Valley had declined to 34,600 acres by the mid-1980s (from 65,400 acres in 1939). Although these studies have differing findings in terms of the number of acres lost (most likely explained by differing methodologies), they attest to a dramatic historic loss of riparian habitat in the Central Valley. As there is no reason to believe that riparian habitat suitable to the beetle (elderberry shrubs) would be destroyed at a different rate than other riparian habitat, we can assume that the rate of loss for beetle habitat in riparian areas has been equally dramatic.

A number of studies have focused on riparian vegetation losses along the Sacramento River, which supports some of the densest known populations of the beetle. Approximately 98 percent

of the middle Sacramento River's historic riparian vegetation was believed to have been extirpated by 1977 (DWR 1979). The State Department of Water Resources estimated that native riparian habitat along the Sacramento River from Redding to Colusa decreased from 27,720 acres to 18,360 acres (34 percent) between 1952 and 1972 (McGill *et al.* 1975; Conrad *et al.* 1977). The average rate of riparian loss on the middle Sacramento River was 430 acres per year from 1952 to 1972, and 410 acres per year from 1972 to 1977. In 1987, riparian areas as large as 180 acres were observed converted to orchards along this River (McCarten and Patterson 1987).

Barr (1991) examined 79 sites in the Central Valley supporting valley elderberry longhorn beetle habitat. When 72 of these sites were re-examined by researchers in 1997, seven no longer supported valley elderberry longhorn beetle habitat. This loss represents a decrease in the number of sites with valley elderberry longhorn beetle habitat by approximately nine percent in six years.

No comparable information exists on the historic loss of non-riparian valley elderberry longhorn beetle habitat such as elderberry savanna and other vegetation communities where elderberry shrubs also occur (oak or mixed chaparral-woodland, or grasslands adjacent to riparian habitat). However, all natural habitats throughout the Central Valley have been heavily adversely affected within the last 200 years (Thompson 1961), and we can therefore assume that non-riparian beetle habitat also has suffered a widespread decline. This analysis focuses on loss of riparian habitat because the beetle is primarily dependent upon riparian habitat. Adjacent upland areas are also likely to be important for the species (Huxel pers. comm. 2000), but this upland habitat typically consist of oak woodland or elderberry savanna bordering willow riparian habitat (Barr 1991). The riparian acreage figures given by Frayer *et al.* (1989) and Katibah (1984) included oak woodlands concentrated along major drainages in the Central Valley, and therefore probably included lands we would classify as upland habitat for the beetle adjacent to riparian drainages.

Between 1980 and 1995, the human population in the Central Valley grew by 50 percent, while the rest of California grew by 37 percent . The Central Valley's population was 4.7 million by 1999, and it is expected to more than double by 2040. The American Farmland Trust estimates that by 2040 more than 1 million cultivated acres will be lost and 2.5 million more put at risk (Ritter 2000). With this growing population in the Central Valley, increased development pressure is likely to result in continuing loss of riparian habitat.

While habitat loss is clearly a large factor leading to the species' decline, other factors are likely to pose significant threats to the long term survival of the beetle. Only approximately 20 percent of riparian sites with elderberry observed by Barr (1991) and Collinge *et al.* (2001) support beetle populations (Barr 1991, Collinge *et al.* 2001). Jones and Stokes (1988) found 65 percent of 4,800 riparian acres on the Sacramento River have evidence of beetle presence. The fact that a large percentage of apparently suitable habitat is unoccupied suggests that the beetle is limited by factors other than habitat availability, such as habitat quality or limited dispersal ability.

Destruction of riparian habitat in central California has resulted not only in a significant acreage loss, but also has resulted in beetle habitat fragmentation. Fahrig (1997) states that habitat

fragmentation is only important for habitats that have suffered greater than 80 percent loss. Riparian habitat in the Central Valley, which has experienced greater than 90 percent loss by most estimates, would meet this criterion as habitat vulnerable to effects of fragmentation. Existing data suggests that beetle populations, specifically, are affected by habitat fragmentation. Barr (1991) found that small, isolated habitat remnants were less likely to be occupied by beetles than larger patches, indicating that valley elderberry longhorn beetle subpopulations are extirpated from small habitat fragments. Barr (1991) and Collinge *et al.* (2001) consistently found valley elderberry longhorn beetle exit holes occurring in clumps of elderberry bushes rather than isolated bushes, suggesting that isolated shrubs do not typically provide long-term viable habitat for this species. Local populations of organisms often undergo periodic colonization and extinction, while the metapopulation (set of spatially separated groups of a species) may persist (Collinge 1996).

Habitat fragmentation can be an important factor contributing to species declines because: (1) it divides a large population into two or more small populations that become more vulnerable to direct loss, inbreeding depression, genetic drift, and other problems associated with small populations; (2) it limits a species' potential for dispersal and colonization; and (3) it makes habitat more vulnerable to outside influences by increasing the edge:interior ratio (Primack 1998).

Small, isolated subpopulations are susceptible to extirpation from random demographic, environmental, and/or genetic events (Shaffer 1981; Lande 1988; Lande 1993; Primack 1998). While a large area may support a single large population, the smaller subpopulations that result from habitat fragmentation may not be large enough to persist over a long time period. As a population becomes smaller, it tends to lose genetic variability through genetic drift, leading to inbreeding depression and a lack of adaptive flexibility. Smaller populations also become more vulnerable to random fluctuations in reproductive and mortality rates, and are more likely to be extirpated by random environmental factors.

The beetle is a specialist on elderberry plants, and tends to have small population sizes and occurs in low densities (Barr 1991; Collinge *et al.* 2001). Collinge *et al.* (2001) compared resource use and density of exit holes between the beetle and a related subspecies, the California elderberry longhorn beetle (*Desmocerus californicus californicus*). The valley elderberry longhorn beetle tended to occur in areas with higher elderberry densities, but had lower exit hole densities than the California elderberry longhorn beetle. With extensive riparian habitat loss and fragmentation, these naturally-small valley elderberry longhorn beetle populations are broken into even smaller, isolated populations. Once a small valley elderberry longhorn beetle population has been extirpated from an isolated habitat patch, the species may be unable to re-colonize this patch if it is unable to disperse from nearby occupied habitat. Insects with limited dispersal and colonization abilities may persist better in large habitat patches than small patches because small fragments may be insufficient to maintain viable populations and the insects may be unable to disperse to more suitable habitat (Collinge 1996).

Studies suggest that the beetle is unable to re-colonize drainages where the species has been extirpated, because of its limited dispersal ability (Barr 1991; Collinge *et al.* 2001). Huxel and

Hastings (1999) used computer simulations of colonization and extinction patterns based on differing dispersal distances, and found that the short dispersal simulations best matched the 1997 census data in terms of site occupancy. This suggests that dispersal and colonization are limited to nearby sites. At spatial scales greater than 6.2 miles (10 km.), such as across drainages, valley elderberry longhorn beetle occupancy appears to be strongly influenced by regional extinction and colonization processes, and colonization is constrained by limited dispersal (Collinge *et al.* 2001; Huxel and Hastings 1999). Except for one occasion, drainages examined by Barr that were occupied in 1991 remained occupied in 1997 (Collinge *et al.* 2001; Huxel and Hastings 1999). The one exception was Stoney Creek, which was occupied in 1991 but not in 1997. All drainages found by Barr (1991) to be unoccupied in 1991 were also unoccupied in 1997. This data suggests that drainages unoccupied by the valley elderberry longhorn beetle remain so.

Habitat fragmentation not only isolates small populations, but also increases the interface between habitat and urban or agricultural land, increasing negative edge effects such as the invasion of non-native species (Huxel *et al.* 2001; Huxel 2000; Soule 1990) and pesticide contamination (Barr 1991). Several edge effect-related factors may be related to the decline of the beetle.

Project-Related Effects to the Valley Elderberry Longhorn Beetle

The overall effect of this project will result in long-term beneficial effects to the valley elderberry longhorn beetle. The project will restore 1,500 acres of habitat fro the imperiled animal. This addition of habitat in the area will benefit the listed beetle by increasing population numbers and improving the dispersal abilities of the species. The proposed project may result in short-term adverse effects to the valley elderberry longhorn beetle. Maintenance and operations activities and potential flood-fighting activities may remove elderberry shrubs from the proposed actions area. If flood-fighting activities occur within the proposed action area, the Corps will restore these areas with the native riparian vegetation mix used during the original restoration effort. Therefore, these direct effects are expected to be only a short-term disturbance.

Indirect effects may occur if maintenance and flood-fighting activities alter the terrain, such as driplines, which may adversely affect elderberry bushes. Vehicles and construction equipment may leak hazardous substances such as motor oil and antifreeze. Although the quantity leaked by a given vehicle or engine may be minute, these substances can accumulate on roads or in parking lots and then get washed into the adjacent environment by runoff during rain storms. A variety of substances could be introduced during accidental spills of materials.

Cumulative Effects

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed project are not considered in this section, because they require separate consultation pursuant to section 7 of the Act. An undetermined number of future land use conversions and routine agricultural practices are not subject to

Federal authorization or funding and may alter the habitat or increase incidental take of the beetle and are, therefore, cumulative to the proposed project. Most of these future non-Federal projects are considered indirect effects of the proposed action and effects are addressed through an interim process of project approval and habitat conservation plan development.

Many activities affecting the beetle involve effects to elderberry shrubs located within riparian ecosystems adjoining or within jurisdictional wetlands. These projects will be evaluated via formal consultation between the Service and the Corps via the Federal nexus provided by section 404 of the Clean Water Act. However, a number of projects exist for which there is no need to discharge dredged or fill material into waters of the U.S. These projects, for which no section 404 permit is required, may lack a Federal nexus and thus, move forward absent formal consultation. These projects pose a significant threat to the recovery of the valley elderberry longhorn beetle. This loss of habitat negatively affects the environmental baseline and is difficult to quantify.

Conclusion

After reviewing the current status of the beetle, the environmental baseline for the action area, the effects of the proposed Hamilton City Flood Damage Reduction and Ecosystem Restoration project, and the cumulative effects, it is the Service's biological opinion that the project, as proposed, is not likely to jeopardize the continued existence of the beetle. Critical habitat has been designated for the beetle. However, this action does not directly or indirectly affect these areas, and therefore, no destruction or adverse modification of critical habitat is anticipated.

Incidental Take Statement

Section 9(a)(1) of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened fish and wildlife species, respectively, without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Harm is defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by impairing behavioral patterns including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with this Incidental Take Statement.

The measures described below are non-discretionary, and must be implemented by the Corps so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, in order for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps (1) fails to

require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

Amount or Extent of Take

The Service anticipates incidental take of the valley elderberry longhorn beetle will be difficult to detect or quantify. The cryptic nature of these species and their relatively small body size make the finding of a dead specimen unlikely. The species occur in habitats that make them difficult to detect. Due to the difficulty in quantifying the number of beetles that will be taken as a result of the proposed action, the Service is quantifying take in terms of the number of elderberry shrubs with stems one inch or greater in diameter that will become unsuitable for beetles due to direct or indirect effects as a result of the action. The Service anticipates that all valley elderberry longhorn beetles inhabiting elderberry bushes within the 1,500 acre project site will be taken as a result of the proposed project.

Upon implementation of the following reasonable and prudent measures, incidental take associated with the project on the listed valley elderberry longhorn beetle, in the form of harm, harassment, or mortality from habitat loss or direct mortality will become exempt from the prohibitions described under section 9 of the Act for direct and indirect effects. In addition, incidental take in the form of harm, harassment, or mortality associated with the proposed project will be exempt from the prohibitions described under section 9 of the Act.

Effect of the Take

The Service has determined that this level of anticipated take is not likely to result in jeopardy to the valley elderberry longhorn beetle or result in destruction or adverse modification of critical habitat for the valley elderberry longhorn beetle.

Reasonable and Prudent Measure

The proposed action contains all of the measures needed to adequately minimize the impacts of anticipated take on the beetle. For that reason, the Service has no Reasonable and Prudent Measures.

Reporting Requirements

The Sacramento Fish and Wildlife Office is to be notified within one working day of the finding of any listed species or any unanticipated take of species addressed in this biological opinion. The Service contact persons for this are the Chief of the Endangered Species Division (Central Valley) at (916) 414-6600, and the Resident Agent-in-Charge of the Service's Law Enforcement Division at (916) 414-6660.

Any dead or severely injured beetles found (adults, pupae, or larvae) shall be deposited in the

Entomology Department of the California Academy of Sciences. The Academy's contact is the Senior Curator of Coleoptera at (415) 750-7239. All observations of valley elderberry longhorn beetles - live, injured, or dead - or fresh beetle exit holes shall be recorded on California Natural Diversity Data Base (CNDDB) field sheets and sent to California Department of Fish and Game, Wildlife Habitat Data Analysis Branch, 1807 13th Street Room 2002, Sacramento, California 95814.

Conservation Recommendations

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities that can be implemented to further the purposes of the Act, such as preservation of endangered species habitat, implementation of recovery actions, or development of information and data bases.

1. The Corps should work with the Service to address significant, unavoidable environmental impacts approved by local agencies.

2. The Corps should continue to assist the Service in the implementation of recovery efforts for the valley elderberry longhorn beetle.

3. It is recommended that the Corps continue to protect and restore riparian and wetland habitats in the Sacramento River basin, to increase habitat for the valley elderberry longhorn beetle.

4. It is recommended that the Corps ensure that monitoring of the proposed restoration project continue for 10 years in accordance with the Service's 1999 *Conservation Guidelines for the Valley Elderberry Longhorn Beetle*. The Corps could approach private non-profit organizations, government agencies, or universities with the possibility of continuing these monitoring efforts.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting federally-listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

Reinitiation – Closing Statement

This concludes formal consultation on the Hamilton City Flood Damage Reduction and Ecosystem Restoration Project. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical

habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

Please contact Rick Kuyper or Adam Zerrenner, Sacramento Valley Branch Chief, at (916) 414-6645 if you have any questions or comments regarding the Hamilton City Flood Damage Reduction and Ecosystem Restoration Project.

Sincerely,

for Kenneth D. Sanchez
Acting Field Supervisor

cc:

FWS, Regional Office, Portland, Oregon (Attn: L. Salata)
U.S. Army Corps of Engineers, Sacramento, California (Attn: Erin Taylor)
Sacramento National Wildlife Refuge Complex, Willows, California (Attn: Kevin Foerster)
California Department of Fish and Game, Rancho Cordova, California (Attn: Terry Roscoe)
The Reclamation Board, Sacramento, California (Attn: Peter Rabbon and Stephen Bradley)
California Department of Water Resources, Sacramento, California (Attn: Annalena Bronson)

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