

10.0 Terrestrial Biological Resources

10.1 Introduction

The following chapter considers whether the proposed project, ISDP, would adversely affect botanical and wildlife resources. The affected environment is described first, followed by a discussion of the environmental effects of ISDP, and the mitigation measures necessary to alleviate any identified significant adverse impacts. Finally, the chapter contains a comparative evaluation of the effects of the alternatives upon terrestrial biological resources.

10.2 Environmental Setting/Affected Environment

10.2.1 Introduction

This description of the existing environmental conditions for terrestrial biology is organized into the following sections: Sacramento-San Joaquin River Delta System; San Pablo and Suisun Bays; Feather and Sacramento Rivers; State Water Project Reservoirs; and State Water Project Service Areas. This discussion includes the regional habitat types and associated special status species, based on federal and State listing categories (Table 10-1). Additional supporting information on terrestrial biological resources can be found in Appendix 6.

10.2.2 Sacramento-San Joaquin River Delta System

The Sacramento-San Joaquin River Delta System occurs where these and other rivers meet in the Central Valley and flow westward into Suisun and San Pablo bays and, ultimately, reach the San Francisco Bay. The terrestrial biological habitats of the Delta are generally freshwater, integrating with the brackish and saltwater habitats toward the west. These include freshwater emergent wetland, riverine, lacustrine, riparian forest, riparian scrub, eucalyptus forest, grassland, ruderal habitat, cropland, and pastureland (DWR 1994e). Prehistorically, this area was a vast mosaic of seasonal and permanent wetlands, with riparian forests occurring in upland areas. The modern Delta is a highly managed system of controlled waterways and productive farmland, consisting of numerous small and large islands, separated by rivers, sloughs, and canals. The existing terrestrial biological habitats can be described as scattered remnants of the more extensive, prehistoric wetlands and riparian forests. These habitats are discussed in more detail in Appendix 6.

The terrestrial wildlife listed as threatened or endangered within lowland Delta habitats (Table 10-2) include: the Valley elderberry longhorn beetle, Swainson's hawk, giant garter snake, California black rail, greater sandhill crane, Aleutian Canada goose, and American peregrine falcon. Other special status species known or expected to occur within the Delta include: the California tiger salamander, western pond turtle, double-crested cormorant, white-faced ibis, California gull, great horned owl, northern harrier, sharp-shinned hawk, Cooper's hawk, osprey (migrating), long-billed curlew, Caspian tern, burrowing owl, loggerhead shrike, yellow warbler, yellow-breasted chat, tricolored blackbird, and San Joaquin pocket mouse. Additionally, these areas may support rookery sites for the great blue heron, great egret, snowy egret, and black-crowned night heron.

The special status botanical resources of the Delta include species occurring in upland and wetland habitats (Table 10-3). Alkaline habitats of the Delta occur in eastern Contra Costa County and include seasonal wetlands, grassland, iodine and saltbush scrub. These habitats are not associated with the waterways of the Delta and will not be affected by changes in water levels. These habitats support populations of Ferris's slender milk-vetch, heartleaf saltbush, brittlescale, Valley spearscale, hispid bird's-beak, palmate-bracted bird's-beak, recurved larkspur, and caper fruited tropidocarpum. Grasslands throughout the Delta region provide suitable habitat for fragrant fritillary. These plants are not associated with the waterways of the Delta or the proposed construction sites and are not expected to be affected by implementation of the ISDP.

Wetland habitats (including freshwater marsh, riparian scrub, and riparian forest) provide suitable habitat for Suisun Marsh aster, Mason's lilaeopsis, slough thistle, Delta coyote-thistle, rose-mallow, Delta tule pea, Delta mudwort, and Sanford's arrowhead (Table 10-3).

Tables 10-4 through 10-11 list the terrestrial biological resources found at the ISDP construction sites, including the proposed intake, fish and flow control structures, and dredging. The corresponding figures illustrate the location and composition of habitat types and special status species associated with each site (Figures 10-1 through 10-7). A detailed discussion of habitat types can be found in Appendix 6.

**TABLE 10-1. LEGEND OF SPECIAL STATUS PLANT AND ANIMAL SPECIES
OF THE INTERIM SOUTH DELTA PROJECT**

Federal

- FE Federal Endangered
- FT Federal Threatened
- FPE Federal Proposed Endangered
- FPT Federal Proposed Threatened
- FSS Federal Sensitive Species
- C Federal Candidate for Listing

State of California

- SE California Endangered
- ST California Threatened
- SR California Rare
- CSC California Species of Special Concern
- CFP California Fully Protected
- * Taxa that are biologically rare, very restricted in distribution, declining throughout their range, or at a critical stage in their life cycle when residing in California.
- * Population(s) in California that may be peripheral to the major portion of a taxon's range, but which are threatened with extirpation within California.
- * Taxa closely associated with a habitat that is declining in California (e.g., wetlands, riparian, old growth forest).
- + These species included at the request of the CDFG.

California Native Plant Society (CNPS)

- List 1A Plants presumed to be extinct in California.
- List 1B Plants rare, threatened, or endangered in California and elsewhere.
- List 2 Plants rare, threatened, or endangered in California, but more common elsewhere.
- List 3 Plants about which we need more information.
- List 4 Plants of limited distribution - a watch list.

-- No Listing

TABLE 10-2. SPECIAL STATUS WILDLIFE SPECIES POTENTIALLY OCCURRING WITHIN THE PROJECT AREA

COMMON NAME <i>Scientific Name</i>	LEGAL STATUS STATE/FED	HABITAT	POTENTIAL FOR OCCURRENCE
INVERTEBRATES			
Valley elderberry longhorn beetle <i>Desmocerus californicus dimorphus</i>	-/FT	Elderberry shrubs.	Not expected due to lack of suitable habitat.
Antioch anthicid beetle <i>Anthicus antiochensis</i>	-/-	Loose and sandy soil (relict dunes, disturbed sandy areas).	Occurrences unlikely, no suitable habitat at project sites.
Sacramento anthicid beetle <i>Anthicus sacramento</i>	-/-	Loose and sandy soil (relict dunes, disturbed sandy areas).	Occurrences unlikely, no suitable habitat at project sites.
Sacramento Valley tiger beetle <i>Cicindela hirticollis abrupta</i>	-/-	Sandy bars and shores within the Delta.	Occurrence unlikely, due to lack of suitable habitat.
Curved-foot hygrotus diving beetle <i>Hygrotus curvipes</i>	-/-	Various seasonal wetlands, vernal swales, and pools fringed with alkali deposits.	Not observed during surveys. Not expected.
Middlekauf's shieldback katydid <i>Idiostatus middlekaufi</i>	-/-	Shrubs associated with loose sand.	Occurrences unlikely, no suitable habitat at project sites.
Antioch sphecid wasp <i>Philanthus nasalis</i>	-/-	Barren sandy areas in proximity to flowering plants.	Only known from Antioch Dunes area. No suitable habitat occurs at the project sites.
REPTILE AND AMPHIBIANS			
California tiger salamander <i>Ambystoma tigrinum californiense</i>	CSC/C	Annual grasslands with vernal pools, seasonal wetlands, and permanent waterways of grasslands.	May occur although unlikely in agricultural drainages and artificial impoundment on Victoria Island and in fields adjacent to most ISDP sites.
Western spadefoot toad <i>Scaphiopus hammondi</i>	CSC/-	Annual grassland with vernal pools and seasonal wetland.	Unlikely in agricultural drainages and artificial impoundment on Victoria Island and in fields adjacent to most ISDP sites.
California red-legged frog <i>Rana aurora draytoni</i>	CSC/FT	Freshwater marsh.	Not expected within the Project Area, due to seasonal flooding and the presence of bullfrog and bass.
Western pond turtle <i>Clemmys marmorata</i>	CSC/-	Freshwater marsh and riparian forest and scrub.	Occurs at the dredge disposal areas, new intake structure, Middle River, Old River (near DMC), Grant Line, and Old River (near Mossdale). Expected at all Project Sites.

TABLE 10-2. SPECIAL STATUS WILDLIFE SPECIES POTENTIALLY OCCURRING WITHIN THE PROJECT AREA (continued)

COMMON NAME <i>Scientific Name</i>	LEGAL STATUS STATE/FED	HABITAT	POTENTIAL FOR OCCURRENCE
REPTILE AND AMPHIBIANS (continued)			
Alameda whipsnake <i>Masticophis lateralis euryxanthus</i>	ST/FPE	Valley and foothill grassland, oak woodland, chaparral, and coastal scrub.	Not expected within the Project Area.
Giant garter snake <i>Thamnophis gigas</i>	ST/FT	Freshwater emergent wetlands with adjacent grasslands.	Suitable habitat occurs on Victoria Island in agricultural ditches and drains. Extensive surveys of the Project Area resulted in no populations of giant garter snakes.
BIRDS			
Double-crested cormorant <i>Phalacrocorax auritus</i>	CSC/-	Coastal lacustrine and riverine habitats. Year long resident along the entire coast of California and on inland lakes, in fresh, salt, and estuarine water.	Forages in open water habitat throughout the Delta.
Great blue heron (nesting) <i>Ardea herodias</i>	*/-	Tall eucalyptus or riparian forest.	Rookery on Eucalyptus Island near new intake site.
White-faced ibis <i>Plegadis chihi</i>	CSC/-	Freshwater emergent wetlands, shallow lacustrine water, muddy grounds of wet meadows and irrigated or flooded pastures and croplands.	May occur during winter at dredge disposed sites on Victoria Island.
Aleutian Canada goose <i>Branta canadensis leucopareia</i>	-/FT	Central Valley croplands and grasslands during winter months.	Suitable wintering habitat occurs within the Project Area at the dredge disposal sites on Victoria Island and cropland habitat adjacent to the flow barrier sites.
Black-shouldered kite <i>Elanus caeruleus</i>	CFP/-	Grasslands and croplands with adjacent scattered trees.	Observed near most ISDP sites. Expected to forage throughout the Project Area.
Northern harrier <i>Circus cyaneus</i>	CSC/-	Meadows, grasslands, emergent wetlands, and open areas.	Observed at most ISDP sites. Expected to nest and forage throughout the Project Area.
Sharp-shinned hawk <i>Accipter striatus</i>	CSC/-	Riparian and coniferous forests adjacent to open areas.	Not observed within the Project Area. May nest in riparian forest and forage in cropland habitats within the Project Area.

**TABLE 10-2. SPECIAL STATUS WILDLIFE SPECIES POTENTIALLY OCCURRING
WITHIN THE PROJECT AREA (continued)**

COMMON NAME <i>Scientific Name</i>	LEGAL STATUS STATE/FED	HABITAT	POTENTIAL FOR OCCURRENCE
BIRDS (continued)			
Cooper's hawk <i>Accipiter cooperi</i>	CSC/ -	Woodlands near water.	Not observed within the Project Area. May occur in suitable habitat.
Red-shouldered hawk <i>Buteo lineatus</i>	- / -	Riparian areas with adjacent swamps, marshes and wet meadows for hunting.	May occur at all barrier and flow control sites.
Swainson's hawk <i>Buteo swainsoni</i>	ST/ -	Nesting: Riparian forest and or scattered trees. Foraging: irrigating cropland and non-native grassland.	Nesting sites occur near Middle River, Grant Line, and Old River (near DMC) sites. Suitable foraging habitat occurs on Byron Tract and Victoria Island at the proposed dredge disposal sites and in cropland adjacent to barrier sites.
Red-tailed hawk <i>Buteo jamaicensis</i>	- / -	Forages in croplands grasslands and grass/shrubs stages of most habitats. Nests in isolated trees or stands of riparian forest.	Nest sites occur near Old River (near Mossdale), Middle River, Grant Line and new intake structure sites. Potential nesting or foraging habitat exists at remaining ISDP sites.
Golden eagle <i>Aquila chrysaetos</i>	CFP, CSC/ -	Forages in various habitat, including grasslands and early stages of forests and shrub habitats, rolling hills and mountain terrain.	Potential: Unlikely
American peregrine falcon <i>Falco peregrine anatum</i>	CFP, SE/FE	Wetlands, woodlands, agricultural areas, cities and coastal.	May occur as a transient winter visitor on Victoria Island.
California black rail <i>Laterallus jamaicensis coturniculus</i>	CFP, ST/ -	Fresh/brackish/saltwater marsh.	Occurs along Old and Middle Rivers near Woodward Island/Victoria Island Canal. Suitable wintering habitat occurs near the Grant Line site and the proposed intake structure site. Black rails are not expected at other locations within the Project Area.
Greater sandhill crane (wintering) <i>Grus canadensis tabida</i>	CFP, ST/ -	Winter habitats include annual and perennial grasslands, grasslands, moist croplands with corn or rice stubble, and open emergent wetlands.	May occur in winter near dredge disposal sites on Victoria Island.

TABLE 10-2. SPECIAL STATUS WILDLIFE SPECIES POTENTIALLY OCCURRING WITHIN THE PROJECT AREA (continued)

COMMON NAME <i>Scientific Name</i>	LEGAL STATUS STATE/FED	HABITAT	POTENTIAL FOR OCCURRENCE
BIRDS (continued)			
California gull <i>Larus californicus</i>	CSC/-	Nests on islands in alkali or freshwater lakes and salt ponds. Inland, frequents lacustrine, riverine, cropland habitats, landfill dumps, and city lawns. Preferred habitats on coast are sandy beaches, mudflats, rocky intertidal, and pelagic areas of marine and estuarine habitats as well as emergent wetlands.	Occurs regularly throughout the Delta in open water habitats.
Western yellow-billed cuckoo <i>Coccyzus americanus occidentalis</i>	SE/-	Extensive riparian forests with dense underbrush and orchards.	No suitable nesting habitat occurs within the Project Area.
Great horned owl <i>Bubo virginianus</i>	*/-	Forest habitats with nearby open areas or meadows.	Observed at the Grant Line site and the Old River site near DMC. Suitable nesting or foraging habitat also occurs at all of the ISDP sites.
Burrowing owl <i>Anthene cucularia</i>	CSC/-	Annual grassland, cropland, and scrubland.	May occur at the dredge disposal sites on Byron Tract and Victoria Island and in cropland habitat adjacent to barrier sites.
Short-eared owl <i>Asio flammeus</i>	CSC/-	Open areas with few trees, such as annual and perennial grasslands, prairies, dunes, meadows, irrigated lands, saline, and fresh emergent wetlands. Needs elevated sites for perches and dense vegetation for roosting and nesting.	May occur at dredged disposal sites on Byron Tract and Victoria Island and cropland habitat adjacent to barrier sites.
California horned lark <i>Eremophila alpestris actia</i>	CSC/-	Grasslands and other open habitats with low, sparse vegetation.	May occur on Victoria Island and in croplands habitat.
Bank swallow <i>Riparia riparia</i>	ST/-	Riverine and vertical cliffs or banks with sandy/loamy sediment.	Small areas of suitable habitat occur near new intake structure site and along Grant Line-Fabian Canal. These areas were surveyed and no bank swallows were found.

**TABLE 10-2. SPECIAL STATUS WILDLIFE SPECIES POTENTIALLY OCCURRING
WITHIN THE PROJECT AREA (continued)**

COMMON NAME <i>Scientific Name</i>	LEGAL STATUS STATE/FED	HABITAT	POTENTIAL FOR OCCURRENCE
BIRDS (continued)			
Loggerhead shrike <i>Lanius ludovicianus</i>	CSC/ -	Cropland and grasslands with perch sites.	Observed along Old River dredge section, and at the Grant Line and new intake structure sites. Expected to occur at all Project Sites.
Yellow warbler <i>Dendroica petechia brewsteri</i>	CSC/-	Breeds in riparian woodlands from coastal and desert lowlands up to 8,000 feet in Sierra Nevada. Also breeds on montane chaparral, open ponderosa pine and mixed conifer habitats with substantial amounts of brush.	Occurs regularly as a migrant. May nest in areas of suitable habitat.
Yellow-breasted chat <i>Icteria virens</i>	CSC/ -	Dense riparian scrub and woodland areas.	May occur in riparian habitat at the Grant Line site and near the proposed intake structure.
Tricolored blackbird <i>Agelaius tricolor</i>	CSC/ -	Freshwater marsh, especially cattails.	Historically nested near the Old River (near Mossdale) site, approximately 1-2 miles upstream. Potentially occurs at all ISDP sites with extensive emergent vegetation.
MAMMALS			
Yuma myotis <i>Myotis yumanensis</i>	-/+	Roosts in buildings, mines, caves, crevices, and under bridges. May also utilize shallow nests. Forages over open water in association with open forests and woodland habitat.	The species is expected to occur throughout the Delta and may forage at any of the barrier sites. No suitable roost sites were located during surveys of the Project area.
Western small-footed myotis <i>Myotis ciliolabrum</i>	-/+	Roosts in caves, buildings, mines, crevices, and occasionally under bridges and under bark. Forages among trees and over water.	This species is expected to occur within the south Delta area and may forage at Project sites. No suitable roost sites were located during surveys of the project area.
Long-eared myotis <i>Myotis evotis</i>	-/+	Roost sites include buildings, crevices, snags and spaces under bark. Forages along habitat edges, in open habitats, and over water.	This species is generally absent from the Central Valley, and, therefore, not expected at the Project sites.

**TABLE 10-2. SPECIAL STATUS WILDLIFE SPECIES POTENTIALLY OCCURRING
WITHIN THE PROJECT AREA (concluded)**

COMMON NAME <i>Scientific Name</i>	LEGAL STATUS STATE/FED	HABITAT	POTENTIAL FOR OCCURRENCE
MAMMALS (continued)			
Fringed myotis <i>Myotis thyanodes</i>	-/+	Roosts in caves, buildings, mines, and crevices. Uses open habitats, early successional stages, streams, lakes, and ponds as foraging areas.	This species is generally absent from the Central Valley, and, therefore, not expected at the Project sites.
Cave myotis <i>Myotis velifer</i>	CSC/+	Primarily roosts in caves, but may utilize mines or buildings. Forages primarily over open water and in riparian habitat. Within California, the distribution of this species is restricted to the Colorado River region.	This species is not expected to occur within the Delta or the Project area.
Long-legged myotis <i>Myotis volans</i>	-/+	Roosts in rock crevices, buildings, under tree bark, in snags, mines, and caves. Feeds over water, and over open habitats, using denser woodland and forest habitats for cover.	This species is generally absent from the Central Valley, and, therefore, not expected at the Project sites.
Spotted bat <i>Euderma maculatum</i>	CSC/+	Prefers to roost in rock crevices, may utilize caves and buildings. Feeds over water.	Because the project is located outside of the range of this species, spotted bats are not expected at the Project sites.
Pale (Townsend's) big eared bat <i>Plecotus townsendii pallascens</i>	CSC/+	Roosts in caves, mines, tunnels, buildings, or other human-made structures. Forages by gleaning invertebrates from brush or trees.	This subspecies is expected to occur throughout the Delta, and may forage at the Project sites. No suitable roosting sites were located during surveys of the Project sites.
Riparian brush rabbit <i>Sylvilagus bachmani riparius</i>	SE, CSC/C	Riparian scrub along the banks of the San Joaquin River in southern San Joaquin County.	Not expected within the Project Area.
San Joaquin pocket mouse <i>Perognathus inornatus inornatus</i>	* / -	Grasslands, blue oak savannahs, coastal scrub, chaparral, and riparian woodland.	Historically known from Union Island. May occur in suitable habitat throughout the Project Area.
San Joaquin kit fox <i>Vulpes macrotis muntica</i>	SE/FT	Annual grassland with associated scrub vegetation.	The range of the kit fox does not include most of the Delta. However, the Byron Tract disposal site is within the range of the subspecies and the Old River flow barrier side is on the fringe of the subspecies range.

**TABLE 10-3. SPECIAL STATUS PLANT SPECIES POTENTIALLY OCCURRING
WITHIN THE PROJECT AREA**

COMMON NAME <i>Scientific Name</i>	LEGAL STATUS CNPS/STATE/FED	HABITAT	POTENTIAL FOR OCCURRENCE
Suisun Marsh aster <i>Aster lentus</i>	List 1B/ - / -	Marshes and swamps (brackish and freshwater).	Populations occur along Old River, north of the proposed dredging section. The area proposed for dredging was surveyed and no populations of Suisun Marsh aster were found.
Bristly sedge <i>Carex comosa</i>	List 2/ - / -	Marshes and swamps (lake margins).	Not located during surveys of the proposed Project Sites.
Slough thistle <i>Cirsium crassicaule</i>	List 1B/ - / -	Chenopod scrub, marshes and swamp (sloughs), and riparian scrub.	Historically known from the confluence of the Old River and San Joaquin River. Surveys of this area did not locate any populations of slough thistle.
Point Reyes bird's-beak <i>Cordylanthus maritimus</i> ssp. <i>palustris</i>	List 1B/ - / -	Coastal salt marshes.	Not expected. No suitable habitat occurs within the Project Area.
Soft bird's-beak <i>Cordylanthus mollis</i> ssp. <i>mollis</i>	List 1B/CR/PE	Coastal salt marshes.	Not expected. No suitable habitat occurs within the Project Area.
Western leatherwood <i>Dirca occidentalis</i>	List 1B/ - / -	Broadleafed upland forest, closed-cone coniferous forest, chaparral, cismontane woodland, North Coast coniferous forest, riparian forest, and riparian woodland (mesic sites).	Suitable habitat occurs within the Project Area. However, searches of these areas did not locate populations of western leatherwood. Therefore, western leatherwood is not expected to occur within the Project Area.
Small spikerush <i>Eleocharis parvula</i>	List 4/ - / -	Coastal salt marshes.	No suitable habitat occurs within the Project Area. Therefore, small spikerush is not expected to occur within the Project Area.
Delta button-celery <i>Eryngium racemosum</i>	List 1B/CE/-	Vernally mesic clay depressions associated with riparian scrub.	No suitable habitat occurs within the Project Area.
Bogg's Lake hedge-hyssop <i>Gratiola heterosepala</i>	List 1B/CE/ -	Marshes and swamps (lake margins) and vernal pools.	Not known from the south Delta area. Not expected in areas influenced by tides.
Marsh gumplant <i>Grindelia stricta</i> var. <i>angustifolia</i>	List 4/ - / -	Coastal salt marshes	No suitable habitat occurs in the Project Area. Therefore, the species is not expected to occur on site.
Diablo helianthella <i>Helianthella castanea</i>	List 1B/ - / -	Broadleafed upland forest, chaparral, cismontane woodland, coastal scrub, riparian woodland, and valley-foothill grassland.	The Project Area is outside the range of this species. Diablo helianthella is not expected on site.
Rose-mallow <i>Hibiscus lasiocarpus</i>	List 2/ - / -	Freshwater marshes and swamps.	Rose-mallow occurs commonly throughout the south Delta. Populations occur along the Old River dredging area and at the proposed intake and Middle River sites.

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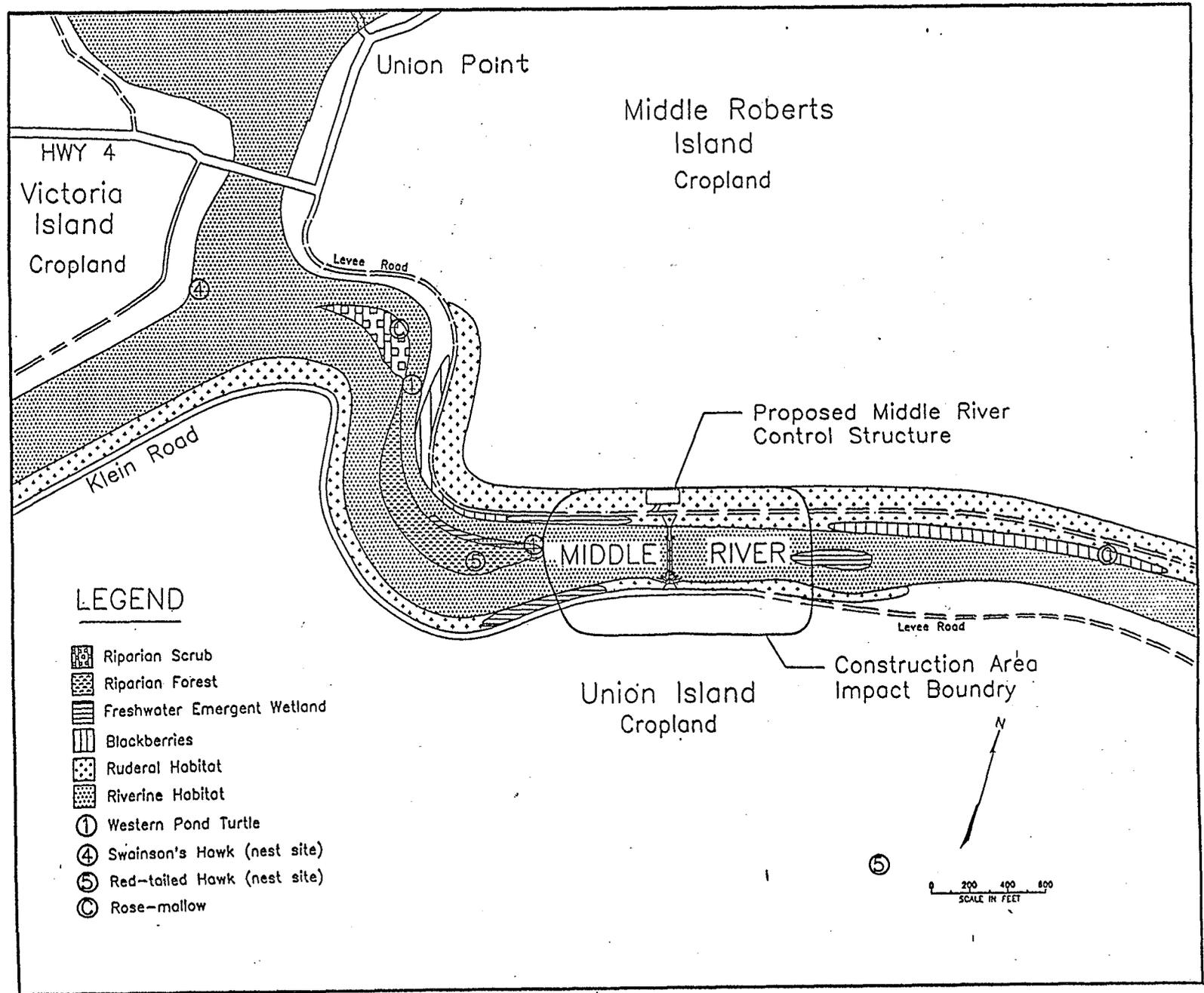
**TABLE 10-3. SPECIAL STATUS PLANT SPECIES POTENTIALLY OCCURRING
WITHIN THE PROJECT AREA (continued)**

COMMON NAME <i>Scientific Name</i>	LEGAL STATUS CNPS/STATE/FED	HABITAT	POTENTIAL FOR OCCURRENCE
Northern California black walnut <i>Juglans californica</i> var. <i>hindsii</i>	List 1B/ - / -	Riparian forest and riparian woodland.	Scattered walnut trees occur throughout the Delta. One tree occurs in the vicinity of the proposed Grant Line structure.
Delta tulle pea <i>Lathyrus jepsonii</i> var. <i>jepsonii</i>	List 1B/ - / -	Freshwater/brackish marshes and swamps.	Occurs at scattered locations throughout the Delta, including populations at the proposed Intake structure and the Grant Line structure.
Mason's lilaeopsis <i>Lilaeopsis masonii</i>	List 1B/CR/ -	Marshes and swamps (brackish or freshwater) and riparian scrub.	Occurs throughout the Project Area, including the intake, Grant Line, Old River (near DMC), and dredge sites.
Delta mudwort <i>Limosella subulata</i>	List 2/ - / -	Riparian scrub and both freshwater and brackish marshes.	Several populations occur along Middle River. However, no populations are known from the Project Area.
Hairless popcorn-flower <i>Plagiobothrys glaber</i>	List 1A/ - / -	Meadows (alkaline) and coastal salt marshes.	No suitable habitat occurs within the Project Area. Therefore, hairless popcorn flower is not expected in the Project Area.
Eel-grass pondweed <i>Potamogeton zosteriformis</i>	List 2/ - / -	Freshwater marshes and swamps.	Suitable habitat occurs within the Project Area. These habitats were surveyed and no populations were found.
Sanford's arrowhead <i>Sagittaria sanfordii</i>	List 1B/ - / -	Shallow freshwater marshes and swamps.	Suitable habitat occurs within the Project Area. However, surveys of these areas did not locate Sanford's arrowhead.
Mad-dog skullcap <i>Scutellaria lateriflora</i>	List 2/ - / -	Meadows (mesic), marshes and swamps.	Occurs on Bouldin Island in the north Delta. Although potential habitat occurs in the south Delta, no populations are known to occur in the Project Area.
California seablite <i>Suaeda californica</i>	List 1B/ - /E	Coastal salt marshes.	Not expected. No suitable habitat occurs within the Project Area.
Wright's trichocoronis <i>Trichocoronis wrightii</i> var. <i>wrightii</i>	List 2/ - / -	Alkaline habitats associated with meadows, marshes and swamps, riparian forest, and vernal pools.	No alkaline habitats occur within the Project Area. Therefore, this species is not expected to occur within the Project Area.

Table 10-4. Middle River Flow Control Structure

Habitat Types Within the Construction Zone	
Acres	Habitat Types:
0.78	Freshwater marsh: <i>Dominant species:</i> tule <i>Subdominant species:</i> button-willow and hedge bindweed.
5.84	Cropland: (Vegetation varies with each planting season.)
6.34	Ruderal habitat: <i>Dominant species:</i> non-native grasses. <i>Subdominant species:</i> milk thistle, tree-tobacco, and short-podded mustard.
9.42	Riverine: (Unvegetated open water found in Middle River.)
Special Status Species	
Species	Observation:
Swainson's hawk	Nest site approximately 0.5 miles away on Victoria Island.
Red-tailed hawk	Nest site located adjacent to the construction area.
Rose mallow	Several populations located upstream of the barrier. Not within the construction zone.

Figure 10-1. Habitat Map of the Middle River Flow Control Structure.



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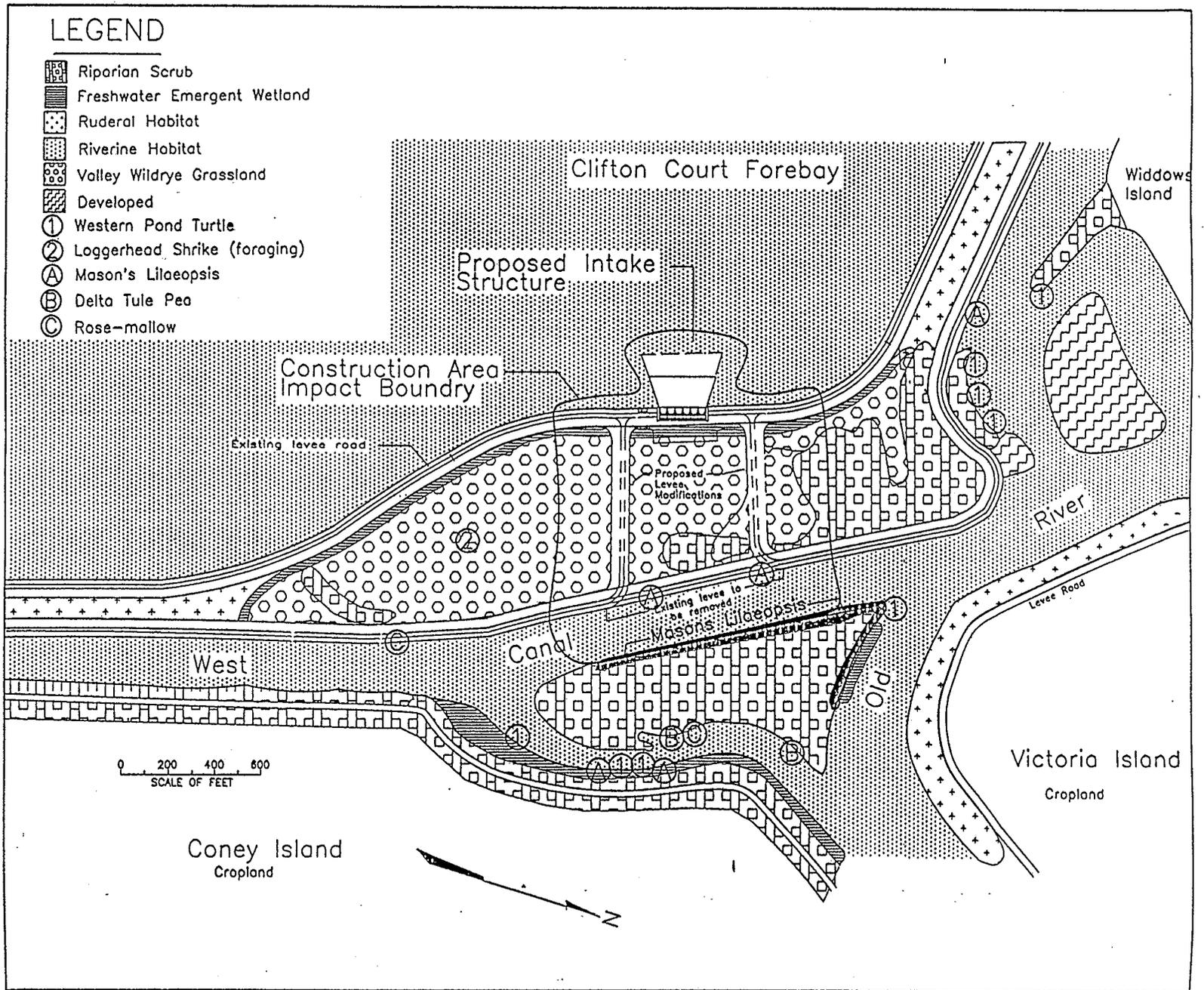
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Table 10-5. Intake Structure

Habitat Types within the Construction Zone	
Acres	Habitat Types:
0.27	Freshwater marsh: <i>Dominant species:</i> tall nut-sedge, tule, and yellow water-primrose. <i>Subdominant species:</i> Australian saltbush, Bermuda grass, and barnyard grass.
10.23	Riverine: (Unvegetated open water found in West Canal and Old River.)
10.74	Wildrye grassland: <i>Dominant species:</i> creeping wildrye. <i>Subdominant species:</i> stinging nettle, polygonum species, and marsh baccharis.
4.40	Ruderal habitat: <i>Dominant species:</i> yellow-star thistle and yellow mustard. <i>Subdominant species:</i> soft chess, wild oat, and ripgut-brome.
2.43	Riparian (willow) scrub: <i>Dominant species:</i> sandbar willow, shining willow, and giant reed. <i>Subdominant species:</i> black willow, Himalayan blackberry, and tree-tobacco.
Special Status Species	
Species	Observation:
Mason's lilaepsis	Populations occur on the waterside levees of Clifton Court Forebay and the unnamed instream island.
Rose-mallow	On the waterside levees of Clifton Court Forebay and the unnamed instream island.
Delta tule pea	Populations occur on the unnamed instream island.
Brittlescale	One populations occurs along the access road to the intake site.
Heron rookery	Nests occur on Eucalyptus Island, along the access road to the intake site.
Other special status species	Western pond turtle and loggerhead shrike were observed in the vicinity of the intake site.

Figure 10-2. Habitat Map of the Intake Structure.



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Table 10-6. Grant Line Canal Flow Control Structure

Habitat Types within the Construction Zone	
Acres	Habitat Type:
0.05	Blackberry scrub: <i>Dominant species:</i> Himalayan blackberry. <i>Subdominant species:</i> white alder and California rose.
0.14	Riparian forest: <i>Dominant species:</i> Fremont's cottonwood and black willow. <i>Subdominant species:</i> Himalayan blackberry, sandbar willow, and California rose.
0.22	Riparian (willow) scrub: <i>Dominant species:</i> shining willow and sandbar willow. <i>Subdominant species:</i> button-willow, California rose, and Himalayan blackberry.
0.38	Freshwater marsh: <i>Dominant species:</i> tule and cattail <i>Subdominant species:</i> yellow iris, American bugleweed, and yellow water-primrose.
3.0	Ruderal habitat: <i>Dominant species:</i> yellow-star thistle and non-native grasses. <i>Subdominant species:</i> short-podded mustard, giant reed, and fiddle neck.
3.19	Cropland: (Vegetation varies with each planting season.)
8.29	Riverine: (Unvegetated open water found in Grant Line Canal.)
Special Status Species	
Species	Observation:
Swainson's hawk	Two nest sites are known from the instream island upstream of the barrier site.
Great horned owl	One nest site observed downstream of the barrier site.
Red-tailed hawk's nest	One nest site on the south levee.
Delta tule pea	One population located on the south side of the instream island upstream of the barrier site.
Northern California black walnut	One individual located downstream of the barrier site.
Mason's lilaeopsis	Two populations located on the instream island upstream of the barrier site.
Other special status species	Loggerhead shrike, black-shouldered kite, and northern harrier have been observed foraging in the vicinity of the barrier site.

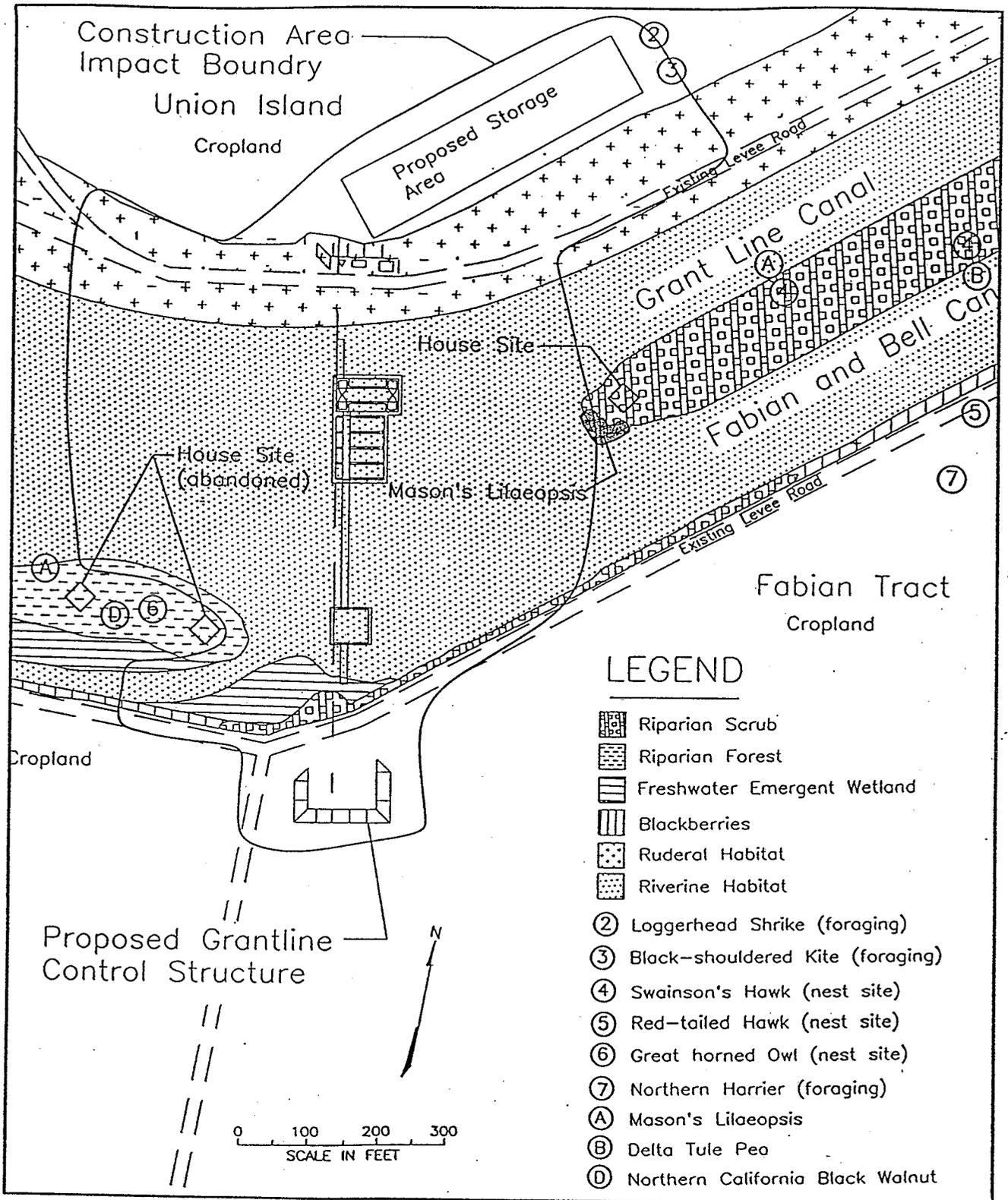


Figure 10-3. Habitat Map of the Grant Line Flow Control Structure.

Table 10-7. Old River Flow Control Structure (Near the DMC)

Habitat Types within the Construction Zone	
Acres	Habitat Type:
2.53	Blackberry scrub: <i>Dominant species:</i> Himalayan blackberry. <i>Subdominant species:</i> California rose, tree-tobacco, and sandbar willow.
3.72	Riverine: (Unvegetated open water found in Old River.)
8.24	Ruderal habitat: <i>Dominant species:</i> non-native grasses and yellow-star thistle. <i>Subdominant species:</i> short-podded mustard, tree-tobacco, and milk thistle.
8.88	Cropland: (Vegetation varies with each planting season.)
Special Status Species	
Species	Observation:
Mason's lilaepsis	Occurs on the northern and southern banks of Old River, both upstream and downstream of the barrier site.
Swainson's hawk	A nest site is located upstream from the barrier site.
Other special status species	Western pond turtles, loggerhead shrike, and black-shouldered kite were observed in the vicinity of the barrier site.

Figure 10-4. Habitat Map of the Old River Flow Control Structure.

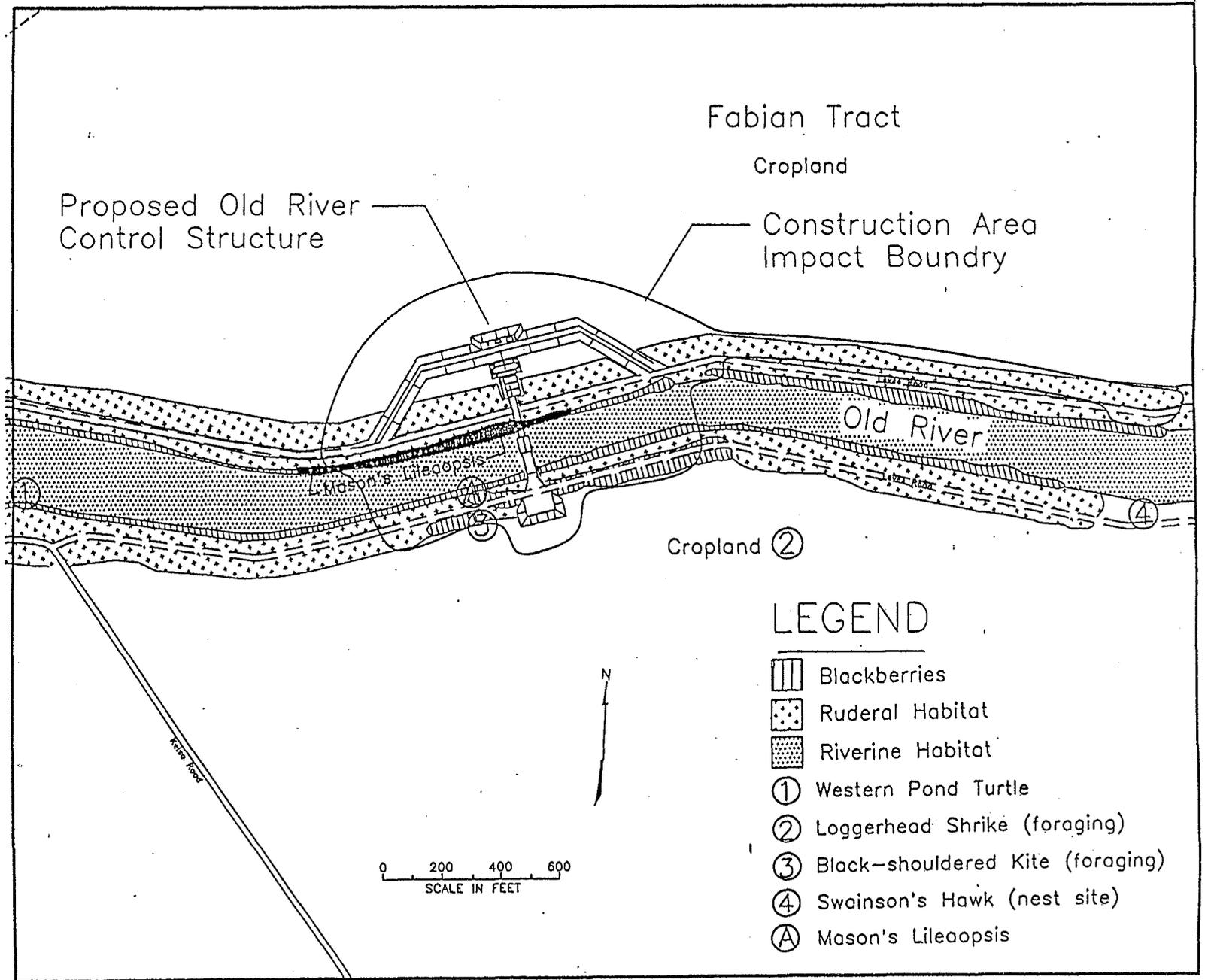
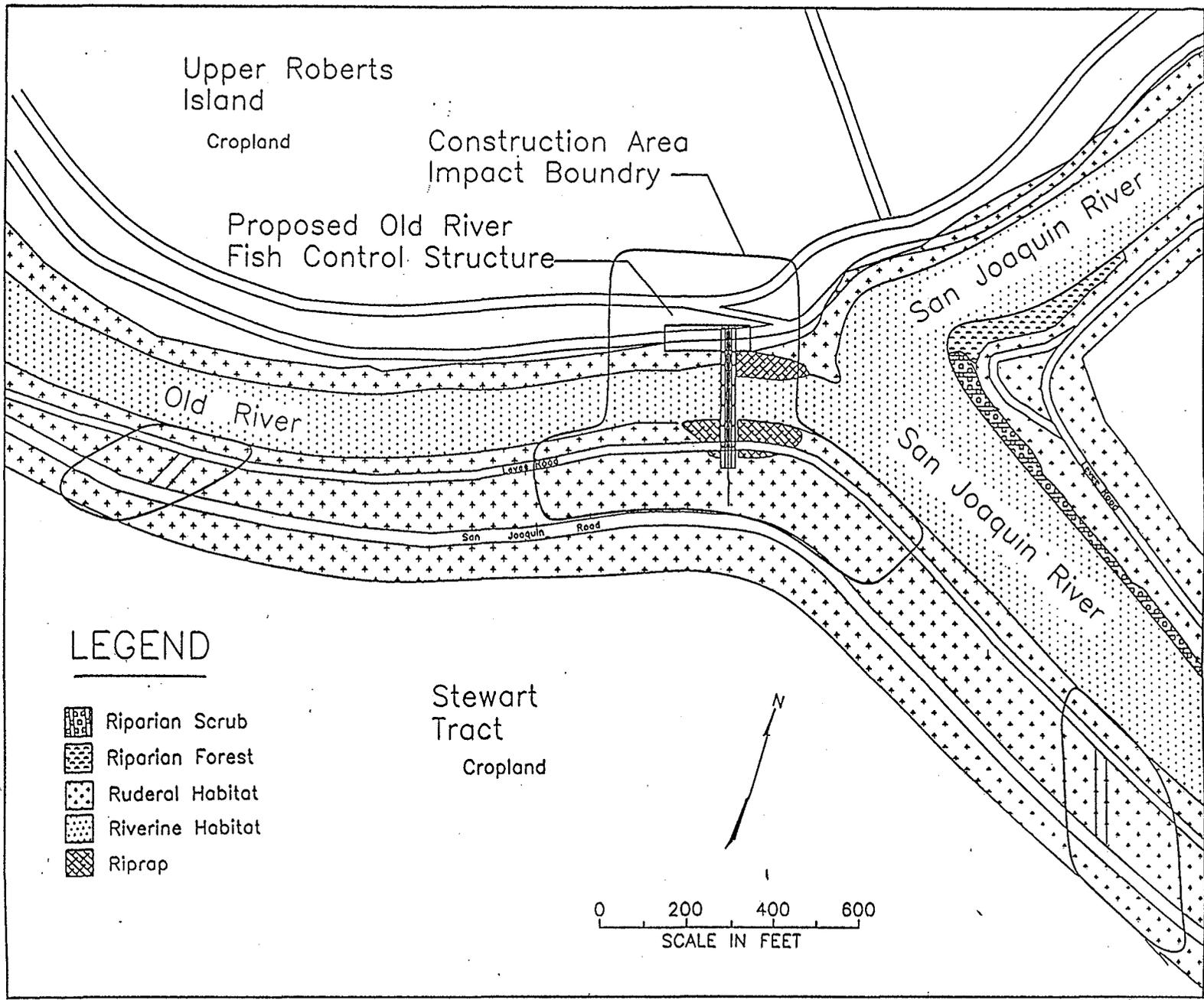


Table 10-8. Old River Fish Barrier (Near Mossdale)

Habitat Types within the Construction Zone	
Acres	Habitat Type:
1.22	Riverine: (Unvegetated open water found in Old River.)
2.22	Cropland: (Vegetation varies with each planting season.)
8.70	Ruderal habitat: <i>Dominant species:</i> pepper-grass, Russian thistle, and riggut brome. <i>Subdominant species:</i> ditch grass and California mugwort.
Special Status Species (none)	

Figure 10-5. Habitat Map of the Old River Fish Barrier Site (Mossdale).

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Table 10-9. Victoria Island Dredged Material Processing Site

Habitat Types within the Construction Zone	
Acres	Habitat Type:
613.5	Cropland (with associated ditches and drains): (Vegetation varies with each planting season.)
Special Status Species	
Species	Observation:
Western pond turtle	Populations observed basking in the ditches and drains of the Island.
Swainson's hawk	Cropland habitat provides potential foraging habitat.
Giant garter snake	Surveys of the island have located some areas of potentially suitable habitat that will be avoided during processing.

Table 10-10. Twitchell Island Dredged Material Reuse Site

Habitat Types within the Construction Zone	
Acres	Habitat Type:
64	Ruderal habitat: <i>Dominant species:</i> ripgut brome, Bermuda grass, yellow-star thistle. <i>Subdominant species:</i> Johnson grass, poison hemlock, and short-podded mustard.
Special Status Species (none)	

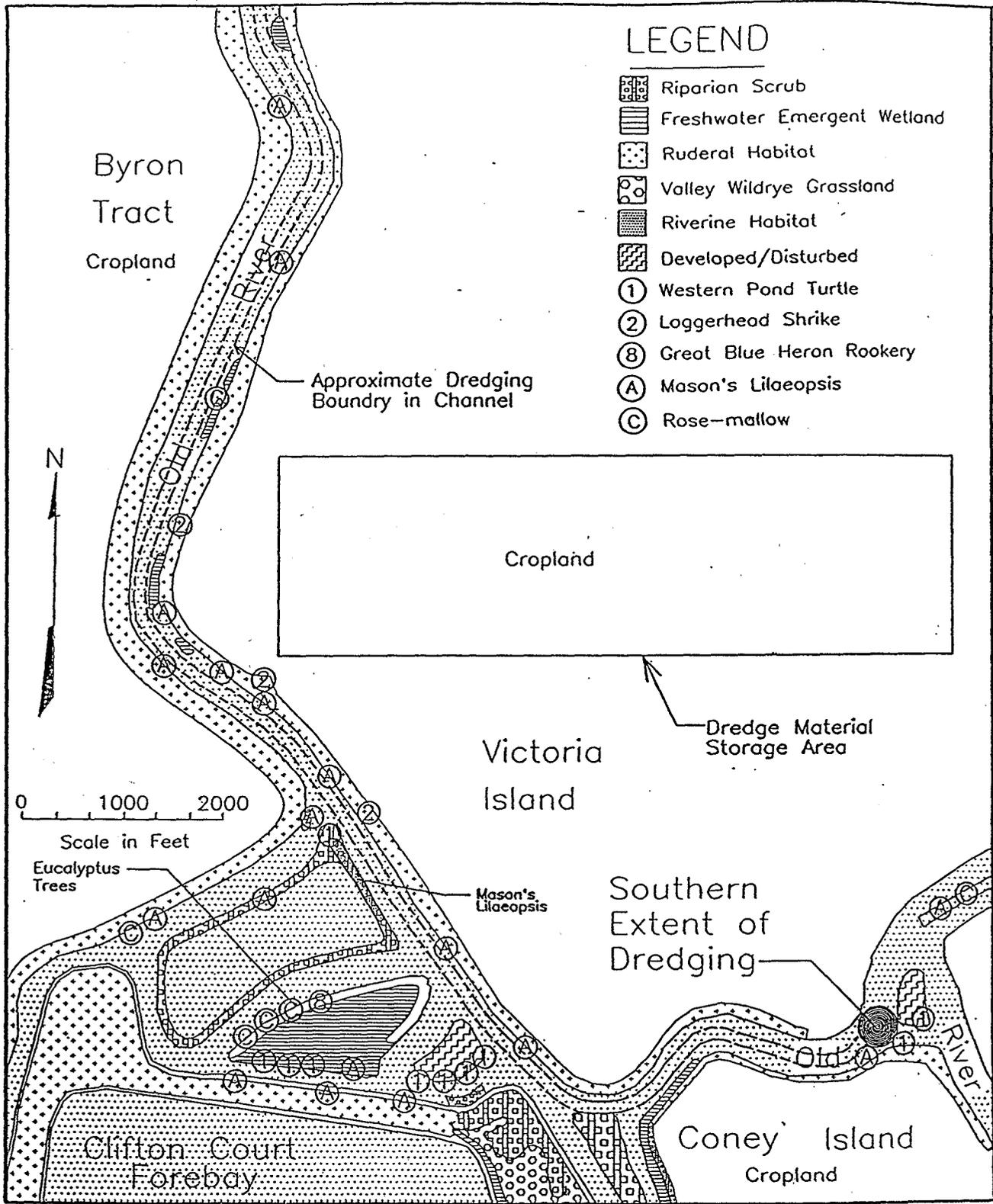


Figure 10-6. Habitat Map of the Victoria Island Dredged Material Processing Site (North).

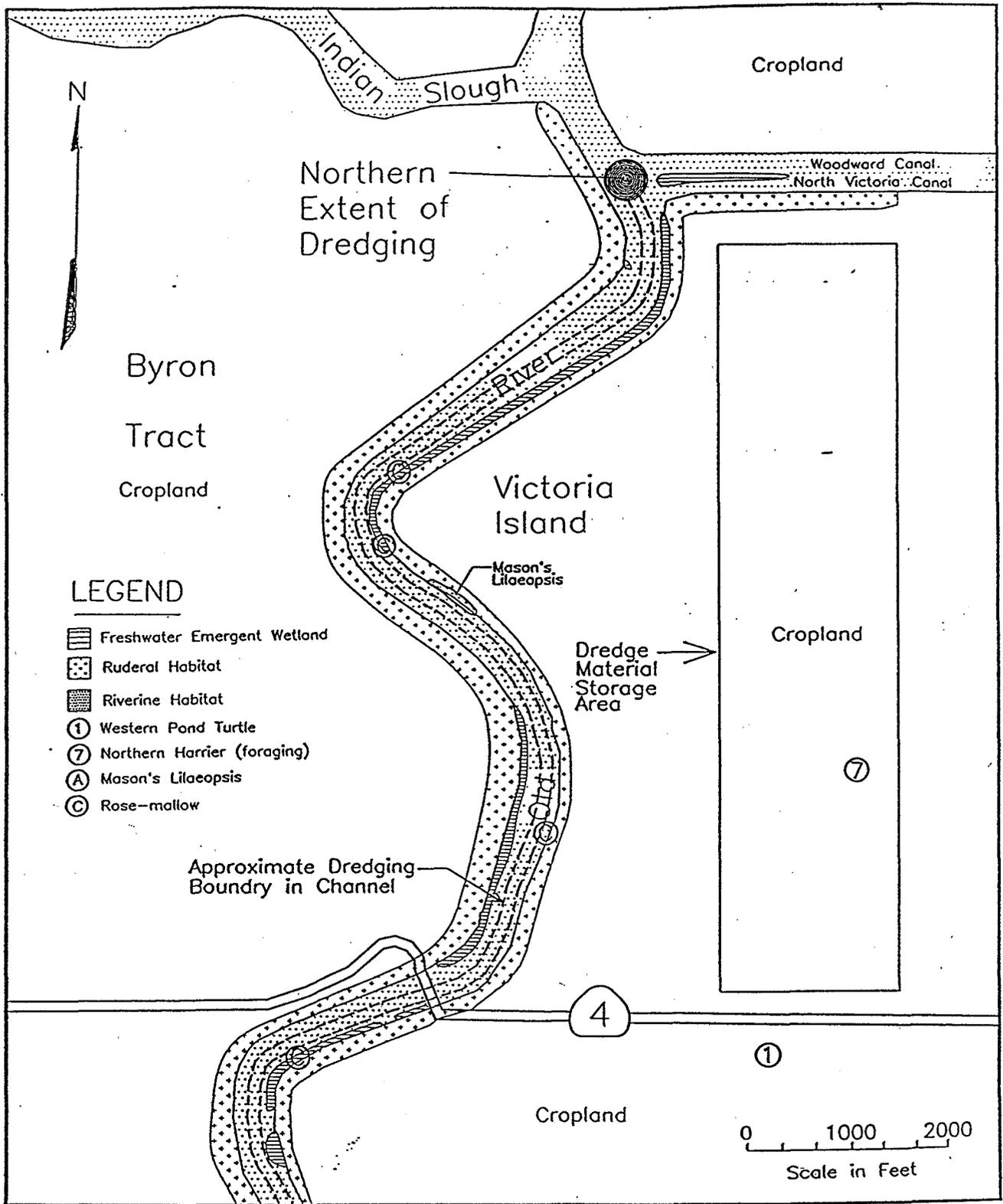


Figure 10-7. Habitat Map of the Victoria Island Dredged Material Processing Site (South).

Table 10-11. Byron Tract Dredged Material Reuse Sites

Habitat Types within the Construction Zone	
Acres	Habitat Type:
200	Cropland: (at northern site). (Vegetation varies with each planting season.)
160	Alkali meadow / vernal pools: <i>Dominant species:</i> Italian ryegrass and rattailed fescue. <i>Subdominant species:</i> goldfields, iodine bush, and soft chess.
Special Status Species	
Species	Observation
Swainson's hawk	Cropland and alkali meadow habitats provide foraging habitat.
San Joaquin kit fox	The CNDDDB reports kit fox habitat from the northern Byron Tract disposal site.

10.2.3 *San Pablo And Suisun Bays*

The following is a general description of the habitats of Suisun and San Pablo bays and associated wildlife, and includes the following freshwater and brackish habitats: mudflats, saline emergent wetland, freshwater emergent wetland, open water, estuarine, and salt pond. This description is based largely upon *Trend Analysis for Existing Biological Conditions in the Bay/Delta Estuary* (DWR 1994e), supplemented with other existing documentation and the experience of the terrestrial biologists who prepared this chapter. The classification of habitats within this discussion is based on Mayer and Laudenslayer (1988). Nomenclature of plant and animal species is based on Hickman (1994) and Laudenslayer et al. (1991), respectively.

Suisun Marsh represents over ten percent of the remaining wetlands in California and is one of the largest contiguous marshlands in the U.S. The brackish water quality within the marsh is influenced by both the saltwater tidal cycles and freshwater outflow from the Delta. The marsh is a critical resource for wintering waterfowl, providing resting and feeding habitat for up to 28 percent of the waterfowl along the Pacific Flyway during the autumn in low rainfall years (DWR 1980).

Suisun Bay is of great importance for the accumulation of food material by the interactions of outward-flowing surface currents and landward bottom currents in what is called the entrapment zone. The resulting conditions support high densities of zooplankton that forms the basis of the food chain in the Bay (DWR 1994e). Large numbers of wintering waterfowl utilize Suisun Bay on a seasonal basis.

Special status plants of the San Pablo-Suisun Bay area include Suisun Marsh aster, Antioch Dunes evening-primrose, Carquinez golden bush, Contra Costa goldfields, Delta tule pea, Delta mudwort, brittlescale, Valley spearscale, Suisun thistle, soft bird's-beak, Contra Costa wallflower, and Mason's lilaepsis.

The San Pablo-Suisun Bay area supports a diversity of wildlife species, including 11 species that are threatened, endangered, or candidates for federal listing. These species include the Lange's metalmark butterfly, American peregrine falcon, California brown pelican, California clapper rail, California black rail, western snowy plover, California least tern, giant garter snake, salt-marsh harvest mouse, Suisun ornate shrew, and salt-marsh wandering shrew. Other special status species associated with the San Pablo-Suisun Bay area include the California tiger salamander, common loon, American white pelican, double-crested cormorant, California gull, long-billed curlew, Caspian tern, northern harrier, short-eared owl, loggerhead shrike, Suisun song sparrow, San Pablo song sparrow, and pallid bat.

10.2.4 *Feather And Sacramento Rivers*

The following describes the terrestrial biological resources of the Feather River downstream from Lake Oroville to the Sacramento River, and the Sacramento River from the confluence of the Feather River downstream to the Delta. These rivers carry water from Lake Oroville to downstream water diversions, including the Banks pumping facilities at Clifton Court Forebay and, as such, are potentially affected by ISDP.

The habitats occurring along these water courses are described here based on existing documentation, previous field experience, and limited field reconnaissance associated with this EIR/EIS. The nomenclature of habitats is based on Mayer and Laudenslayer (1988). Habitats occurring along the banks of these waterways include valley-foothill riparian, cropland, and ruderal habitat. Special status plants associated with the Feather and Sacramento rivers include fox sedge, rose-mallow, northern California black walnut, and Sanford's arrowhead.

The habitats of the Feather and Sacramento rivers also support several species of threatened or endangered wildlife, or candidates for federal listing. These species include the bank swallow, Swainson's hawk, Valley elderberry longhorn beetle, giant garter snake, and, potentially, western yellow-billed cuckoo. The American peregrine falcon may occur as a migrant through this area during spring or winter. Riparian habitats of these rivers also support three California Fully Protected species; the ringtail, golden eagle (winter visitor) and white-tailed kite. Other special status species occurring within these habitats include the Sacramento Valley tiger beetle, California tiger salamander, western pond turtle, Barrow's goldeneye, double-crested cormorant, California gull, northern harrier, golden eagle, ferruginous hawk, sharp-shinned hawk, Copper's hawk, burrowing owl, long-eared owl, great horned owl, loggerhead shrike, yellow warbler, yellow-breasted chat, tricolored blackbird, pallid bat, and San Joaquin pocket mouse. Additionally, these areas may support rookery sites for the great blue heron, great egret, snowy egret, and black-crowned night heron.

10.2.5 *State Water Project Reservoirs*

The following discussion describes the terrestrial biological resources of the primary water storage facilities of the SWP, including Lake Oroville and San Luis Reservoir in northern California; and Pyramid, Perris, Silverwood, and Castaic lakes in southern California.

Lake Oroville. Lake Oroville is located in the Sierra Nevada Mountains in eastern Butte County. Dominant habitats surrounding Lake Oroville include interior live oak woodland and mixed oak woodland. Other less common habitats occurring at scattered locations include blue oak woodlands and mixed chaparral. Developed areas provide low quality habitat for most species of wildlife and occur at the dam site, public boat launches, campgrounds, and two marinas located on the Lake. Lacustrine habitat at Lake Oroville provides valuable foraging habitat for bald eagles and osprey, but is degraded by recreational boating.

The lacustrine and mixed oak woodland habitats of Lake Oroville provide foraging areas and nesting sites for the endangered bald eagle (Eric See pers. comm.). Other special status species known or expected to occur at Lake Oroville include the osprey, white-tailed kite, golden eagle, and northern goshawk.

San Luis Reservoir. San Luis Reservoir is located in the inner Coast Ranges of Merced County and stores water for both the SWP and Central Valley Project (CVP). At San Luis Reservoir, non-native grassland is the predominant habitat, integrating with localized patches of blue oak woodland on the western shore. Habitat quality is generally high in these areas, due to low levels of disturbance. Developed/disturbed habitats at the dam site and other scattered locations surrounding the reservoir include the boat launches and overview sites.

These habitats support the San Joaquin kit fox, American peregrine falcon, and Swainson's hawk. The tributaries surrounding the reservoir may support populations of the California red-legged frog. Other listed species expected at the reservoir site during the winter include the Aleutian Canada goose, bald eagle, and greater sandhill crane. Several other special status species are expected to occur at the San Luis Reservoir, including the California tiger salamander, foothill yellow-legged frog, western pond turtle, California horned lizard, San Joaquin whipsnake, common loon, American white pelican, double-crested cormorant, Barrow's goldeneye, long-billed curlew, California gull, osprey, northern harrier, Cooper's hawk, merlin, prairie falcon, white-tailed kite, ferruginous hawk, burrowing owl, long-eared owl, loggerhead shrike, and San Joaquin pocket mouse (DFG and DWR 1989).

Pyramid Lake. Pyramid Lake is located in the Transverse Ranges in Los Angeles County. The dominant habitats surrounding the lake are chaparral and coastal scrub. Oak woodlands occur on the south shore of the Lake and at scattered locations within the chaparral-coastal scrub community. Other habitats include lacustrine habitat and disturbed areas associated with the dam site and various recreational facilities.

Piru Creek, a tributary of Pyramid Lake, supports populations of the arroyo toad and California red-legged frog (Cathy Brown pers. comm.). Several other special status species are either known or expected to occur at Pyramid Lake, including the California newt, foothill yellow-legged frog, western pond turtle, two-striped garter snake, San Diego horned lizard, California mountain kingsnake, California gull, northern harrier, sharp-shinned hawk, loggerhead shrike, golden eagle, Cooper's hawk, osprey, and prairie falcon.

Castaic Lake. Castaic Lake is located in the Transverse Ranges in Los Angeles County downstream from Pyramid Lake. The dominant habitats surrounding Castaic Lake are chaparral and coastal scrub. Other habitats occurring at scattered locations include valley-foothill riparian, lacustrine, oak woodland, and disturbed areas.

Castaic Creek also supports populations of the arroyo toad and California red-legged frog (Cathy Brown pers. comm.). Other special status species known or expected to occur at Castaic Lake includes the California newt, foothill yellow-legged frog, San Diego horned lizard, western pond turtle, two-striped garter snake, California Mountain kingsnake, Cooper's hawk, northern harrier, sharp-shinned hawk, golden eagle, osprey, prairie falcon, and loggerhead shrike.

Silverwood Lake. Silverwood Lake is located in the San Bernardino Mountains in southern San Bernardino County. As with other reservoir sites in southern California, the chaparral-coastal scrub community dominates the shoreline at Silverwood Lake. Valley-foothill riparian habitat occurs in association with the various tributaries entering the lake and at other isolated locations. Montane hardwood-conifer habitat occurs on the north facing slopes of the south shore. Disturbed areas occur in association with the dam site and various recreational facilities.

These habitats may support the southern rubber boa or Stephen's kangaroo rat, both State-Threatened species. Other special status species known or expected to occur within the vicinity of the lake include the California newt, foothill yellow-legged frog, southern sagebrush lizard, San Diego horned lizard, coastal western whiptail, California mountain kingsnake, California

gull, golden eagle, Cooper's hawk, northern harrier, sharp-shinned hawk, loggerhead shrike, and yellow warbler.

Perris Reservoir. Perris Reservoir is located in the Peninsular Ranges of Riverside County. Developed/disturbed areas dominating the western half of the reservoir include dam and recreational facilities such as boat launches, marina facilities, and picnic grounds. An area of well developed valley-foothill riparian habitat occurs along the eastern shoreline and is designated as a protected wildlife area. Chaparral, coastal scrub, and annual grassland occur on the eastern slopes of the reservoir.

These habitats may support the threatened Stephen's kangaroo rat. Other special status animals known or expected to occur within these habitats include the California newt, western spadefoot toad, San Diego banded gecko, San Diego horned lizard, Caspian tern, double-crested cormorant, Cooper's hawk, osprey, golden eagle, northern harrier, sharp-shinned hawk, loggerhead shrike, short-eared owl, burrowing owl, yellow warbler, and yellow-breasted chat.

10.2.6 State Water Project Service Area

A description of the terrestrial biological resources of the service area was prepared for use in this EIR/EIS and is contained in Appendix 6. This includes overviews for eighteen counties in California which could receive water from ISDP, including Alameda, Butte, Imperial, Kings, Kern, Los Angeles, Napa, Orange, Plumas, Riverside, Santa Barbara, San Bernardino, San Diego, Santa Clara, San Luis Obispo, Solano, Stanislaus and Ventura. This descriptive material was placed in an appendix, in considering: 1) the length of the descriptions and the page limit for this EIR/EIS; and 2) the determination that service area impacts are less-than-significant because of the relatively limited amounts of water supplied by ISDP in relation to the current levels of planned and approved growth in these areas (see Chapter 22: Growth-Inducing Impacts).

10.3 Impacts/Environmental Consequences

10.3.1 Introduction

The following discussion examines the biological resources and special status species potentially affected by implementation of ISDP. The effects due to the construction and operation of the ISDP were evaluated in accordance with the CEQA Guidelines, NEPA Regulations, Section 404(b)(1) Guidelines, various regulatory jurisdictions, and local resource conservation plans. The following is a summary of the significance criteria used in this evaluation.

10.3.2 Significance Criteria

Section 15064 of the CEQA Guidelines discusses the determination of a significant effect (or impact) on biological resources and/or rare, threatened or endangered species, using careful judgment, and based, to the extent possible, on scientific and factual data. Additionally, the determination of significant effects is based on the project specific setting. This evaluation of

substantial or significant effects is based on the biological resources of the project site, and the local or regional context of which these species are a part.

The NEPA Regulations also direct that significance is based on context and intensity. The context of evaluation may result in different significance determinations depending on the setting of the proposed action. The intensity of an effect refers to the severity of the impact. When determining significant impacts, the NEPA Regulations indicate that the intensity of an impact must consider the degree to which the action may adversely affect an biological resources, endangered or threatened species (or its habitat that has been determined to be critical under the Endangered Species Act of 1973, as amended).

Impacts to biological resources are sometimes locally important, but not significant according to CEQA and NEPA, because although the effect would result in an adverse alteration of the existing conditions, the effect is not substantial on a region-wide or population-wide basis. Substantial effects are those that would diminish, or result in the loss of an important biological resource, or those that would obviously conflict with local, State, or federal resource conservation plans, goals, or regulations.

The effects of the alternatives on biological resources were evaluated based on criteria presented in the CEQA Guidelines, including Section 15065 and Appendix G. Section 15065 of the CEQA Guidelines states that a project may have a significant effect on biological resources when the project has the potential to interfere substantially with the movement of any resident or migratory fish or wildlife species; substantially diminish habitat for fish, wildlife or plants; cause a fish or wildlife population to fall below self-sustaining levels, and reduce the number or restrict the range of a rare or endangered plant or animal. Appendix G states the a project will have a significant impact on the environment when the project, "substantially affects a rare or endangered species of plant or animal or the habitat of such species."

Other significant impacts may occur when a proposed project conflicts with federal or state laws, and/or local conservation plans. During impact analysis of this project the following laws and plans were considered: Federal Endangered Species Act (FESA); California Endangered Species Act (CESA); California Native Plant Protection Act (CNPPA); Clean Water Act; and California Fish and Game Code.

In accordance with Section 15380 of CEQA, rare or endangered species include those species that are listed as such by either the California Fish and Game Commission (CFGC) or the USFWS, *and* those species that are not listed but meet the definition of rare or endangered. As directed by CEQA, this impact analysis considers species that are not formally listed, but which have been shown to meet the criteria of rare or endangered.

In accordance with the NEPA Regulations as published by the Council on Environmental Quality the proposed alternatives were evaluated for both direct and indirect effects. As published in 40 CFR 1508.8, these include: *direct effects*, which are caused by the action and occur at the same time and place; and *indirect effects*, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include related effects on natural systems and ecosystems.

Project related impacts on wetland resources were also evaluated in accordance with the 404(b)(1) Guidelines, which indicated that the placement of dredged or fill materials into wetlands may cause significant adverse impacts to biological resources (45 FR 85344, December 24, 1980).

10.3.3 Construction- And Dredging-Related Impacts

Disturbance to Terrestrial Biological Resources. Construction associated with the ISDP Alternative would be expected to disturb the habitats adjacent to the construction sites. Expected disturbances would include noise associated with grading and operation of other heavy equipment, increased truck and barge traffic, erosion and sedimentation associated with grading, and human intrusions. During the summer months, dust from grading and truck traffic on dirt roads would be expected to drift and coat adjacent vegetation and reduce the quality of these habitats for resident wildlife. Due to local farming activities, these sites currently experience noise associated with heavy equipment on a periodic basis. However, the construction activities at these sites would be expected to continue daily for more than two years. In addition, impacts to plant and wildlife habitat could occur from the exposure of construction related solvents, fuels, and other toxic materials including diesel, oil, gasoline, and raw concrete. These potential adverse impacts would be considered significant.

Active Raptor Nests. Construction of the barrier sites could affect nesting raptors. Specific areas of concern include the following flow barrier sites: 1) Grant Line: disturbance of two nesting Swainson's hawks and one great horned owl nest; 2) Old River: disturbance of a nesting Swainson's hawk; and 3) Middle River: disturbance of a nesting Swainson's hawk and a red-tailed hawk. Because of changes in raptor populations, nesting sites may change from year to year. The current nests could be unused in future years in favor of other locations. Exact nesting sites could change prior to proposed project construction. Adverse impacts to raptor nests would be considered significant.

Mason's Lilaeopsis. This plant species would be affected by ISDP, as follows: 1) Two small populations occurring on the existing levee will be removed to provide for the construction of the proposed intake; 2) The construction of the proposed Old River Flow control structure is expected to remove most of a 1,000-foot colony of Mason's lilaeopsis; and 3) The scattered populations of Mason's lilaeopsis occurring along the segment of Old River proposed for dredging may be lost due to the placement of temporary structures along the banks of Old River. These would be considered significant adverse impacts.

Rose-mallow. Dredging on Old River may result in the loss of rose-mallow populations. The loss of these populations is considered a significant impact.

Brittlescale. A population of brittlescale occurs along the northern levee of Clifton Court Forebay. The construction of the northern intake structure may increase off-road traffic and remove this brittlescale population or degrade its habitat. This would be considered a significant adverse impact.

Swainson's Hawk. The implementation of ISDP has the potential to reduce the number of Swainson's hawks within the project area. The potential significant adverse impacts that may occur at the flow barrier sites include disturbance to active nest sites and the loss of 5.8 acres of cropland habitat that provide suitable foraging habitat for nesting pairs. This is considered a significant adverse impact.

Heron Rookery Site. A rookery site occurs on Eucalyptus Island in Italian Slough, adjacent to the northern edge of Clifton Court Forebay and supports approximately 100 nests. The traffic associated with the construction of the proposed northern intake may have a substantial effect on the eastern portion of the rookery, especially early in the nesting season. This would be considered a significant adverse impact.

Giant Garter Snake. Suitable habitat for the giant garter snake occurs in the agricultural drains associated with the Victoria Island dredge processing sites. Although giant garter snakes were not observed on the site, these snakes are generally very secretive and difficult to locate, and may still occur in areas of suitable habitat. The construction and operation of the dredged material settling ponds on Victoria Island have the potential to result in the loss of giant garter snakes. This would be considered a significant adverse impact.

Western Pond Turtle. The construction of the proposed barriers, new intake, and dredged material settling ponds on Victoria Island could result in the inadvertent destruction of turtles and nest sites. This would be considered a significant adverse impact.

San Joaquin Kit Fox. Within the Project area, potential kit fox occurrences are limited to the northern Byron Tract dredged material disposal site and Old River flow barrier site near DMC. While surveys of this area have not confirmed the presence of kit fox at or near the barrier site, resource agencies have indicated that kit fox may sporadically occur within this area (Baseline Environmental Consulting 1994). Construction efforts within kit fox territories may result in the loss of individuals due to den entrapment, vehicular conflict, and other construction site hazards. The loss of kit fox due to construction related activities would be considered a significant impact.

Other Special Status Species. The implementation of the proposed ISDP project may result in the loss of habitat in the south Delta project area for the black-shouldered (white-tailed) kite, northern harrier, double-crested cormorant, white-faced ibis, sharp-shinned hawk, Cooper's hawk, ferruginous hawk, merlin, burrowing owl, short-eared owl, California horned lark, loggerhead shrike, yellow-breasted chat, tricolored blackbird, San Joaquin pocket mouse, and ringtail. Although this project may decrease foraging habitat or potential nest sites of these species, the local and regional populations of these species are considered stable and abundant. These project-related losses of habitat would not be substantial. Accordingly, this is considered a less-than-significant impact.

Loss of Cropland Habitat. The conversion of cropland habitat to dredge processing areas on Byron Tract and Victoria Island would be expected to result in the loss of habitat for a variety of local wildlife species. This conversion of habitat is similar to the fallowing of cropland, a common practice in the Delta. These areas would be expected to hold dredged material for two

years to allow for draining and settling. Following removal of this material, these sites would return to agricultural production and local wildlife would be expected to return to these sites. The conversion of cropland for processing dredged material would not be expected to result in substantial affects upon wildlife. This is considered a less-than-significant impact.

Ruderal Habitat. The construction of the intake and control structures would be expected to result in the total loss of 5.01 acres of ruderal habitat (Table 10-2). These habitats are generally composed of non-native plants and offer few resources to wildlife. Wildlife diversity is generally low at these sites. Additionally, regular levee maintenance precludes many wildlife species. Ruderal habitats are common and abundant throughout the Delta on levees and in other locations. Because these habitats are common, and generally support few native plants, and support low wildlife diversities, the loss of these habitats is considered a less-than-significant impact.

Riverine Habitat. Riverine habitat occurs at or near most ISDP sites. Construction of the flow barriers at Middle River, Grant Line, and Old River would be expected to result in the total loss of 0.97 acres of riverine habitat. Additionally, the construction of the Old River fish barrier near Mossdale would be expected to result in the additional loss of 0.15 acres of riverine habitat, resulting in a total loss of 1.12 acres of riverine habitat (Table 10-12). Riverine habitat provides important wildlife foraging habitat within the Delta for terrestrial wildlife. Although riverine habitat is common in the Delta, this habitat is subject to the jurisdiction of the Corps pursuant to Section 404 of the Clean Water Act and the DFG pursuant to Section 1600 of the California Fish and Game Code. Construction of the Old River flow control structure will include the set-back of levee channels which increase riverine habitat by 1.50 acres (Table 10-12). Because the construction of the proposed project will increase riverine habitat, no significant impact is expected.

Freshwater Marsh Habitat. The loss of freshwater marsh habitat may occur during dredging. Other indirect impacts to wildlife habitat would include noise and intrusion associated with dredging activities, potential scour and sedimentation of adjacent vegetation, and a general reduction in water quality due to turbidity. These adverse impacts would be considered significant. Construction of the barrier sites would remove 0.61 acres of freshwater marsh habitat (Table 10-12). This is considered a significant impact.

Riparian (Willow) Scrub Habitat. The construction of the northern intake structure and the Grant Line barrier would result in the loss of 1.36 acres of riparian scrub habitat. Construction of the Old River site near DMC would result in the loss of 0.61 acres of blackberry scrub (Table 10-12). This is considered a significant adverse impact, resulting in a total loss of 1.97 acres of habitat.

Table 10-12. Summary of Habitat Loss Due to Construction of the Facilities

Habitat	Acreage
Cropland	5.8
Ruderal	5.01
Riverine	1.12* (1.50)
Freshwater Marsh	0.61
Riparian/blackberry scrub	1.97
Valley wildrye	8.86

* 1.12 acres of riverine habitat removed during construction; 1.50 acres of riverine habitat created as a result of setback levee channels at the Old River Flow control structure site.

Valley Wildrye Grassland. The construction of the proposed northern intake structure would result in the loss of 8.86 acres of Valley wildrye grassland (Table 10-12). While this habitat is somewhat disturbed, it does provide valuable wildlife habitat within the south Delta. Construction of this site would also fragment the existing habitat at the site. Because this habitat site provides important wildlife values within the south Delta the loss or fragmentation at this site is considered a significant adverse impact.

10.3.4 Operation-Related Impacts

Operation-Related Scour. The operation of the ISDP could result in changes in flows, and velocities at various locations throughout the south Delta, leading to an increase in scour. The specific areas of concern include: 1) instream islands at the following sites: the proposed northern intake site between Clifton Court Forebay and Coney Island and the northern extent of dredging in the vicinity of Woodward Canal and Old River; and 2) freshwater wetlands: patches of freshwater marsh at scattered locations along the Old River dredge area north and south of Highway 4. These potential adverse impacts would be considered significant.

Water Levels. Barrier operations would be expected to alter water levels within the south Delta, and this may affect terrestrial habitats. The habitats potentially affected would include approximately 20 populations of Mason's lilaepsis, along with freshwater marsh and riparian habitat. Adverse impacts to these resources would be considered significant.

Delta Tule Pea. The operation of the proposed project may result in significant adverse impacts on two populations of Delta tulle pea. These populations are from Grant Line Canal and the unnamed instream island located adjacent to the proposed northern intake structure. This is considered a significant adverse impact.

Mason's Lilaepsis. One population of Mason's lilaepsis occurs on the instream island adjacent to the proposed intake. The population may be affected by increased velocities created by operation of the new intake. This is considered a significant adverse impact.

Rose-mallow. The implementation of ISDP may result in the loss of rose-mallow populations due to the operation of the northern intake structure and the barriers on Grant Line Canal and Middle River. This is considered a significant adverse impact.

Delta mudwort. Delta mudwort occurs in association with Mason's lilaepsis in marsh and riparian tidal habitat on Grant Line Canal. Therefore, operational of the Grant Line barrier is expected to affect Delta mudwort in a similar fashion. Operation of the Grant Line barrier is expected to cause prolonged inundation of Delta mudwort habitat, potentially resulting in the loss of individual plants. This is considered a significant adverse impact.

Western Pond Turtle. The operation of the ISDP could alter habitat within the south Delta by inundation of basking sites and changes in streamside vegetation. However, basking sites are neither limiting nor static in the south Delta. New basking sites are expected to be created in the south Delta by both natural and anthropomorphic factors. This is considered a less-than-significant impact.

Entrapment Zone and Delta outflow. The entrapment zone is a highly productive area of the Estuary, characterized by higher levels of particles, higher abundance of several types of organisms, and a turbidity maximum. This zone is commonly associated with the position of the two ppt salinity isopleth (X_2), but actually occurs over a broader range of salinities (Kimmerer 1992). However, X_2 remains a predictive indicator for the entrapment zone and salinity changes in response to Delta outflow, and is used for this analysis. Changes in Delta outflow that result in substantially decreased fisheries productivity or changes in vegetation composition could potentially have indirect significant impacts on terrestrial biological resources, as these changes could cause a reduction in food web organisms or the loss/change of breeding and nesting areas, escape cover, travel, corridors, and preferred food sources for resident and transient wildlife species associated with the aquatic ecosystem. An evaluation of the operation of ISDP was made using the results of DWR modeling based on these concepts.

A substantial decline in fisheries productivity related to the entrapment zone and Delta outflow is not expected to occur as a result of project operations (See Section 9 of this EIR/EIS). Delta outflow is expected to change slightly with the operation of ISDP, shifting the position of X_2 from baseline conditions both east and west at various times of the year. These shifts in X_2 would occur primarily in the winter months from October to February and could be as much as 3.5 kilometers east (upstream) (during wet year types). These changes are not expected to cause a change in vegetation types. For these reasons, the operation of the proposed project is not expected to cause significant impacts associated with the entrapment zone and Delta outflow.

Feather and Sacramento Rivers. In general, the operation of ISDP would be expected to maintain flows along the Feather River near average historical conditions in October; cause flows greater than historical average from May through August; and result in less than average historical flows in September, and November through April. These changes would not be substantial; the project affected flows would be expected to be adequate for maintaining the existing wildlife and riparian habitats along the Feather and Sacramento rivers. This is considered a less-than-significant impact.

Effects of Powerlines on Waterfowl. At the request of the DFG, potential waterfowl conflicts with the proposed project were evaluated using the *California-Oregon Transmission Project Waterfowl Mitigation Plan* (Western Area Power Administration February 1992). This report contains a comprehensive review of literature on collision impacts associated with transmission lines. While the proposed project lines are considerably smaller than the transmission lines considered in the report, the general issues of flyway safety still apply. The following is a summary of potential ISDP related powerline - waterfowl conflicts.

Construction of the ISDP sites will also include the construction and operation of 3-wire powerlines. At the Grant Line, Old River and Middle River flow barrier sites, 3-wire powerlines occur adjacent to the barrier sites. Powerlines to tie into these existing sources are expected to be less than 200 feet. In all of these cases existing powerlines occur behind the levees in cropland and ruderal habitat. These lines are not a direct hazard for birds landing or taking off from Grant Line Canal, Old River or Middle River.

At the Old River fish barrier site, the proposed 3-wire powerline will be constructed along Cohen Road behind the existing levee. The proposed line will be approximately 2,000 feet long

covering cropland and ruderal habitats. Because of their removed location to Old River and lack of surrounding waterfowl habitats, these proposed lines are not expected to be a direct hazard for birds landing or taking off in the area. The position and location of this line is not expected to cause significant impacts for flying birds.

At the northern intake site, approximately 3,000 feet of existing powerlines are located along the base of the eastern levee and will be relocated to the top of the western levee adjacent to the open water of Clifton Court Forebay. This open water habitat has been recognized as an important resting and rafting area for migrating and wintering waterfowl (Western Area Power Administration February 1992). Most of these birds move from Clifton Court Forebay eastward to Coney and Victoria islands to feed in corn fields. Existing powerlines represent an existing hazard to birds flying on this route, relocating the powerlines closer to Clifton Court Forebay and higher on the levee may increase the risk for flying waterfowl. The additional loss of birds due to collision would be a significant impact. Measures to reduce powerline collision hazard should be implemented.

Power Lines and Raptors. There is a potential for raptors to be electrocuted through contact with the electrical distribution lines that would bring power to the barriers and the northern intake structure. This would be considered a significant adverse impact.

Reservoir Levels. The modeling conducted for ISDP indicates that expected water elevations at the Perris Reservoir would not differ substantially from existing water levels, with minimal changes in water elevation ranging from 0.1 to 2.3 feet. These minor changes would not be expected to cause the loss of water dependent habitats at the reservoir. This is considered a less-than-significant impact.

10.4 Mitigation Measures For The ISDP Alternative

10.4.1 Introduction

The following discussion proposes measures to mitigate for potential impacts to biological resources from the construction and/or operation of the proposed ISDP. The proposed action/project was evaluated in accordance with the CEQA Guidelines, NEPA Regulations, 404(b)(1) Guidelines, various regulatory jurisdictions, and local resource conservation plans.

10.4.2 Mitigation For Construction And Dredging Related Impacts

Construction-Related Mitigation. The following measures are proposed to reduce construction related noise, dust, erosion, siltation, human intrusion, and potential exposure to toxic materials. The implementation of these measures would reduce these potential impacts to less-than-significant levels.

Biological Monitor. The monitor will assure compliance with the environmental protection and mitigation measures contained in the EIR/EIS, flag sensitive resources to be avoided during construction, and provide onsite orientation and direction to assure disturbance is minimized.

Avoid Equipment Idling. To reduce noise, equipment operators should shut-off equipment when not in use and avoid unnecessary idling.

Grading. To avoid excessive erosion and siltation, no grading should occur during the rainy season. All grading should be conducted from April 15 through November 15.

Hydroseeding. To reduce erosion and siltation following grading, the contractor should hydroseed all graded surfaces after final grading prior to the rainy season with a mixture of quick germinating, native grassland species.

Riprap Methods. Riprap or Rosgen's non-riprap vegetation methods should be utilized in areas where site conditions preclude the establishment of vegetation.

Silt Fencing. Where grading occurs adjacent to Delta waterways, the contractor should install silt fencing to reduce erosion and siltation associated with runoff.

Flagging. Prior to grading for these sites, the contractor should flag the construction zone surrounding each site. The flagging should remain in place until all construction activities are completed. The flagged area should include enough area for the parking of all construction related vehicles and storage for all construction materials. Parking and material storage outside of construction zones should be prohibited.

Fencing. At the discretion of the biological monitor, other sensitive biological resources could be fenced with appropriate buffer zones prior to construction.

Watering/Soil Binders. To reduce dust during construction, the contractor should water earth surfaces and incorporate soil binders during grading. All unpaved roads associated with construction and the construction sites should be watered on a daily basis.

Speed Limits. To reduce dust and noise during all phases of construction, a speed limit of 15 miles per hour should be imposed on unpaved roads and in construction zones. The contractor should post the designated speed limit at all construction sites and along unpaved roads. Off-road traffic should be strictly prohibited, and appropriate areas will be sign posted.

Control Landing Sites. During construction, boat and barge traffic at the Grant Line and Middle River sites should avoid instream islands. Landing on these islands and anchoring of boats and/or barges to these islands should be prohibited.

Remove Trash and Revegetate. The construction of the intake structure, flow barriers and seasonal fish barrier will result in the degradation of habitats adjacent to these sites. Construction at these sites may degrade riparian scrub, freshwater marsh, blackberry scrub, and wildrye grassland. Following construction at these sites, the contractor should remove all trash and construction debris and implement a revegetation plan to return native vegetation to the construction zones. The elements that should be included in the revegetation of these sites are described in Appendix 6.

Spill Contingency Plan. To reduce the potential exposure to toxic substances, prior to grading the contractor should prepare a *Hazardous Material Handling and Spill Contingency Plan*. The plan should remain onsite during the construction phase of the project. The contractor and crew should operate in accordance with this plan at all times.

Dredging of Old River. The following general measures should be implemented to reduce adverse dredging-related impacts to a less-than-significant level.

Scale Maps. Prior to dredging, the precise course of dredging should be drawn on plan maps to scale. These maps should include the location of all temporary structures for the transport of dredge material to the processing areas on Byron Tract or Victoria Island. These maps should include the locations of sensitive resources that should be avoided during the dredging (e.g., freshwater marsh and rare plants). Copies of these maps should be presented to the biological monitor and representatives of the DFG and USFWS.

Open Channel. During dredge activities, dredging should be confined to the open channel. All freshwater marsh vegetation should be avoided.

Biological Monitor. During dredging, a biological monitor should regularly monitor dredging activities and note any incidence of habitat loss.

Turbidity Control. To minimize turbidity and siltation, the project description includes provisions for the use of hydraulic suction dredge and silt curtains at all times. Other measure to reduce turbidity and siltation include: during dredging large sets and thick cuts should be avoided, windrows and ridges should be minimized, anchor dredging should be avoided, all pipeline leaks should be repaired, and pipelines should be flushed prior to disassembly.

Replacement of Habitat. Following dredging, any loss of freshwater marsh habitat should be replaced at a ratio developed in conjunction with the regulating agencies.

Active Raptor Nests. Prior to construction and grading all construction areas should be surveyed by a qualified biologist who has been approved by DFG. Proposed truck routes along remote levee roads where regular truck traffic is uncommon should also be surveyed. Prior to dredging, the levees along Old River should be inspected for nesting raptors. Nests occurring along major roads are not expected to be affected by an incremental increase in traffic volume and should not

be surveyed. Prior to grading, the DFG should be notified in writing of the results of the survey. Notification should include dates and times of surveys, areas surveyed, name of the biologist, maps showing the location any nests discovered (both active and abandoned), species of raptor using the nest site, and any anticipated conflict which may occur as a result of construction or dredging (e.g., nest disturbance, removal of nest trees, etc.). During the pre-construction surveys, particular attention should be given to the nest sites identified during previous surveys. Should the proposed construction or dredging conflict with nesting raptors, the measures set forth in Appendix 6.

An onsite biological monitor should routinely observe nesting sites identified during pre-construction surveys and note any construction interference. Construction activities that are disruptive to breeding and/or nesting raptors should be avoided during the breeding and nesting seasons.

Prior to construction and clearing of proposed power line rights of way, DWR and Reclamation should conduct a pre-construction survey of the proposed rights of way. The survey should be conducted during the breeding season by a qualified biologist. A survey report should be prepared prior to grading and submitted to the DFG and USFWS. The report should include the following: dates and times of surveys, areas surveyed, name of the biologist, maps showing the location any nests discovered (both active and abandon), species of raptor using the nest site, and a determination of whether raptors may be affected by the construction of the proposed power line. Should active raptor nests occur along the proposed power line, no construction activities should occur within 0.5 mile of that nest until the biological monitor determines that the young birds have fledged.

Mason's Lilaepsis. DWR and Reclamation should implement the following measures to mitigate for the loss of Mason's lilaepsis populations due to the construction of the northern intake structure and the Old River flow barrier to a level that is less-than-significant:

Consultation. Prior to grading or construction at the northern intake and Old River flow control sites, the DWR and Reclamation should request consultation from the DFG regarding impacts to Mason's lilaepsis and a permit or memorandum of understanding (MOU) for the transplanting of Mason's lilaepsis, pursuant to Section 2081 of the California Fish and Game Code. In accordance with guidelines published by the DFG (DFG February 1986), the DWR and Reclamation should continue consultation with DFG staff to determine the extent of impacts to Mason's lilaepsis and that the project is in compliance with the CESA. These guidelines indicate that DFG consultation is included within the CEQA process. Previously, the DWR and Reclamation have solicited comments from the Department in the NOP process and included DFG in working group meetings.

Transplanting Plan. Prior to transplanting, the DWR and Reclamation should prepare a plan for the transplanting of the Mason's lilaepsis. The plan should be based on the *Barker Slough Mason's Lilaepsis Transplant Study* (ECOS, Inc. 1988 and McCarten 1991). This program has shown that Mason's lilaepsis can be successfully transplanted. Prior to implementation, the plan will be reviewed and approved by the DFG. Elements of the plan should include those set forth in Appendix 6.

Precise Plan Maps. Prior to dredging, the DWR and Reclamation should prepare precise plan maps of the proposed dredge area, including the course of dredging, placement of temporary structures, and the locations of all special status plants (Mason's lilaeopsis). All temporary structures will be located more than 50 feet away from a population of Mason's lilaeopsis.

Pre-Construction Surveys. Not more than 60 days in advance of dredging, the biological monitor should survey the locations of the temporary structures to ensure Mason's lilaeopsis populations that may have become established prior to dredging are not inadvertently removed. Should a population be discovered the temporary structure will be relocated to allow for a 50-foot buffer.

Inspect Transport Piping. To avoid erosion and/or the inadvertent placement of dredge material on Mason's lilaeopsis during dredging, the contractor should inspect the transport piping on a daily basis. Should any leaks be detected, these will be sealed prior to the continuation of dredging activities.

Rose-mallow. In conjunction with other mitigation measures to avoid the loss of rare plants during dredging, populations of rose-mallow should be mapped on the plan maps of the dredging site, to avoid the potential loss of rose-mallow populations during dredging activities. Temporary structures should not be placed within 50 feet of a rose-mallow population.

The operation of the proposed northern intake is expected to increase erosion of the instream island that supports a population rose-mallow; however, the implementation of mitigation measures to either relocate the northern intake site or install energy dissipation structures at this site will prevent the erosion of this instream island.

The operation of the barrier sites at Middle River and Grant Line could inundate rose-mallow populations. Extensive surveys located two populations upstream from the Middle River barrier site and one population upstream from the Grant Line site (DWR 1992b). Plants occurring within the intertidal zone will be reseeded to downstream locations, using the protocol contained in Appendix A. Impacts to rose-mallow populations at the Grant Line Barrier site may also be avoided by the relocation of the barrier to a location at the eastern end of the canal.

Brittlescale. The construction of the northern intake structure may increase off-road traffic and remove this brittlescale population or degrade its habitat. To reduce the potential impact of incidental off-road traffic to the brittlescale population to a level that is less-than-significant the following measures will be implemented:

No traffic will use the northern access road.

Swainson's Hawk. Prior to construction, the Swainson's hawk nest sites identified at the Old River and Middle River sites will be surveyed by a qualified biologist to determine whether these nests are active. If the nests are determined to be active, then the truck routes will be rerouted to avoid disturbance to the nesting hawks. The selected route will not be within one half mile of an

active nest site. The proposed route will be surveyed and evaluated by a qualified biologist to ensure that no other biological resources may be affected along the newly proposed route.

Trucks should remain rerouted until the biological monitor has determined the young Swainson's hawks have fledged. After the young hawks have fledged, the original truck routes may be reused.

At the Grant Line site two active Swainson's hawk nests are located within approximately 1,000 feet from the proposed barrier site. These birds are not expected to tolerate noise and disturbance associated with construction. Postponement of construction activities during the breeding and nesting is not feasible. Because of the close proximity of the nest site to the proposed barrier site, the avoidance of construction activities that may disturb nesting Swainson's hawks is unavoidable. The measures set forth in Appendix 6 should be implemented by the DWR and Reclamation prior to construction.

To mitigate for the loss of 5.8 acres of foraging habitat within one mile of a nest tree, the DWR and Reclamation should comply with the DFG Management Conditions as specified in the *Staff Report Regarding Mitigation for Impacts to Swainson's Hawks (Buteo swainsonii) in the Central Valley of California*. As per these guidelines, the terms described in Appendix 6 should be included in the final mitigation agreement.

Heron Rookery Site. No hauling of embankment material along the northern access route should occur during the heron breeding season. This is the season when birds are most affected by disturbance and when disturbance is most detrimental to the colony. The breeding season occurs from February through March (Pratt 1970). Once the birds have laid eggs the attachment to the nest is stronger and abandonment of the nests is not expected. Embankment material will not be hauled along the northern access route to the northern intake site from February through March. During this time, embankment and other heavy trucks may access the site from the southern route that would avoid disturbance to the heron rookery.

Giant Garter Snake. The construction and operation of the dredged material settling ponds on Victoria Island have the potential to result in the loss of giant garter snakes, although no snakes have been observed in any of the previous surveys in the ISDP area (ECOS 1987, MGA 1995). Measures to avoid impacts to suitable giant garter snake habitat will be implemented. Implementation of the mitigation measures set forth in Appendix 6 is expected to reduce impacts to giant garter snakes to a less-than-significant level.

Western Pond Turtle. To avoid the loss of western pond turtles and eggs due to construction related activities, prior to construction, DWR and Reclamation should exclude turtles from suitable nesting sites by the installation of temporary plastic fencing at all of the construction sites to prevent pond turtles from entering the construction site and laying eggs. The fencing should be installed on or before March 1st to avoid the beginning of the egg laying season (March through August). Fencing should be installed six inches below the ground level at all locations. In accordance with approved DFG/USFWS turtle survey protocol, turtles should be removed from these areas immediately following fencing. Prior to construction grading, the temporary fencing may be removed.

To avoid the loss of hibernating western pond turtles, construction at the various construction sites should not begin while turtles are hibernating. Construction may begin during the active season March through October.

To avoid the loss of western pond turtles due to the construction and operation of the Victoria Island settling ponds, no dredged material should be placed in the ditches and drains of the island. To facilitate turtle escape from heavy equipment, dredging placement should occur during the active season for this species.

San Joaquin Kit Fox. To avoid the loss of kit fox during construction of the settling ponds on Byron Tract and the Old River flow barrier site, preconstruction surveys and onsite construction protocols should be implemented to remove or avoid onsite construction hazards to kit fox. These protocols are discussed in the *Standard Recommendations for Protection of the San Joaquin Kit Fox* (USFWS September 1995). These protocols include: preconstruction surveys and avoidance of any potential kit fox dens, and construction procedures (speed limits, avoidance of night construction, proper storage of materials, minimization of disturbance areas, avoidance of kit fox entrapment, sensitivity training, prohibiting the use of rodenticide and herbicide, and a reporting procedure for inadvertent death of a kit fox). Implementation of these measures would reduce the potential impacts to a less-than-significant level.

Freshwater Marsh Habitat. The construction of the northern intake and Grant Line barriers would result in the permanent loss of 0.61 acres of freshwater marsh habitat (Table 10-12). To compensate for the loss of freshwater marsh habitat, DWR and Reclamation should plant freshwater emergent vegetation at an offsite location according to the specifications set forth in Appendix 6.

Riparian (Willow) Scrub Habitat. The construction of the northern intake structure and the Grant Line barrier would result in the loss of 1.36 acres of riparian scrub habitat. Construction of the Old River site near DMC would result in the loss of 0.61 acres of blackberry scrub. To compensate for the loss of these habitats DWR and Reclamation should create riparian scrub habitat at another location along the waterways of the south Delta. The riparian scrub habitats will be created according the specifications set forth in Appendix 6.

Valley Wildrye Grassland. The construction of the proposed northern intake structure would result in the loss of 8.86 acres of Valley wildrye grassland. To compensate for this loss, DWR and Reclamation should create Valley wildrye grassland habitat at another location in the south Delta. Habitat creation will occur as specified in Appendix 6.

10.4.3 *Operation-Related Mitigation*

Operation-Related Scour. Operation-related scour may occur along Old River. Sensitive habitat areas include instream islands and patches of freshwater marsh vegetation along the levees of Old River. The instream islands at the following sites may be adversely impacted by scour: the proposed northern intake site between Clifton Court Forebay and Coney Island and at the northern extent of dredging in the vicinity of Woodward Canal and Old River, patches of

freshwater marsh at scattered locations along the Old River dredge area north and south of Highway 4 and may also be affected by scour.

Implementation of the following mitigation measures are expected to reduce the project related impacts to plant and wildlife habitat to a level less-than-significant level:

Protection of Island Habitat. To reduce the flow velocities passing the unnamed channel islands within the Project Area, DWR and Reclamation should install near-shore energy dissipation structures to protect these islands from increased rates of erosion or relocate the northern intake as illustrated in Figure 10-8. At the island near Woodward Canal and Old River, energy dissipation structures should be placed around the entire island. These structures should be placed around the island to reduce the effects of the high velocity flows. However, to maintain the biological integrity of the site, no structures should be placed on the island.

Monitoring Effectiveness. Following installation of these structures, the effectiveness of these structures will be monitored for a period of five years, as specified in the following monitoring procedure. In the event that increased erosion occurs in spite of these preventions, DWR and Reclamation will consult with ACOE, DFG, and USFWS to develop alternative forms of habitat replacement. Following this consultation, the DWR and Reclamation shall implement the agreed upon habitat replacement measures.

Remote Sensing. Because of the dynamic nature of the Delta, the precise degree and location of scouring along Old River cannot be accurately predicted. The program set forth in Appendix 6 should be implemented by DWR and Reclamation after the dredging of Old River is completed.

Water Levels. To identify and quantify adverse impacts to freshwater marsh and riparian habitats, DWR will continue the Vegetation Monitoring Plan as described in *The South Delta Barriers Project: Assessment of Existing Fish, Wildlife, and Plant Community Resources and Potential Project Impacts* (February 14, 1992). DWR and Reclamation should locate areas of intertidal habitat that can be enhanced or improved to support Mason's lilaepsis. This program will not include measures which would destabilize critical flood control levees. Areas for enhancement activities include the levees of Clifton Court Forebay, Twitchell Island, and Sherman Island. Where this program identifies project related losses of habitat, DWR and Reclamation should replace habitat at other locations within the Delta.

Mason's Lilaepsis. DWR and Reclamation should implement the following measures to mitigate for the loss of Mason's lilaepsis populations due to the operation of the northern intake structure and Grant Line Barrier:

Relocation of Grant Line Barrier. To avoid potential operational impacts to Mason's lilaepsis populations on Grant Line canal, DWR and Reclamation will relocate the Grant Line Barrier site to the eastern end of the canal (Figure 10-9). The mitigation site is approximately 5.5 miles east of the current location, or 500 feet east of the Tracy Boulevard Bridge.

Protection of Island Habitat. Prior to construction of the northern intake structure, DWR and Reclamation shall implement measures to reduce erosion potential of the adjacent instream island to avoid impacts to Mason's lilaepsis. These measures shall include the construction of energy dissipation structures or the relocation of the northern intake, as illustrated in Figure 10-8. This measure will be implemented in conjunction with other measures presented to preserve the unnamed instream island located at the junction of West Canal and Old River (adjacent to Coney Island).

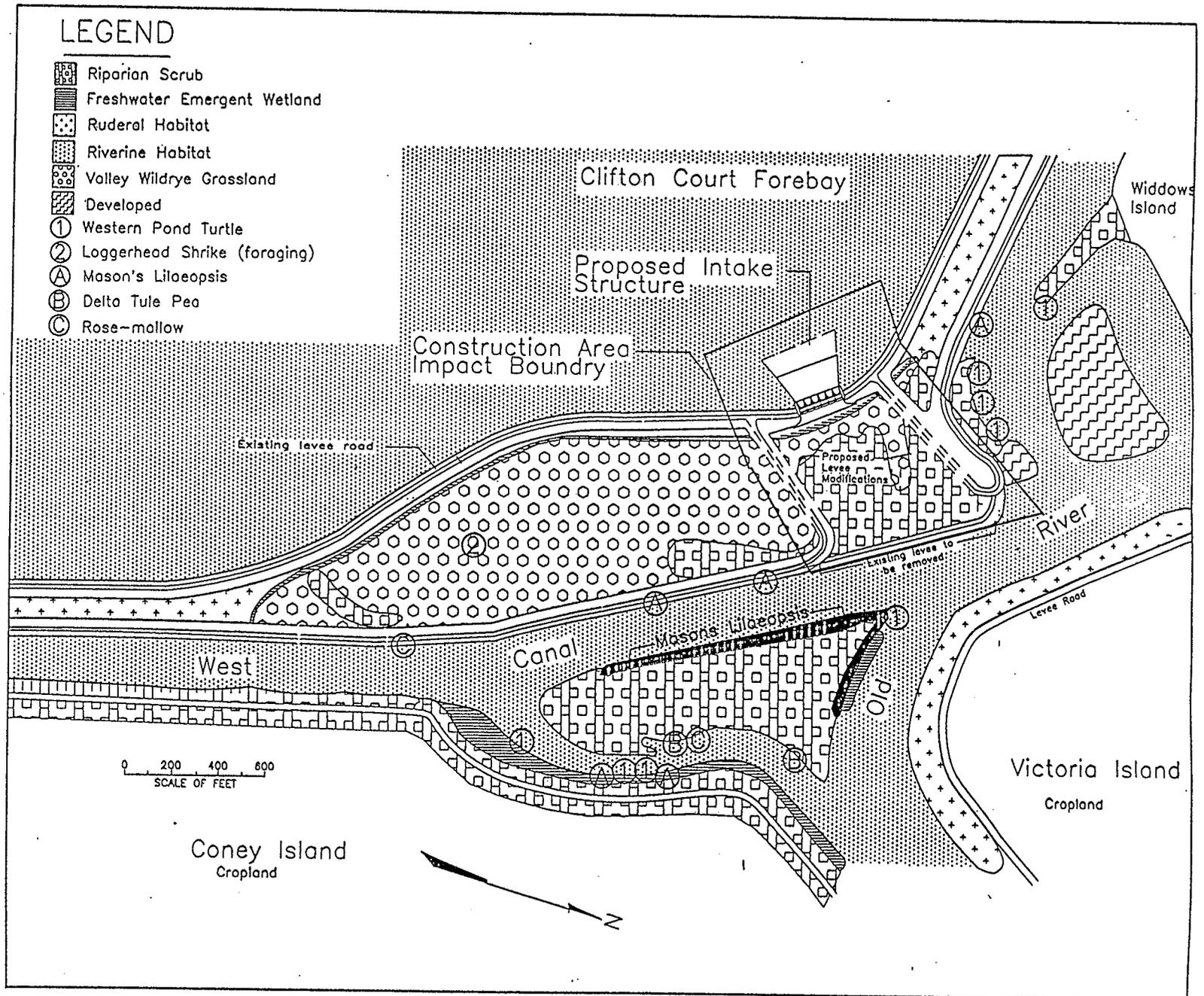
Delta Tule Pea. Prior to construction of the Grant Line barrier site, the DWR and Reclamation should relocate the Grant Line Barrier site or prepare and implement a plan to establish a new population of Delta tule pea. The relocation of the Grant Line Barrier site would also reduce impacts on other special status plant species (Delta mudwort and Mason's lilaepsis). The program should include the elements set forth in Appendix 6. The implementation of mitigation measures presented under Mason's lilaepsis to install energy dissipation structures at the unnamed instream island located between Clifton Court Forebay and Coney Island reduce potential adverse impacts to this population of Delta tule pea to a level that is less-than-significant.

Delta mudwort. Comprehensive surveys of the south Delta and previous impact analysis indicate that populations of Delta mudwort upstream from the Grant Line barrier site may be affected by the operation of the proposed flow barrier. These impacts include prolonged inundation of plants which generally survive partial inundation, but are not expected to tolerate continual inundation during the growing season. These impacts are similar to the impacts associated with Mason's lilaepsis. Because these plants co-occur in similar habitats within the Delta, implementation of mitigation measures for the loss of Mason's lilaepsis habitat will also reduce impacts to Delta mudwort to a level that is less-than-significant.

Powerlines and Raptors. To avoid raptor electrocutions, prior to construction DWR should incorporate the design criteria outlined in Appendix A into the final powerline configuration.

Effects of Powerlines on Waterfowl. Prior to construction, DWR and Reclamation should implement one of the following measures: 1) avoid waterfowl collision hazards by redesigning the proposed project so that the powerlines are underground at the northern intake site; 2) minimize the additional risk to waterfowl through redesigning the proposed powerline route at the proposed northern intake by retaining the existing alignment and adding a new section along the proposed intake channel; and 3) minimize powerline exposure to waterfowl by relocating the poles from the top of the levee to the base of the levee away from the open water habitat of Clifton Court Forebay. In addition, after construction DWR and Reclamation should install markers on these lines to improve visibility.

Figure 10-8. Habitat and Species Map - Intake.



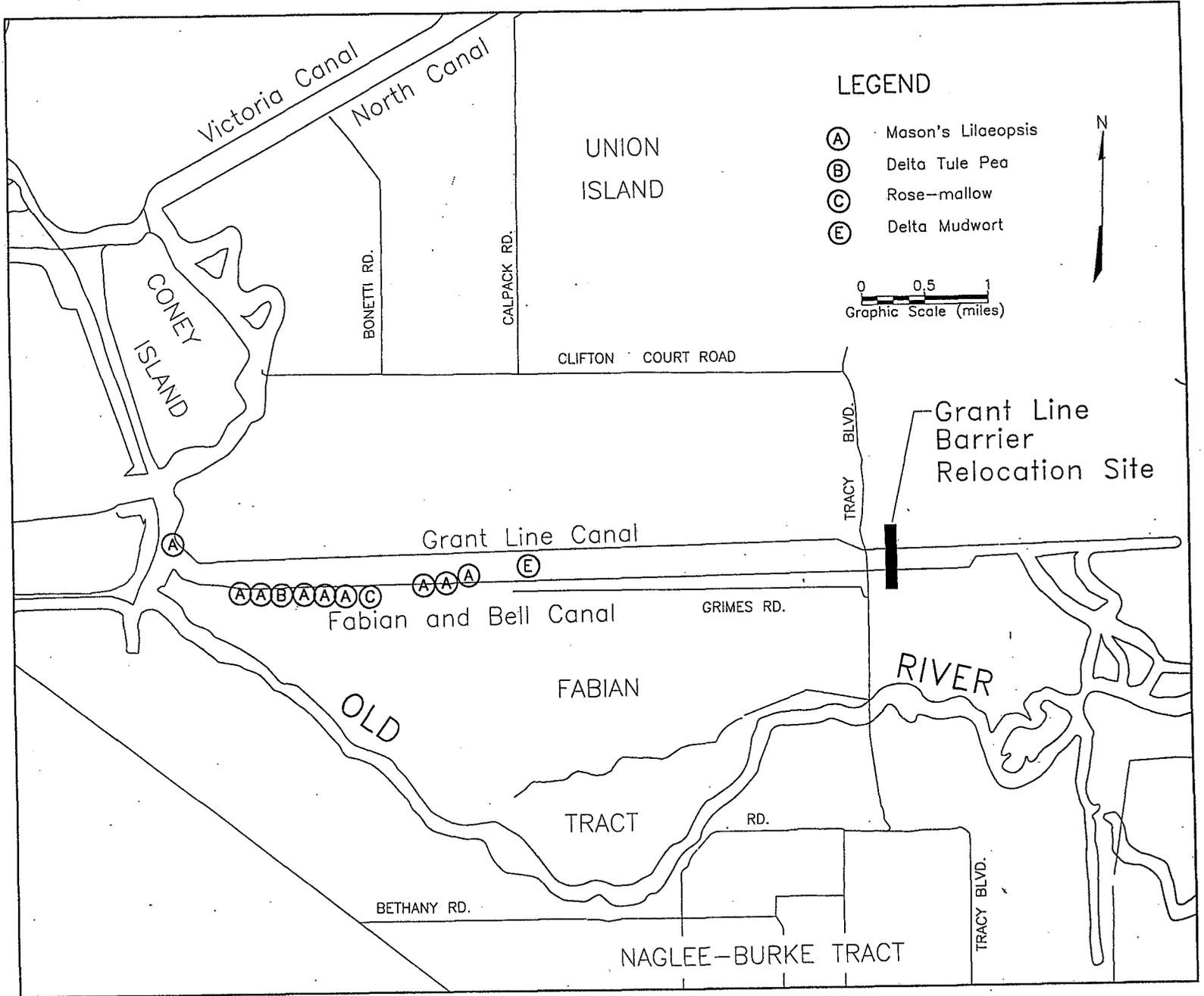
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Figure 10-9. Relocation Site for the Grant Line Canal

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10.5 Comparative Evaluation of the Alternatives

10.5.1 Enlargement Of Clifton Court Forebay, Construction Of Two Intake Structures, Increased Export Capacity, And Construction Of Permanent Barriers

- *Introduction*

This alternative would include several of the components that are associated with the proposed project, ISDP. These are the construction and operation of the Old River fish control structure, Middle River tide barrier, Grant Line Canal barrier, and Old River flow control structure. The intake proposed for ISDP would not be constructed. Instead, this alternative would include an enlargement of the Clifton Court Forebay and the construction of two intake facilities on the enlarged forebay.

Accordingly, this alternative would include all of the impacts associated with ISDP, except those created by the construction and operation of the northern intake facility. In addition, this alternative would include impacts associated with the expanded forebay and the construction of two new intake facilities, as described in the following.

- *Vegetation and Wildlife*

Construction Related Effects on Vegetation and Wildlife within the Project Area. The construction of this alternative would disturb approximately 2,900 acres of plant and wildlife habitat associated with the forebay expansion. Expected disturbances include grading, noise, dust, and human intrusion. Implementation of the related mitigation measures set forth for ISDP would reduce these impacts to a level that is less-than-significant. The construction of setback levees on Middle River would be expected to cause a significant disturbance to wildlife habitats due to human intrusion, barge and truck traffic, grading, and other construction related disturbances. These activities could also result in indirect impacts on the adjacent aquatic environments due to erosion and sedimentation. These disturbances would be considered significant.

Loss of Plant and Wildlife Habitat within the Project Area. Construction of this alternative would result in the loss of ruderal, riparian, freshwater marsh, Valley sink scrub, vernal pool, alkali grassland, Valley wildrye grassland, riverine, blackberry thicket, cropland, and other habitats. The expansion of Clifton Court Forebay would convert 2,900 acres of terrestrial and wetland habitats on Victoria Island and Byron Tract, into open water forebay habitat. Lost habitats include Valley sink scrub, vernal pool, and alkali grassland habitat from Byron Tract, and approximately 2,800 acres of cropland habitat. The loss of cropland habitat would be a significant and unavoidable impact. The loss of vernal pool, Valley sink scrub, riparian scrub, and alkali grasslands would also be significant, but could be reduced to a level that is less-than-significant by the implementation of avoidance and habitat creation measures.

The construction of the Middle River setback levee would be expected to result in the loss of 0.29 acres of freshwater marsh wetlands along the levees of Upper Jones Tract in the vicinity of

the setback levee (Botanical Research Group August 1994). The loss of wetland habitat would be a significant impact. Additionally, the construction of the setback levee would cause the conversion of some cropland habitat occurring on Upper Jones Tract to riverine habitat. This would be considered a less-than-significant adverse impact.

Operational Effects on Vegetation and Wildlife within the Project Area. Intake structures associated with the proposed Victoria Island Forebay would be located along Victoria/Woodward Canal on the northern portion of the proposed forebay. These intake sites would draw water from Old River and Middle River. The resulting increase in flows would be expected to generate increased water velocities that could cause localized scouring of instream islands located adjacent to these intake sites in Victoria Canal and in Middle River. Because these islands provide a type of important plant and wildlife habitat that is generally declining throughout the Delta, the potential loss of instream islands would be considered a significant impact. Project modeling also indicates that the operation of this alternative would be expected to result in increased flow velocities in Old River. Under some conditions these velocities would be expected to be greater than 3.0 fps and cause scouring in Old River. Where these conditions persist the loss of freshwater marsh and riparian habitats could occur. The potential loss of these plant and wildlife habitats would constitute a significant adverse impact.

Disturbance to Raptor Nests within the Project Area. The general treeless character of the proposed expansion sites precludes most raptors from nesting in these areas. Surveys of the proposed expansion sites have located one Swainson's hawk nest from the Byron Tract area (MGA 1993a). The expansion of the Clifton Court Forebay would be expected to remove this nest. This could constitute a significant impact. Because there are no known raptor nests on the Upper Jones Tract levee, the proposed setback levee for Middle River would not be expected to remove any raptor nests. However, the instream islands in Middle River support populations of nesting northern harriers that could be affected by barge traffic associated with the construction of the setback levee. The potential disturbance to nesting raptors would constitute a significant impact.

Effects on Raptors Due to Power Line Construction within the Project Area. The construction of the facilities associated with this alternative could require the relocation of existing power lines (and/or transmission lines) or the installation of new power lines for facility operation. The configuration of the new and relocated lines could pose a safety hazard to local and migrating raptor populations, due to electrocution. The potential electrocution of raptors would constitute a significant adverse impact.

- *Special Status Species*

Delta Tule Pea. The implementation of this alternative could cause an increase in the rate of erosion due to increased flow velocities of the instream islands in Middle River that support populations of Delta tule pea. The potential loss of these populations is a significant adverse impact.

Mason's Lilaepsis. Populations of Mason's lilaepsis would be affected by the construction and operation of the SDWMP. The construction of the Middle River set back levee would remove

several populations of Mason's lilaepsis. In addition, other populations in Middle River may be affected by construction related activities. Operation of the SDWMP would generate velocities greater than 3.0 fps in front of the proposed intakes that would cause the erosion of instream islands that support Mason's lilaepsis populations. The loss of these populations would be a significant adverse impact.

Rose-mallow. The implementation of the SDWMP would also result in the removal of rose-mallow populations. The construction of the Middle River setback levee is expected to remove approximately ten rose-mallow plants located at scattered locations along the Upper Jones Tract levee (MGA October 1994). The construction of the setback levees would require barges to transport material and equipment and perform various construction activities (i.e., levee removal, etc.). These traffic and barge related activities may affect the rose-mallow populations occurring at other locations along this portion of Middle River, including plants from the instream islands of Middle River. The potential loss of these populations would be considered a significant adverse impact. The operation of the proposed intake structures at Victoria Island may result in velocities greater than 3.0 fps, which may cause the loss of instream islands (from Middle River and Woodward Canal) which support rose-mallow. The potential loss of these populations would be considered a significant adverse impact.

Brittlescale. Brittlescale populations are known to occur in alkali habitats in the vicinity of Clifton Court Forebay. One population is known to occur the along Italian Slough at the northwestern corner of the forebay. The implementation of this alternative is expected to result in the inundation of suitable unsurveyed brittlescale habitat west of the forebay (Miriam Green pers. comm.). Until a DFG approved survey is conducted to determine the presence or absence of this species, the environmental analysis must consider this species

Delta Mudwort. This alternative may result in the loss of populations of Delta mudwort. The Delta mudwort is known from 21 occurrences (CNDDDB 1994) in California, most of which are from the Delta, where this species occurs in association with Mason's lilaepsis in marsh and riparian scrub habitat with tidal influences. Although the biology of the Delta mudwort is not well understood, most known populations occur in association with other species that tolerate tidal inundation. Within the south Delta, twelve populations occur in Middle River and one population is known from Old River (MGA 1993b). The construction of the Middle River setback levee may result in the loss of Delta mudwort populations occurring on the levee of Upper Jones Island and the potential loss of populations occurring on the adjacent instream islands due to construction activities. The direct loss of Delta mudwort populations and the potential loss of island populations is a significant adverse impact. The operation of the proposed alternative may result in flows with a velocity greater than 3.0 fps, which may cause erosion of instream islands and other substrates supporting populations of Delta mudwort. The potential loss of these populations is a significant adverse impact.

Suisun Marsh Aster. Unlike the ISDP Alternative, the implementation of this alternative could cause the loss of populations of Suisun Marsh aster. Populations of Suisun Marsh aster are known from several counties in California, the center of distribution is Suisun Marsh. Within the south Delta, five small populations are known from the Old River, Middle River, and Santa Fe Cut areas (MGA 1993b and CNDDDB 1994). Suisun Marsh aster is seriously threatened by the

loss and alteration of marsh habitat. The limited distribution and threats that concern local populations indicate that Suisun Marsh aster is a *rare* species as defined by CEQA.

Five populations of Suisun Marsh aster are known from the south Delta (MGA 1993b and CNDDDB 1994). The operation of this alternative is expected to change water levels in the vicinity of these populations. The increases in water levels may affect these species causing anaerobic soil conditions for durations that this species can not tolerate. Where project implementation results in these conditions and the loss of these plants occurs, the loss of these plants may be considered a significant adverse impact. The construction of the Middle River setback levee is expected to remove one population of Suisun Marsh aster. The loss of this population is a significant impact.

Swainson's Hawk. The implementation of this alternative is expected to affect local populations of Swainson's hawks by substantially decreasing foraging habitat in the area, the loss of a nest site on Byron Tract, and localized nesting disturbance during construction of other project components. These adverse impacts are considered to be significant.

Nesting Herons. Under this alternative, the proposed northern intake would not be constructed, and associated significant impacts on the nesting herons at Eucalyptus island would not occur. Expansion of the Clifton Court Forebay on Byron Tract would require construction in the vicinity of the Eucalyptus Island heron rookery with associated barge traffic. However, these activities are expected to occur approximately 1,250 feet away from the nesting birds, and therefore, no significant impact to nesting herons is expected to occur at this site. The construction of the Middle River setback levee may affect the rookery site located in the instream islands due to barges and boat traffic associated with the construction of this levee. This disturbance is considered a significant adverse impact.

California Black Rail. Unlike the ISDP, implementation of this alternative could affect populations of California black rail. Within the south Delta, populations of black rail are only known from the instream islands of Old and Middle rivers (MGA 1993a and CNDDDB 1994). The construction of the Middle River setback levee could cause a significant level of disturbance to black rails in this area. Operational effects on black rail habitat may occur, should the proposed intake at Woodward Canal create flows with velocities greater than 3.0 fps. Such conditions would cause these islands to erode, thereby, reducing the black rail habitat in the south Delta. The construction and operation of this alternative would cause significant adverse impacts to black rail.

Giant Garter Snake. Expansion of Clifton Court Forebay would inundate portions of Victoria Island with suitable giant garter snake habitat that may or may not support giant garter snakes. Until a DFG approved trapping program is completed and determines that the snakes do not occur in the project area, the presence of this species with regard to the proposed alternative must be considered. The removal of this habitat would be considered a significant adverse impact.

Valley Elderberry Longhorn Beetle. Unlike the ISDP, implementation of the SDWMP may affect the Valley elderberry longhorn beetle. Extensive surveys of the proposed forebay expansion area did not locate elderberry shrubs on Victoria Island and the northern portion of

Byron Tract. The areas south and west of the existing forebay have not been surveyed and potentially could support elderberries (Miriam Green pers. comm.). Until these areas have been surveyed, the absence of this species can not be assumed. The potential loss of elderberries and associated VELB in these areas is a significant adverse impact.

San Joaquin kit fox. The expansion of Clifton Court Forebay to the south of the existing forebay and northwest to Byron Tract would inundate cropland and grassland habitats on the edge of the known range of the San Joaquin kit fox. Extensive surveys of this area and other areas in the south Delta have not confirmed kit fox use of this area (active dens, tracks, or scat) (Baseline Environmental Consulting 1994). In general, kit fox sighting have been limited to habitats south and west of Byron Road. Given the wide ranging nature of the kit fox, it is conceivable that kit fox occur within the forebay expansion area on rare occasions. The potential loss of kit fox during construction activities would be considered a significant impact. Preconstruction surveys and adherence to DFG/USFWS construction protocols would avoid the potential loss of kit fox.

- *Service Area*

The following discussion focuses on potential impacts associated with changes in the delivery of water within the SWP Service Area, including the 17 counties of the State that receive water from the SWP.

Effects on Vegetation, Wildlife, and Special Status Species. Within the SWP Service Area, potentially significant effects on biological resources may occur where increases in water supply directly cause or contribute to urban/agricultural/industrial growth and the indirect loss of habitat and/or special status species. DWR has been generally concerned about secondary or indirect impacts on biological resources in the service area and has developed the Service Area Impact Study program to comply with NEPA, CEQA, as well as, state and federal Endangered Species Acts (CDWR May 1995). Independently of ISDP, DWR is implementing a four stage procedure to develop GIS information on the location of special status resources and potential growth areas within the SWP Service Area; determine potential impacts which may be attributed to increased SWP deliveries; and identify potential mitigation measures appropriate to site specific impacts.

10.5.2 Reduction Of CVP/SWP Exports And Management Or Reduction Of Demand For SWP Water

- *Introduction*

This is a non-structural alternative which would differ substantially from ISDP in not including the construction and operation of new facilities in the Delta, and not including the dredging of Old River. None of the environmental effects of ISDP would occur if this alternative were implemented.

- *Management Area*

The following discussion describes the significant impacts that may occur on vegetation, wildlife, and special status species within the Management Area, with particular attention to potential operational effects in the south Delta. Operational effects on biological resources in other components of the Management Area include the operational changes at SWP reservoirs, water changes on the Feather and Sacramento rivers, and Delta outflow that may affect the San Pablo-Suisun Bay area. These project related adverse effects were determined to be less-than-significant.

Operational Effects on Vegetation and Wildlife in the South Delta. With the implementation of this alternative preliminary modeling indicates that water levels within the south Delta would increase by 0.20 to 0.30 feet during the irrigation season. These increases are not expected to result in substantial changes in vegetation or habitat conditions within the south Delta. For these reasons, the implementation of this alternative is not expected to cause significant adverse impacts in the south Delta.

Mason's Lilaopsis. Water level changes due to the implementation of this reduced pumping program are expected to be as much as 0.30 feet. Unlike the ISDP Alternative, the natural tidal fluctuations would continue under this program. These water level changes may affect the lower portions of the Mason's lilaopsis colonies within the south Delta, but are not expected to remove an entire colony that is established over the range of the intertidal zone. These changes may have some incremental effects on south Delta populations of Mason's lilaopsis, but they should not result in the substantial loss of a population. These adverse impacts are considered cumulatively significant.

- *Service Area*

The following discussion focuses on potential impacts to vegetation, wildlife, and special status species associated with changes in the delivery of water within the SWP Service Area, including the 8 counties of the State that receive water from the SWP.

- *Vegetation And Wildlife*

The implementation of this alternative would include several measures to reduce the demand for water in the service areas. These measures are described in more detail in *Bulletin 160-93 The California Water Plan Update* (DWR 1994e). The implementation of these measures could result in significant adverse impacts to wildlife habitat.

Agricultural Water Conservation. Lining of agricultural channels and ditches could result in the loss of hydrophytic vegetation, which provides important wildlife habitat. Depending on regional conditions and the extent of lining ditches, this loss could be significant (DWR 1993c).

Depending on location, tail water from agricultural operations may support important wildlife habitat including large and small wetland and riparian habitats. Many of the managed wetlands

in the Central Valley depend on drain and tail water to support the permanent and seasonal wetland habitat for waterfowl migrating along the Pacific Flyway. In areas dominated by monotypic crop conditions, small patches of riparian habitat may provide limiting resources for wildlife on a seasonal basis including nesting, resting, thermal, and escape cover, movement corridors, and valuable foraging habitat. The loss or substantial alteration of these habitats could result in significant impacts to local, regional, and migratory wildlife populations (DWR 1993c).

Urban Water Conservation. Although urban wildlife habitats are often overlooked, these areas can be important refuges for many species. Storm-water detention basins, drainage facilities, ground water recharge basins, and sewage treatment plants all provide habitat for urban wildlife. Where urban water conservation projects result in the loss of habitats associated with these water sources, the loss of habitat could be considered a significant impact (DWR 1993c).

Land Retirement. Land retirement in the west side of the San Joaquin Valley could result in several beneficial effects for some species of wildlife. However, significant impacts could occur where land retirement leads to a long-term substantial loss of tail and drainage water for wetland and riparian habitat as discussed pervasively under agricultural water conservation.

Water Transfers. Where water transfers must be conveyed through the Delta, significant impacts could occur if the timing of transfers does not allow for the Delta outflow requirement as stated in D-1485 (DWR 1993c).

Water transfers (both short and long-term) could include the fallowing of cropland in one area and the transferring of water to another area. The fallowing of all cropland could reduce wildlife resources for some species, including escape cover, foraging, and/or nesting habitat. The local context and intensity of such a program could result in significant impacts to local and migratory wildlife.

In addition, where water transfers include the short-term fallowing of cropland used for grain production (including corn, wheat, rice, and barley), significant impacts could occur to local and migrating wildlife that depend on surplus grain made available by harvesting inefficiencies (DWR 1993c).

Reclamation. Vegetation and wildlife impacts associated with ground water reclamation are generally site specific, depending on location and facility design. General issues include facility placement in relation to sensitive biological resources and exposure to contaminants associated with the ground water reclamation process. These impacts could be significant, but generally could be avoided through environmentally sensitive facility siting and design.

San Diego County Water Authority Water Resources Plan. This plan includes infrastructure improvements for emergency water storage and conservation and supply development measures to meet the projected water demands for the County by the year 2010. These measures include the construction of new storage and conveyance facilities, improvements to existing facilities, water recycling, ground water development, brackish water desalination, and conservation through the implementation of BMPs. As with the urban water conservation and ground water reclamation subcomponents previously discussed, significant impacts to wildlife habitat could

occur as a result of the implementation of some subcomponents of this plan. Site specific impacts associated with other subcomponents are not discussed here as these types of impacts could only be identified through a project level review.

Santa Clara Valley Water Management Plan. This plan includes water conservation programs, water reclamation, permanent water transfers, and additional long-term storage to meet existing water demands during drought years. As with other subcomponents such as urban water conservation and water transfers, the implementation of this plan could cause a significant loss of wildlife habitat. Site specific impacts associated with other subcomponents are not discussed here as these types of impacts can only be identified through a project level review.

- *Special Status Species*

Special Status Plants within the Service Area. The implementation of this alternative could result in the alteration of wetland and riparian habitats that are supported by tail and drain water from agricultural operations in the west side of the San Joaquin Valley. Special status plants associated with these habitats include Mexican mosquito fern, bristly sedge, slough thistle, four-angled spike rush, Delta button-celery, Delta tule pea, slender-leaved pondweed, Sanford's arrowhead and Wright's trichocoronis (Skinner and Pavlik 1994). Where a substantial loss of tail water causes a loss of a special status plant population, these losses would be considered a significant adverse impact.

Special Status Wildlife within the Service Area. The implementation of this alternative could result in the alteration of wetland and riparian habitats that are supported by tail and drain water from agricultural operations in the west side of the San Joaquin Valley. Special status species which are dependent on these habitat types include the following: the western pond turtle, giant garter snake, white faced ibis, Aleutian Canada goose, Swainson's hawk, northern harrier, white-tailed kite, long billed curlew, purple martin, tricolored blackbird, yellow-breasted chat, and ringtail. Where a substantial loss of tail water causes a decline in a population of these species, these losses would be considered significant.

10.5.3 Modification Of CVP/SWP Exports, Consolidation Of Agricultural Diversions, Extension Of Existing Agricultural Diversions, And Increased Pumping At Harvey O. Banks Up To 10,300 cfs.

The implementation of this alternative would be expected to result in significant impacts on biological resources associated with the dredging of 4.9 miles of Old River and construction and operation of a new intake facility at Clifton Court Forebay. Under this alternative, construction and operation impacts associated with the ISDP flow and fish barriers would not occur. Instead, impacts on biological resources associated with the consolidation and extension of diversions and additional dredging of Paradise Cut, Middle River, and Old River could be expected. The following is a discussion of impacts expected to occur with the construction and operation of the consolidated and extended agricultural diversions.

Construction Related Effects on Vegetation and Wildlife within the Project Area. The construction of the 400 acres of regulating reservoirs 11.5 miles of water pipeline, and 1,080 acres of settling ponds would result in construction related disturbances greater than those described under the proposed action. These disturbances would be considered significant adverse impacts and would require the implementation of mitigation measures as described for the preferred alternative.

Dredging Related Effects on Vegetation and Wildlife within the Project Area. The implementation of this alternative would require selective dredging of approximately 36 miles of Middle River, Old River, and Paradise Cut. The dredging of these channels could result in significant impacts due to habitat disturbance and potential loss of habitat. These potential adverse impacts would be considered significant.

Habitat Loss within the Project Area. The construction of the 11.5 miles of water pipeline and the dredging of Paradise Cut, Middle and Old rivers may remove important waterside vegetation. The loss of this vegetation is considered a significant adverse impact. These impacts should be avoided by sighting structures away from waterside vegetation, and avoidance of waterside vegetation during dredging.

Disturbance to Raptor Nests within the Project Area. Extensive surveys of the south Delta located nest sites for red-tailed hawk, Swainson's hawk, white-tailed kite, and northern harrier on the levees surrounding these islands (MGA 1993a and b). The dredging of Old River, Middle River, and Paradise Cut and the construction of the consolidated diversions, reservoirs, and pipelines would be expected to remove and/or disturb some of these active nest sites. The loss of and/or disruption to active nests would be considered a significant adverse impact.

Rose-mallow and Delta Tule Pea. These plants are known in the south Delta from Middle River adjacent to consolidation sites 5 and 7. The construction of these facilities is not expected to remove these populations. Dredging of the channel may affect these populations. The loss of rose-mallow and Delta tule pea populations would be considered a significant adverse impact.

Swainson's Hawk. The implementation of this alternative includes the construction of consolidated diversions and dredging within the vicinity of approximately 18 Swainson's hawk nests. If these activities occur during the nesting season the loss or abandonment of an active nest site may occur. The loss or abandonment of an active nest site is considered a significant adverse impact.

Western Pond Turtle. Project-related impacts to western pond turtle may occur where construction activities cause the loss of turtles. The loss of turtles would be considered a significant adverse impact. Implementation of construction protocols as described under the preferred alternative would reduce the potential for impact to the level that is less than significant.

Valley Elderberry Longhorn Beetle (VELB). Surveys of consolidation sites and dredging areas have located areas where substantial stands of elderberries occur. The potential loss of suitable habitat for the VELB would be a significant adverse impact.

Localized Operational Effects within the Project Area. The implementation of this alternative could cause localized scouring at the consolidated and extended diversions along Middle River, Old River and Paradise Cut. Depending on facility location, project related scouring could result in the localized loss of instream islands and waterside vegetation. The potential loss of these habitats would be considered a significant adverse impact. The potential impacts could be avoided by operation of pumps at channel velocities less than 3.0 feet per second.

In order to evaluate the feasibility of this alternative, the DWR conducted preliminary modeling to determine the effects of reduced pumping on water levels in the south Delta. The results of this modeling indicated that water levels would rise by as much as 0.35 feet during the irrigation season. Unlike the ISDP alternative, tidal fluctuations would continue under this program. Because of the dynamic nature of the Delta and the flora that it supports, this increase in water levels is not expected to cause substantial losses of streamside vegetation. For these reasons, the operation of this consolidated pump stations would not be expected to result in significant adverse impacts to vegetation and wildlife habitat due to substantial changes in water levels.

Operational Effects on Mason's *Lilaeopsis*. Water level changes up to 0.35 feet are expected due to the implementation of this reduced pumping program. Unlike the ISDP alternative, the natural tidal fluctuations will continue under this program. These water level changes may affect the lower portions of the Mason's *lilaeopsis* colonies within the south Delta, but are not expected to remove an entire population. These adverse impacts would be considered cumulatively significant.

10.5.4 ISDP With An Additional Clifton Court Forebay Intake At Italian Slough

- *Introduction*

This alternative would include all of the facilities and environmental effects associated with ISDP, plus the effects of the construction and operation of a second intake facility at Italian Slough, which is discussed in the following.

- *Vegetation And Wildlife*

Construction Related Effects on Vegetation and Wildlife within the Project Area. The construction of an intake facility on Italian Slough and associated rock fill storage area would be expected to result in indirect impacts to adjacent wildlife habitats due to traffic, grading, noise, and human intrusion. These activities could also result in indirect impacts to adjacent aquatic environments due to erosion and sedimentation. These adverse impacts would be potentially significant, but could be minimized by the measures described for ISDP.

Loss of Plant and Wildlife Habitat within the Project Area. The construction of this alternative would result in the loss of habitat at the proposed intake site at Italian Slough and the loss of habitat at the riprap storage area. The construction of the proposed intake structure at Italian Slough would remove less than four acres of ruderal habitat. This habitat is highly disturbed, almost exclusively composed of riprap and non-native plants, and provides limited value for

wildlife. The loss of four acres of ruderal habitat would be a less-than-significant adverse impact.

The operation of the proposed structure would require a two acre site for the storage of rock fill. The proposed site is gently sloping and currently supports a mosaic of Valley sink scrub and non-native annual grassland. Construction and operation of this storage area would result in the loss of this habitat and the potential degradation of down slope habitats through erosion and sedimentation. While the onsite habitats currently show some signs of disturbance, Valley sink scrub is a habitat of limited distribution in California. This remaining patch is one of the few remaining examples of this habitat type in the area. Therefore, the onsite loss of two acres of Valley sink scrub habitat and associated potential off-site degradation would constitute a significant adverse impact. Mitigation measures are presented for ISDP that would reduce this impact to less-than-significant level.

Operational Effects on Vegetation and Wildlife in the Project Area. Impacts would be expected to occur in Italian Slough. The increase in water flows past unarmored islands (including, Eucalyptus, Widdow's, and other unnamed islands) in the slough would be expected to accelerate the rate of erosion of these islands. These instream islands are important remnants of the original Delta habitats, and provide valuable wildlife cover. The loss of these islands would be considered a significant adverse impact.

- *Special Status Species*

Mason's Lilaeopsis. The operation of an intake facility at Italian Slough is expected to increase flows passing Widdow's, Eucalyptus, and other unnamed islands upstream from the proposed intake site. These islands support several populations of Mason's lilaeopsis. Where these flows create velocities greater than 3.0 fps, erosion of these islands and populations of Mason's lilaeopsis may occur. The loss of these populations would be a significant adverse impact.

Rose-mallow. Should the operation of the Italian Slough intake structure create velocities greater than 3.0 fps in Italian Slough, then these flows may cause the loss of rose-mallow populations on Widdow's, Eucalyptus, and other unarmored islands located downstream from the proposed intake. The potential loss of these populations would be a significant adverse impact.

Brittlescale. One population of brittlescale occurs adjacent to the proposed site for the Italian Slough intake. This population may be affected by construction activities, including equipment traffic and parking, materials storage, and other activities that may result in the inadvertent disturbance to brittlescale and brittlescale habitat. Where these activities may cause the loss of the population, the potential loss of this population is considered a significant adverse impact.

Nesting Herons. The operation of the intake facility may cause an increase in the rate of erosion when increased flows generate velocities greater than 3.0 fps. Long-term increases in erosion may cause a collapse of the island and a loss of the rookery site. The potential loss of the rookery site would be a significant impact.

10.5.5 ISDP Without The Northern Intake, And With An Expanded Existing Intake

- *Introduction*

This alternative would differ from ISDP in not including the construction of a new intake at the northern extent of Clifton Court Forebay. Instead, the existing Clifton Court Forebay intake would be expanded and West Canal would be widened. The effects of expanding the existing intake and widening West Canal are discussed in the following.

- *Vegetation and Wildlife*

Construction Related Effects on Vegetation and Wildlife within the Project Area. Construction associated with this alternative would be expected to disturb the ruderal habitats adjacent to the existing intake site. Expected disturbances would include noise associated with the operation of heavy equipment, increased truck and barge traffic, and human intrusions. These activities could also result in indirect impacts to the adjacent aquatic environments due to erosion and sedimentation. Additional impacts to plant and wildlife habitat could occur from the exposure of construction related solvents, fuels and other toxic materials including diesel fuels, oil, gasoline, and raw concrete. The construction of this facility would result in significant impacts to adjacent plant and wildlife habitat. While specific design parameters for widening of West Canal have not been determined, the adverse effects of construction would be similar and considered significant.

Loss of Plant and Wildlife Habitat within the Project Area. The construction of this alternative would be expected to cause additional impacts associated with the expansion of the existing intake and West Canal. The expansion of the existing intake site would be expected to result in the loss of less than 5.0 acres of ruderal habitat with marginal value for wildlife. Native plants are not generally associated with these habitat types, and wildlife diversity is low. The loss of ruderal habitat at this site would be a less-than-significant adverse impact.

The expansion of West Canal would remove several acres of cropland habitat. This would be considered a less-than-significant adverse impact. The relocation of this canal would also remove several patches of willow scrub habitat. These habitats are subject to Section 404 of the Clean Water Act and Section 1600 of the California Fish and Game Code. Because the removal of this habitat conflicts with these regulations, implementation of this alternative would result in significant adverse impacts on willow scrub habitat.

Operational Effects in the Project Area. The reconfiguration of the levees on Coney Island combined with the effects of the operation of the expanded intake would be expected to generate increased water velocities around the instream islands at the junction of Old River and West Canal. These increases in velocity could reach 3.0 fps and cause the loss of these islands. The potential loss of these islands would be considered a significant adverse impact.

10.5.6 *No Action (Maintain Existing Conditions)*

- *Project, Management, Service Areas*

Effects on Vegetation, Wildlife, and Special Status Species. This alternative would maintain the existing biological resources in the Project, Management, and Service Areas of the SWP. Consequently, this alternative would not affect vegetation, wildlife, and special status species. Thus, no significant adverse impacts would be expected.

10.5.7 *No Action (Maintain Conditions As They Would Exist In The Future)*

- *Project, Management, Service Areas*

Effects on Vegetation, Wildlife, and Special Status Species. This alternative would maintain the existing biological resources in the Project, Management, and Service Areas of the SWP. Consequently, this alternative would not effect vegetation, wildlife, and special status species. Thus, no significant adverse impacts would be expected.