FOOTNOTE 17 FOR TABLE 3

San Joaquin Valley
Water Year Hydrologic Classification

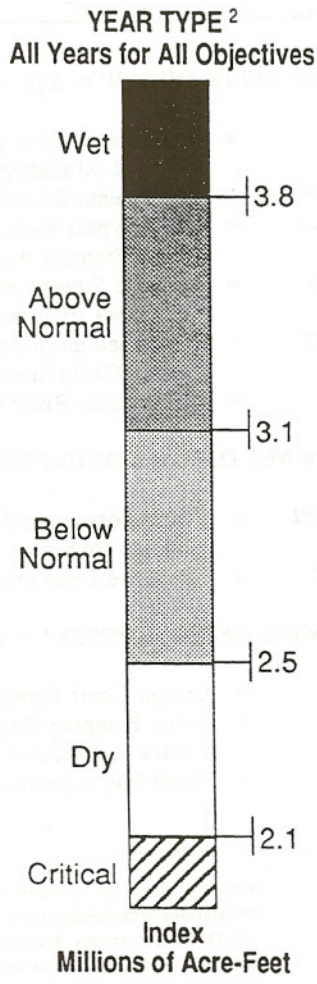
Year classification shall be determined by computation of the following equation:

INDEX = 0.6 * X + 0.2 * Y + 0.2 * Z

Where:
- X = Current year's April – July San Joaquin Valley unimpaired runoff
- Y = Current October – March San Joaquin Valley unimpaired runoff
- Z = Previous year's index [1]

The San Joaquin Valley unimpaired runoff for the current water year (October 1 of the preceding calendar year through September 30 of the current calendar year), as published in California Department of Water Resources Bulletin 120, is a forecast of the sum of the following locations: Stanislaus River, total flow to New Melones Reservoir; Tuolumne River, total inflow to Don Pedro Reservoir; Merced River, total flow to Exchequer Reservoir; San Joaquin River, total inflow to Millerton Lake. Preliminary determinations of year classification shall be made in February, March, and April with final determination in May. These preliminary determinations shall be based on hydrologic conditions to date plus forecasts of future runoff assuming normal precipitation for the remainder of the water year.

Classification	Index Millions of Acre-Feet (MAF)
Wet	Equal to or greater than 3.8
Above Normal	Greater than 3.1 and less than 3.8
Below Normal	Equal to or less than 3.1 and greater than 2.5
Dry	Equal to or less than 2.5 and greater than 2.1
Critical	Equal to or less than 2.1



[1] A cap of 4.5 MAF is placed on the previous year's index (Z) to account for required flood control reservoir releases during wet years.

[2] The year type for the preceding water year will remain in effect until the initial forecast of unimpaired runoff for the current water year is available.

FOOTNOTES 11 AND 23 FOR TABLE 3

NDOI and PERCENT INFLOW DIVERTED [1]

The NDOI and the percent inflow diverted, as described in this footnote, shall be computed daily by the DWR and the USBR using the following formulas (all flows are in cfs):

NDOI = DELTA INFLOW - NET DELTA CONSUMPTIVE USE - DELTA EXPORTS

PERCENT INFLOW DIVERTED = (CCF + TPP) ÷ DELTA INFLOW

where *DELTA INFLOW = SAC + SRTP + YOLO + EAST + MISC + SJR*

SAC = Sacramento River at Freeport mean daily flow for the previous day; the 25-hour tidal cycle measurements from 12:00 midnight to 1:00 a.m. may be used instead.

SRTP = Sacramento Regional Treatment Plant average daily discharge for the previous week.

YOLO = Yolo Bypass mean daily flow for the previous day, which is equal to the flows from the Sacramento Weir, Fremont Weir, Cache Creek at Rumsey, and the South Fork of Putah Creek.

EAST = Eastside Streams mean daily flow for the previous day from the Mokelumne River at Woodbridge, Cosumnes River at Michigan Bar, and Calaveras River at Bellota.

MISC = Combined mean daily flow for the previous day of Bear Creek, Dry Creek, Stockton Diverting Canal, French Camp Slough, Marsh Creek, and Morrison Creek.

SJR = San Joaquin River flow at Vernalis, mean daily flow for the previous day.

where *NET DELTA CONSUMPTIVE USE = GDEPL - PREC*

GDEPL = Delta gross channel depletion for the previous day based on water year type using the DWR's latest Delta land use study.[2]

PREC = Real-time Delta precipitation runoff for the previous day estimated from stations within the Delta.

and where *DELTA EXPORTS* [3] *= CCF + TPP + CCC + NBA*

CCF = Clifton Court Forebay inflow for the current day.[4]

TPP = Tracy Pumping Plant pumping for the current day.

CCC = Contra Costa Canal pumping for the current day.

NBA = North Bay Aqueduct pumping for the current day.

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1 Not all of the Delta tributary streams are gaged and telemetered. When appropriate, other methods of estimating stream flows, such as correlations with precipitation or runoff from nearby streams, may be used instead.

2 The DWR is currently developing new channel depletion estimates. If these new estimates are not available, DAYFLOW channel depletion estimates shall be used.

3 The term "Delta Exports" is used only to calculate the NDOI. It is not intended to distinguish among the listed diversions with respect to eligibility for protection under the area of origin provisions of the California Water Code.

4 Actual Byron-Bethany Irrigation District withdrawals from Clifton Court Forebay shall be subtracted from Clifton Court Forebay inflow. (Byron-Bethany Irrigation District water use is incorporated into the GDEPL term.)

FOOTNOTE 14 FOR TABLE 3

TABLE A
Number of Days When Maximum Daily Average Electrical Conductivity of 2.64 mmhos/cm Must Be Maintained at Specified Location [a]

PMI [b] (TAF)	Chipps Island (Chipps Island Station D10)					PMI [b] (TAF)	Port Chicago (Port Chicago Station C14) [d]					PMI [b] (TAF)	Port Chicago (Port Chicago Station C14) [d]				
	FEB	MAR	APR	MAY	JUN		FEB	MAR	APR	MAY	JUN		FEB	MAR	APR	MAY	JUN
≤ 500	0	0	0	0	0	0	0	0	0	0	0	5250	27	29	25	26	6
750	0	0	0	0	0	250	1	0	0	0	0	5500	27	29	26	28	9
1000	28 [c]	12	2	0	0	500	4	1	0	0	0	5750	27	29	27	28	13
1250	28	31	6	0	0	750	8	2	0	0	0	6000	27	29	27	29	16
1500	28	31	13	0	0	1000	12	4	0	0	0	6250	27	30	27	29	19
1750	28	31	20	0	0	1250	15	6	1	0	0	6500	27	30	28	30	22
2000	28	31	25	1	0	1500	18	9	1	0	0	6750	27	30	28	30	24
2250	28	31	27	3	0	1750	20	12	2	0	0	7000	27	30	28	30	26
2500	28	31	29	11	1	2000	21	15	4	0	0	7250	27	30	28	30	27
2750	28	31	29	20	2	2250	22	17	5	1	0	7500	27	30	29	30	28
3000	28	31	30	27	4	2500	23	19	8	1	0	7750	27	30	29	31	28
3250	28	31	30	29	8	2750	24	21	10	2	0	8000	27	30	29	31	29
3500	28	31	30	30	13	3000	25	23	12	4	0	8250	28	30	29	31	29
3750	28	31	30	31	18	3250	25	24	14	6	0	8500	28	30	29	31	29
4000	28	31	30	31	23	3500	25	25	16	9	0	8750	28	30	29	31	30
4250	28	31	30	31	25	3750	26	26	18	12	0	9000	28	30	29	31	30
4500	28	31	30	31	27	4000	26	27	20	15	0	9250	28	30	29	31	30
4750	28	31	30	31	28	4250	26	27	21	18	1	9500	28	31	29	31	30
5000	28	31	30	31	29	4500	26	28	23	21	2	9750	28	31	29	31	30
5250	28	31	30	31	29	4750	27	28	24	23	3	10000	28	31	30	31	30
≥ 5500	28	31	30	31	30	5000	27	28	25	25	4	>10000	28	31	30	31	30

[a] The requirement for number of days the maximum daily average electrical conductivity (EC) of 2.64 mmhos per centimeter (mmhos/cm) must be maintained at Chipps Island and Port Chicago can also be met with maximum 14-day running average EC of 2.64 mmhos/cm, or 3-day running average NDOIs of 11,400 cfs and 29,200 cfs, respectively. If salinity/flow objectives are met for a greater number of days than the requirements for any month, the excess days shall be applied to meeting the requirements for the following month. The number of days for values of the PMI between those specified in this table shall be determined by linear interpolation.

[b] PMI is the best available estimate of the previous month's Eight River Index. (Refer to Footnote 13 for Table 3 for a description of the Eight River Index.)

[c] When the PMI is between 800 TAF and 1000 TAF, the number of days the maximum daily average EC of 2.64 mmhos/cm (or maximum 14-day running average EC of 2.64 mmhos/cm, or 3-day running average NDOI of 11,400 cfs) must be maintained at Chipps Island in February is determined by linear interpolation between 0 and 28 days.

[d] This standard applies only in months when the average EC at Port Chicago during the 14 days immediately prior to the first day of the month is less than or equal to 2.64 mmhos/cm.

Appendix J

Biological Species of Concern

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APPENDIX J

Biological Species of Concern

J.1 INTRODUCTION

The federal Endangered Species Act requires federal agencies, in consultation with the Secretaries of the Interior and Commerce, to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of the critical habitat of the species (50 CFR Part 402). For the purposes of this document, consultation procedures under section 7 of the Endangered Species Act may be consolidated with interagency cooperation procedures required by other statutes, such as the National Environmental Policy Act (NEPA) (50 CFR 402.6). Likewise, the California Endangered Species Act requires that each state lead agency consult with the California Department of Fish and Game to ensure that any action authorized, funded, or carried out by that state lead agency is not likely to jeopardize the continued existence of any endangered or threatened species (Fish and Game Code Section 2090).

This appendix presents information about a wide variety of special status species (i.e., listed, proposed or candidate threatened and endangered) and more common but important species of birds, fish, mammals, plants and reptiles. This information was obtained through informal consultation between federal and state resource agencies.

This appendix identifies the possible species of concern within the LTMS Planning Area. Section J.2 presents a list of listed, proposed, and candidate endangered and threatened species that may occur in the LTMS Planning Area or be affected by dredging or dredged material disposal. Section J.3 is the outcome of informal consultations among state and federal resource agencies to define potential effects of dredging and disposal activities on certain special status species and develop possible management strategies to avoid adverse impacts. If these tables are adopted through a formal programmatic consultation, any projects that meet the specified requirements would not be required to enter into project-specific formal consultation. Section J.4 discusses threatened and endangered and other special status species that could be impacted by upland/wetland reuse (UWR) projects. Any potential impacts associated with UWR projects would depend on the number and exact locations of such sites, which are not defined in this EIS/EIR. The effects on endangered species from the development of specific UWR sites are appropriately addressed in site-specific environmental reviews. However, some non-aquatic species that could be impacted by UWR projects are discussed in section J.4.

J.2 LISTING OF SPECIES (USFWS LETTER)

The U.S. Fish & Wildlife Service (USFWS) and California Department of Fish and Game (CDFG) were asked to provide a list of special status species that could potentially occur in the LTMS Planning Area or that might be affected by dredging and disposal activities. A special status species is defined as any species that is listed, is a candidate for listing, or has been recommended by a federal agency for listing as threatened or endangered under the Endangered Species Act.

The resource agencies provided a list of special status species that have been found in the 12 counties surrounding the San Francisco Bay Estuary (see Table J-1). As discussed in Chapter 4, the Planning Area includes those areas where dredged material is likely to be used in upland areas, as well as San Francisco Bay west of Sherman Island and a corridor that stretches from the Golden Gate to the San Francisco Deep Ocean Disposal Site. While the Planning Area spans all of the 12 counties, there are many locations within each county where use of dredged material is not expected.

The LTMS agencies reviewed the list provided by USFWS to narrow the list of species to those that should be considered during site-specific environmental reviews of dredging-related facilities. This review was conducted using the CDFG's California Natural Diversity Database (CNDDB) and other reference material on the habitat and life history of species on the list. In many cases, species on the original list were found to be outside of the area where

Table J-1. Species of Concern
(page 1 of 8)

Common Name	*Scientific Name*	*Status*	*Comments*
Mammals			
Alameda Island mole	*Scapanus latimanus parvus*	FSC, SSC	No occurrences in CNDDB. *S. latimanus* habitat is soft soil in valleys and mountain meadows in several biotic communities from the Lower Sonoran to the Hudsonian life zones.
*Berkeley kangaroo rat	*Dipodomys heermanni berkeleyensis*	FSC	Habitat is >50'. Found in Briones Valley and east Oakland. (PE-LS1992).
*Fringed myotis bat	*Myotis thysanodes*	FSC	Upper Sonoran life zones in open woods. Range is all along Pacific coast.
*Greater western (California) mastiff bat	*Eumops perotis californicus*	FSC	Alameda (Tracy - cliffs), San Benito, and Mariposa counties south in arid/semiarid lowlands.
*Long-eared myotis bat	*Myotis evotis*	FSC	Mostly in woods in Upper Sonoran, Transition, and Canadian life zones. Pacific coast range and Sierra Nevada.
*Long-legged (hairy-winged) myotis bat	*Myotis volans*	FSC	Open forest in upper Sonoran and Transition life zones.
*Pacific western big-eared bat	*Plecotus townsendii townsendii*	FSC, SSC	Oak woodland, pasture, grassy hillsides. Petaluma River, Marin. (PE-LS1992)
*Point Reyes jumping mouse	*Zapus trinotatus orarius*	FSC, SSC	No occurrences in CNDDB. *Zapus trinotatus* found chiefly in meadows in the forests of redwood, fir, spruce, and hemlock. Range extends south from Washington to north of San Francisco Bay.
*Point Reyes mountain beaver	*Aplondontia rufa phaea*	FSC, SSC	Riparian stream habitat with dense vegetation - Drakes Bay & Double Point (Marin).
Riparian brush rabbit	*Sylvilagus bachmani riparius*	FPE, SSC	Habitat is valley floor riparian and floodplain - only in San Joaquin and Stanislaus counties (Ripon Quad).
Salt marsh harvest mouse	*Reithrodontomys raviventris*	FE, SE	Tidal salicornia (salt and brackish marsh) habitat; 129 occurrences.
Salt marsh vagrant shrew	*Sorex vagrans halicoetes*	FSC, SSC	Tidal salt marsh (Redwood Point, Mountain View, San Quentin, Richmond).
*San Francisco dusky-footed woodrat	*Neotoma fuscipes annectens*	FSC, SSC	No occurrences in CNDDB. *N. fuscipes* range does not include San Francisco Bay area or Central Valley, according to Ingles.
*San Joaquin pocket mouse	*Perognathus inoratus*	FSC	Grassy or weedy fine-textured soil in the Lower and Upper Sonoran life zones of the San Joaquin and Salinas valleys.
San Joaquin kit fox	*Vulpes macrotis mutica*	FE, SE	Grazed grassland, agricultural land, valley/coastal mountain interface zone. Primarily northwest San Joaquin valley.
San Joaquin Valley (riparian) woodrat	*Neotoma fuscipes riparia*	FPE, SSC	Valley floor, riparian floodplain in San Joaquin (Corral Hollow Creek).
*Small-footed myotis bat	*Myotis ciliolabrum* (formerly *M. subulatus*)	FSC	Arid uplands.
Suisun ornate shrew	*Sorex ornatus sinuosus*	FSC, SSC	Grizzly Island, Mare Island, Napa, Benicia (PE-LS1987). *S. ornatus* habitat is streams and brush-covered hillsides.
*Yuma myotis bat	*Myotis yumanensis*	FSC	Chiefly open woods, suboreal zones throughout state.

Table J-1. Species of Concern

(page 2 of 8)

Common Name	Scientific Name	Status	Comments
Birds			
Alameda (South Bay) song sparrow	*Melospiza melodia pusilla*	FSC	Salt marsh habitat.
Aleutian Canada goose	*Branta canadensis leucopareia*	FT	Wetlands, grasslands, cultivated fields.
American peregrine falcon	*Falco peregrinus anatum*	FE, SE	High cliffs, banks, dunes, near water (Oakland airport).
Bald eagle	*Haliaeetus leucocephalus*	FT, SE	Coast, rivers, large lakes in open areas.
*Bell's sage sparrow	*Amphispiza belli belli*	FSC, SSC	Coast of California.
Black rail	*Laterallus jamaicensis*	FSC, ST	Salt, brackish, and freshwater marsh habitat. Pickleweed habitat.
California clapper rail	*Rallus longirostris obsoletus*	FE, SE	Salt and brackish marshes; fresh water marshes in southwest.
California least tern	*Sterna antillarum* (= *ablifrons*) *browni*	FE, SE	Salt marshes and salt ponds, open flat beaches, river and lake margins, near shallow water.
California brown pelican	*Pelecanus occidentalis californicus*	FE, SE	Open coastal habitat.
*Ferruginous hawk	*Buteo regalis*	FSC, SSC	Open country, usually prairies, plains, badlands.
*Harlequin duck	*Histrionicus histrionicus*	FSC, SSC	Coastal islets, winters along North American coasts.
*Little willow flycatcher	*Empidonas traillii brewsteri*	FSC, SE	
*Marbled murrelet	*Brachyramphus marmoratus*	FT, SE	Conifer forests near coast, inland lakes, coastal waters, nests inland; feeds on crustaceans and fish.
*Mountain plover	*Charadrius montanus*	FSC, SSC	
*Northern spotted owl	*Strix occidentalis caurina*	FT	Old growth forest above 200 feet.
Salt marsh common yellowthroat	*Geothylpis trichas sinuosa*	FSC, SSC	Fresh, salt, and brackish water marshes.
San Pablo (Suisun) song sparrow	*Melospiza melodia samuelis*	FSC, SSC	Marsh habitat.
Swainson's hawk	*Buteo swainsoni*	FSC, ST	Migratory, wintering in Delta, rarely nesting.
Tricolored blackbird	*Agelaius tricolor*	FSC, SSC	Fresh water marshes, croplands, nest near/over water.
Western burrowing owl	*Athene cunicularia hypugea*	FSC, SSC	
Western snowy plover	*Charadrius alexandrinus nivosus*	FT, SSC	Sandy beaches on marine and estuarine shores.
White-faced ibis	*Plegadis chihi*	FSC, SSC	Marshes, swamps, ponds, rivers, mostly freshwater habitat.
Reptiles			
*Alameda whipsnake (striped racer)	*Masticophis lateralis euryxanthus*	FPE, ST	Oak woodlands, canyons, hillsides above 500 feet. East Oakland and Contra Costa County areas (Mt. Diablo/Las Trampas).
California horned lizard	*Phrynosoma coronatum frontale*	FSC, SSC	Grazed grassland in San Joaquin/Tracy area; 3 of 5 occurrences in San Joaquin delta area.
San Francisco garter snake	*Thamnophis sirtalis tetrataenia*	FE, SE	Mostly freshwater pond/reservoir habitat, treefrog diet, in hills of San Mateo County (CNDDB). Also at low elevation near San Francisco Airport.
*San Joaquin whipsnake	*Masticophis flagellum ruddocki*	FSC, SSC	Zero occurrences in CNDDB.
Giant garter snake	*Thamnophis gigas*	FT, ST	Ten of 94 occurrences in Delta area - Jersey and Liberty islands; occurs Fresno to Sacramento.
Green turtle	*Chelonia mydas*	FT	Rare visitor to Central California waters.
Leatherback turtle	*Dermochelys coriacea*	FE	Rare visitor to Central California waters.
Loggerhead turtle	*Caretta caretta*	FT	Rare visitor to Central California waters.
Northwestern pond turtle	*Clemmys marmorata marmorata*	FSC, SSC	Riparian creek-sides, floodplains, estuarine environments.

Table J-1. Species of Concern
(page 3 of 8)

Common Name	*Scientific Name*	*Status*	*Comments*
Reptiles (continued)			
Olive (Pacific) Ridley sea turtle	*Lepidochelys olivacea*	FT	Rare visitor to Central California waters.
*Silvery legless lizard	*Anniella pulchra pulchra*	FSC, SSC	Zero occurrences in CNDDB.
*Southwestern pond turtle	*Clemmys marmorata pallida*	FSC, SSC	Oak woodland, riparian habitat all outside area (Southern California).
Amphibians			
California red-legged frog	*Rana aurora draytoni*	FT, SSC	Grazed grasslands, ponds.
California tiger salamander	*Ambystoma californiense*	FC, SSC	Stock ponds in annual grasslands of valley-foothill hardwood habitats. Sonoma, Petaluma River area.
*Foothill yellow-legged frog	*Rana boylii*	FSC, SSC	Mostly in foothills (Austin Creek, Russian River, Rohnert Park - Sonoma; and Saint Helena - Napa County).
*Northern red-legged frog	*Rana aurora aurora*	FSC, SSC	Bog habitat in redwood forest; all 19 occurrences in Humboldt area.
*Western spadefoot toad	*Sacphiopus hammondi*	FSC, SSC	Pond habitat.
Fish			
Coho salmon	*Oncorhynchus kisutch*	FT	Historically known from San Pablo Bay tributaries.
Delta smelt	*Hypomesus transpacificus*	FT, ST	
Green sturgeon	*Acipenser medirostris*	FSC, SSC	
Kern Brook lamprey	*Lampetra hubbsi*	FSC, SSC	
Longfin smelt	*Spirinchus thaleichthys*	FSC, SSC	
Pacific lamprey	*Lampetra tridentata*	FSC	
River lamprey	*Lampetra ayresi*	FSC, SSC	
Sacramento splittail	*Pogonichthys macrolepidotus*	FPT, SSC	
Steelhead trout (coastal central California)	*Oncorhynchus mykiss*	FT	Includes all SF Bay steelhead except Central Valley (Sacramento, San Joaquin rivers) stocks.
Steelhead trout (Central Valley)	*Oncorhynchus mykiss*	FPE	Includes steelhead of Sacramento, San Joaquin rivers, still under review by NMFS.
Tidewater goby	*Eucyclogobius newberryi*	FE, SSC	
Spring-run chinook salmon	*Oncorhynchus tshawytscha*	FPE	
Fall/late fall-run chinook salmon	*Oncorhynchus tshawytscha*	FPT	
Winter-run chinook salmon	*Oncorhynchus tshawytscha*	FE, SSC	
Invertebrates			
*Antioch cophuran robberfly	*Cophura hurdi*	FSC	One specimen known - Antioch dunes (LS-1939).
*Antioch Dunes anthicid beetle	*Anthicus antiochensis*	FSC	Antioch dunes preserve area. PE (LS-1953). No appropriate sites for rehandling or disposal facilities.
*Antioch efferian robberfly	*Efferia antiochi*	FSC	One specimen known - Antioch dunes (LS-1959).
*Antioch mutillid wasp	*Myrmosula pacifica*	FSC	One specimen known - Antioch dunes (LS-1952).
*Antioch sphecid wasp	*Philanthus nasalis*	FSC	Antioch dunes, Sacramento/San Joaquin Delta area. No appropriate sites for rehandling or disposal facilities.
*Bay checkerspot butterfly	*Euphydryas editha bayensis*	FT	Found on native grasslands, outcrops of serpentine soil - hillsides of San Mateo county and inland, east of Mount Diablo.

Table J-1. Species of Concern
(page 4 of 8)

Common Name	Scientific Name	Status	Comments
Invertebrates (continued)			
*Bridges' coast range shoulderband snail	*Helminthoglpta nickliniana bridgesi*	FSC	Open hillsides with tall grass/weeds in Contra Costa and Alameda counties. Found at Marsh Creek Canyon near Mount Diablo
*Bumblebee scarab beetle	*Lichnanthe ursina*	FSC	Habitat is sand dunes along outer coast.
California freshwater shrimp	*Syncaris pacifica*	FE, SE	Fourteen occurrences - all in Napa, Sonoma, Marin counties.
*Callippe silverspot butterfly	*Speyeria callippe callippe*	FPE	Hillsides on San Bruno Mountain, >200 feet.
Ciervo aegialian scarab beetle	*Aegialia concinna*	FC1	Sandy substrates (one occurrence).
Conservancy fairy shrimp	*Branchinecta conservatio*	FE	Zero occurrences in CNDDB.
Curved-foot hygrotus diving beetle	*Hygrotus curvipes*	FSC	One occurrence in aquatic, shallow muddy pool at Oakley (east of Antioch).
Delta green ground beetle	*Elaphrus viridus*	FT	Grassland and vernal pool habitat. Two occurrences in Solano County (Dozier and Elmira Quads).
*Globose dune beetle	*Coelus globsus*	FSC	Eight occurrences all in Southern California.
*Hurd's metapogon robberfly	*Metapogon hurdi*	FSC	Zero occurrences in CNDDB.
Lange's metalmark butterfly	*Apodemia mormo langei*	FE	Antioch sand dunes.
*Leech's skyline diving beetle	*Hydroporous leechi*	FSC	Zero occurrences in CNDDB.
*Longhorn fairy shrimp	*Branchinecta longiantenna*	FE	Freshwater pond habitat. Two of seven occurrences in Alameda & Contra Costa counties. Wind energy development threatens.
Marin elfin butterfly	*Incisalia mossii*	FSC	Not found in CNDDB.
Middlekauf's shieldback katydid	*Idiostatus middlekauf*	FSC	One occurrence in Antioch dunes.
*Mission blue butterfly	*Icaricia icariodes missionensis*	FE	Occur on slopes and hillsides in San Mateo and San Francisco counties.
*Molestan blister beetle	*Lytta molesta*	FSC	Two occurrences – one southwest of Modesto (Westley), other Sequoia National Park.
*Molestan blister beetle	*Lytta molesta*	FSC	Seasonally found in Central Valley from Contra Costa to Kern counties; one of 11 occurrences in Brentwood.
Myrtle's silverspot butterfly	*Speyeria zerene myrtleae*	FE	Zero occurrences in CNDDB.
Opler's longhorn moth	*Adella oplerella*	FSC	Zero occurrences in CNDDB.
Ricksecker's water scavenger beetle	*Hydrochara ricksecke*	FSC	One of 4 occurrences in Jepson Prairie Preserve (not much known).
Sacramento anthicid beetle	*Anthicus sacramento*	FSC	Found in sand among dredge spoil.
*San Bruno elfin butterfly	*Incisalia mossii bayensis*	FE	Found on hillsides and ridgetops; San Mateo County: San Bruno Mountains, Whiting ridge.
San Francisco lacewing	*Nothochrysa californica*	FSC	Zero occurrences in CNDDB.
San Joaquin dune beetle	*Coelus gracilis*	FSC	One of 5 occurrences in Antioch Dunes (1974) - rest in Fresno and Kings canyon.
Sonoma arctic skipper	*Carterocephalus palaemon* ssp.	FSC	Zero occurrences in CNDDB.
*Valley elderberry longhorn beetle	*Desmocerus californicus dimorphus*	FT	Riparian habitat, mostly higher elevations. Of 124 occurrences, several in Yolo and San Joaquin counties.
*Vernal pool fairy shrimp	*Branchinecta lynchi*	FT	Vernal pool habitat - upland. Twelve occurrences - Madera to Sacramento counties.
Vernal pool tadpole shrimp	*Lepidurus packardi*	FE	One of 4 occurrences at Kesterson, confluence of Salt Slough and San Joaquin River.

Common Name	Scientific Name	Status	Comments
Invertebrates (continued)			
*Bridges' coast range shoulderband snail	*Helminthoglpta nickliniana bridgesi*	FSC	Open hillsides with tall grass/weeds in Contra Costa and Alameda counties. Found at Marsh Creek Canyon near Mount Diablo
*Bumblebee scarab beetle	*Lichnanthe ursina*	FSC	Habitat is sand dunes along outer coast.
California freshwater shrimp	*Syncaris pacifica*	FE, SE	Fourteen occurrences - all in Napa, Sonoma, Marin counties.
*Callippe silverspot butterfly	*Speyeria callippe callippe*	FPE	Hillsides on San Bruno Mountain, >200 feet.
Ciervo aegialian scarab beetle	*Aegialia concinna*	FC1	Sandy substrates (one occurrence).
Conservancy fairy shrimp	*Branchinecta conservatio*	FE	Zero occurrences in CNDDB.
Curved-foot hygrotus diving beetle	*Hygrotus curvipes*	FSC	One occurrence in aquatic, shallow muddy pool at Oakley (east of Antioch).
Delta green ground beetle	*Elaphrus viridus*	FT	Grassland and vernal pool habitat. Two occurrences in Solano County (Dozier and Elmira Quads).
*Globose dune beetle	*Coelus globsus*	FSC	Eight occurrences all in Southern California.
*Hurd's metapogon robberfly	*Metapogon hurdi*	FSC	Zero occurrences in CNDDB.
Lange's metalmark butterfly	*Apodemia mormo langei*	FE	Antioch sand dunes.
*Leech's skyline diving beetle	*Hydroporous leechi*	FSC	Zero occurrences in CNDDB.
*Longhorn fairy shrimp	*Branchinecta longiantenna*	FE	Freshwater pond habitat. Two of seven occurrences in Alameda & Contra Costa counties. Wind energy development threatens.
Marin elfin butterfly	*Incisalia mossii*	FSC	Not found in CNDDB.
Middlekauf's shieldback katydid	*Idiostatus middlekauf*	FSC	One occurrence in Antioch dunes.
*Mission blue butterfly	*Icaricia icariodes missionensis*	FE	Occur on slopes and hillsides in San Mateo and San Francisco counties.
*Molestan blister beetle	*Lytta molesta*	FSC	Two occurrences – one southwest of Modesto (Westley), other Sequoia National Park.
*Molestan blister beetle	*Lytta molesta*	FSC	Seasonally found in Central Valley from Contra Costa to Kern counties; one of 11 occurrences in Brentwood.
Myrtle's silverspot butterfly	*Speyeria zerene myrtleae*	FE	Zero occurrences in CNDDB.
Opler's longhorn moth	*Adella oplerella*	FSC	Zero occurrences in CNDDB.
Ricksecker's water scavenger beetle	*Hydrochara ricksecke*	FSC	One of 4 occurrences in Jepson Prairie Preserve (not much known).
Sacramento anthicid beetle	*Anthicus sacramento*	FSC	Found in sand among dredge spoil.
*San Bruno elfin butterfly	*Incisalia mossii bayensis*	FE	Found on hillsides and ridgetops; San Mateo County: San Bruno Mountains, Whiting ridge.
San Francisco lacewing	*Nothochrysa californica*	FSC	Zero occurrences in CNDDB.
San Joaquin dune beetle	*Coelus gracilis*	FSC	One of 5 occurrences in Antioch Dunes (1974) - rest in Fresno and Kings canyon.
Sonoma arctic skipper	*Carterocephalus palaemon* ssp.	FSC	Zero occurrences in CNDDB.
*Valley elderberry longhorn beetle	*Desmocerus californicus dimorphus*	FT	Riparian habitat, mostly higher elevations. Of 124 occurrences, several in Yolo and San Joaquin counties.
*Vernal pool fairy shrimp	*Branchinecta lynchi*	FT	Vernal pool habitat - upland. Twelve occurrences - Madera to Sacramento counties.
Vernal pool tadpole shrimp	*Lepidurus packardi*	FE	One of 4 occurrences at Kesterson, confluence of Salt Slough and San Joaquin River.

Table J-1. Species of Concern
(page 5 of 8)

Common Name	*Scientific Name*	*Status*	*Comments*
		Plants	
Adobe lily	*Fritillaria pluriflora*	FSC	
*Adobe sanicle	*Sanicula maritima*	FSC	Last seen in Potrero Hills, San Francisco (>250 feet) before 1900. Other 10 occurrences found from Monterey south.
Alkali milk-vetch	*Astragalus tener* var. *tener*	FSC	Found at elevations 0 to 50 feet in Union City, San Francisco, Napa, and Montezuma Wetlands site.
Antioch Dunes evening-primrose	*Oenothera deltoides* ssp. *howellii*	FE, SE	Grassy dune habitat. Found at Antioch Dunes and Jersey Island (8 occurrences).
*Baker's manzanita	*Arctostaphylos bakeri* ssp. *bakeri*	SR	Serpentine, chaparral habitat (Camp Meeker, Sonoma) (8 occurrences).
Baker's stickyseed (Sonoma sunshine)	*Blennosperma bakeri*	FE, SE	Vernal pools and swales. Excellent site near Sears Point (others southwest of Santa Rosa, Sebastapol).
*Beach layia	*Layia carnosa*	FE, SE	Point Reyes area >30 feet (PE). Other 22 occurrences found in Humboldt, Monterey and Drakes Bay.
*Brewer's dwarf-flax (western-flax)	*Hesperolinon breweri*	FSC	Chaparral, foothill grasslands, often rocky serpentine soil (near Antioch).
Brittlescale	*Atriplex depressa*	FSC	Riparian salt marsh habitat. Two of 41 occurrences in area, Dozier (Solano) and Montezuma Slough.
Burke's goldfields	*Lasthenia burkei*	FE	Vernal pools, Sonoma County.
California sea blite	*Suaeda californica*	FE, SE	Salt flats and marsh habitat (upper littoral). Two of 10 occurrences: Yacht harbor-Palo Alto, west of Albany.
Caper-fruited tropidocarpum	*Tropidocarpum capparideum*	FSC	Two of 12 occurrences in delta (Clifton Court Forebay & Union Island).
Carquinez goldenbush	*Isocoma arguta*	FSC	Habitat is low benches adjacent to seasonal drainage (5 occurrences). Found in Montezuma Wetlands/Bird Island area.
*Coast lily	*Lilium maritimum*	FSC	All 48 occurrences on north coast (Mendocino, Sonoma counties).
Colusa grass	*Neostapfia colusana*	FT, SE	Alkaline saline playa, vernal pool habitat - several of 22 occurrences near Olcott Lake, Jepson Prairie Preserve & Davis area.
*Compact cobweb thistle	*Cirsium occidentale* var. *compactum*	FSC	Twelve occurrences all in San Luis Obispo area.
Contra Costa goldfields	*Lasthenia conjugens*	FE	Vernal pools in open grassy areas, seasonal wetlands habitat. Found at Grizzly Island, Solano County.
Contra Costa wallflower	*Erysimum capitatum* ssp. *angustatum*	FE, SE	Not in CNDDB.
*Crystal Springs lessingia	*Lessingia arachnoidea*	FSC	Zero occurrences in CNDDB.
*Delta coyote-thistle	*Eryngium racemosum*	FSC	Delta area south of Stockton.
Delta tule-pea	*Lathyrus jepsonii* var. *jepsonii*	FSC	Freshwater and brackish marshes, < 5 feet elevation. (Brannan Island, Fagan's Marsh, Edgerly Island, Coon Island, Napa [CW])
*Diablo rock-rose	*Helianthella castanea*	FSC	Upland forest, chaparral. Hillsides of Oakland, San Francisco, Mount Diablo (300-700 feet) (15 occurrences).
Diamond-petaled poppy	*Eschscholzia rhombipetala*	FSC	One occurrence of 6 in Antioch (rest San Luis Obispo area). Nothing of Antioch site known.
Ferris's milk-vetch	*Astragalus tener* var. *ferrisiae*	FSC	One of 10 occurrences in vernal meadow southeast of Dixon (rest Northern California).
*Fountain thistle	*Cirsium fontinale* var. *fontinale*	FE, SE	Crystal Springs Reservoir, San Mateo.

Common Name	Scientific Name	Status	Comments
Plants (continued)			
Fragrant fritillary	*Fritillaria liliacea*	FSC	Located >40 feet elevation in coastal prairie, open grassland, including Jepson Prairie Preserve. (Point Reyes, Pulgas Ridge, Potrero Hills [San Francisco], Mills College [Oakland]).
(?)Gairdner's yampah	*Perideridia gairdneri* ssp. *gairdneri*	FSC	Zero occurrences in CNDDB.
Heartscale	*Atriplex cordulata*	FSC	Alkaline meadow at edge of marsh. Approximately 5 of 40 occurrences in area (Dozier, Solano). Most in south.
*Hickman's cinquefoil	*Potentilla hickmanii*	FPE	Ocean bluff habitat (1 of 3 sites Half Moon Bay - rest Monterey).
Hispid bird's-beak	*Cordylanthus mollis* ssp. *hispidus*	FSC	Tidal zone of Suisun Marsh; also alkaline grassland and alkaline scrub from Central Valley to Southern California.
Hoover's button-celery	*Eryngium aristulatum* var. *hooveri*	FSC	Zero occurrences in CNDDB.
*Interior California larkspur	*Delphinium californicum* ssp. *interius*	FSC	Zero occurrences in CNDDB.
*Kellogg's (wedge-leaved) horkelia	*Horkelia cuneata* ssp. *sericea*	FSC	Coniferous forests, coastal scrub.
*Large-flowered fiddleneck	*Amsinckia grandiflora*	FE, SE	Annual upland grassland. LLL and Black Diamond Mine are sites.
Legenere	*Legenere limosa*	FSC	Vernal pool 2.4 miles south of Napa Hospital, and east side of Highway 29 (Suscol Ridge) at around 40 feet elevation.
*Little mousetail	*Myosurus minimus* ssp. *apus*	FSC	All 17 occurrences Southern California.
*Marin checkermallow	*Sidalcea hickmanii* ssp. *viridis*	FSC	Zero occurrences in CNDDB.
*Marin dwarf-flax (western-flax)	*Hesperolinon congestum*	FT	Grassy serpentine slopes of Marin, Petaluma River, Crystal Springs Road, San Mateo; Presidio, San Francisco; found at elevations >140 feet.
Marin knotweed	*Polygonum marinense*	FSC	Napa River, Cuttings Wharf.
Marsh sandwort	*Arenaria paludicola*	FE, SE	One occurrence at Presidio Swamp, Fort Point (San Francisco).
Mason's lilaeopsis	*Lilaeopsis masonii*	FSC, SR	Fresh, brackish, and salt water marsh vegetation in littoral zone with strong tidal influence. Mare Island is saltiest location, also found along Napa River (south of Rotto Landing).
*Mission Delores campion	*Silene verecunda* ssp. *verecunda*	FSC	Hillsides and dunes greater than 100 feet in elevation, San Francisco location.
*Montara manzanita	*Arctostaphylos montaraensis*	FSC	Coastal scrub (>100 feet), San Bruno Mountain and Montara Mountain.
*Most beautiful (uncommon) jewelflower	*Streptanthus albidus* ssp. *peramoenus*	FSC	Serpentine grasslands in Santa Rosa hills and Oakland hills (800 feet).
Mount Diablo bird's beak	*Cordylanthus nidularius*	FSC	Not in CNDDB.
*Mount Diablo jewelflower	*Streptanthus hispidus*	FSC	Hillsides on Mount Diablo.
*Mount Diablo phacelia	*Phacelia phacelioides*	FSC	Rocky, serpentine slopes on Mount Diablo.
*Mount Tamalpais thistle	*Cirsium hydrophilum* var. *vasevi*	FSC	Hillsides of Mount Tamalpais.
Northcoast (Point Reyes) bird's-beak	*Cordylanthus maritimus* ssp. *palustris*	FSC	38 occurrences mostly Drakes Bay & north, also Alameda Marsh, Tiburon, Palo Alto.
*Northcoast semaphore grass	*Pleuropogon hooverianus*	FSC	Grassy flats, under redwood trees, mostly north of area.
*Northern California black walnut	*Juglans californica* var. *hindsii*	FSC	Riparian forests, riparian woodlands.
*Pallid manzanita (Alameda manzanita)	*Arctostaphylos pallida*	FPT, SE	Oakland, Berkeley hills, >1,100 feet (LS-1991).
*Palmate-bracted bird's-beak	*Cordylanthus palmatus*	FE, SE	Alkali sink habitat from Fresno, south, to Woodland, north.

Table J-1. Species of Concern
(page 7 of 8)

Common Name	*Scientific Name*	*Status*	*Comments*
Plants (continued)			
Papoose spikeweed (Congdon's tarplant)	*Hemizonia parryi* ssp. *congdonii*	FSC	Grasslands (<100m) (LS-1986). 1 of 24 occurrences - Benicia along I-680, rest in Santa Clara and south.
*Point Reyes horkelia	*Horkelia marinensis*	FSC	Located on Point Reyes peninsula (>40 feet).
*Presidio clarkia	*Clarkia franciscana*	FE, SE	Coastal scrub/grasslands in Presidio, San Francisco and Oakland hills (>75 feet in elevation).
*Presidio manzanita	*Arctostaphylos hookeri* ssp. *ravenii*	FE, SE	Serpentine slopes of South San Francisco and Presidio (PE, LS-1989) (7 occurrences).
*Recurved larkspur	*Delphinium recurvatum*	FSC	Alkaline soils and swales. Two of 21 occurrences around Clifton Court Forebay, rest in Southern California.
Robust spineflower	*Chorizanthe robusta*	FE	Coastal dune/scrub (30-150 feet). Alameda, Colma (San Francisco).
*Rock sanicle	*Sanicula saxatilis*	FSC	Talus slopes below chaparral, Mount Diablo and Lick Observatory.
*Sacramento Orcutt grass	*Orcuttia viscida*	FPE	Vernal pool, grasslands. Eight occurrences mostly Buffalo Creek, Sacramento.
*San Bruno Mountain manzanita	*Arctosphylos imbricata*	FSC	Brushy slopes of San Bruno Mountain (>700 feet) (4 occurrences).
*San Francisco gumplant	*Grindelia hirsutula* var. *maritima*	FSC	Cliffy coastal scrub plant community, open slopes in San Francisco (>100 feet) (15 occurrences).
*San Francisco lessingia	*Lessingia germanorum*	FPE	Found at elevations >80 feet in Daly City and the Presidio area.
San Francisco Bay spineflower	*Chorizanthe cuspidata* var. *cuspidata*	FSC	Zero occurrences in CNDDB.
*San Francisco manzanita	*Arctostaphylos hookeri* ssp. *franciscana*	FSC	Serpentine slopes (>300 feet). Last seen 1942, Presidio Ave.
*San Francisco owl's clover	*Triphysaria floribunda*	FSC	Found at elevations >100 feet at Point Reyes National Seashore, San Bruno Mountain, Lake Merced, and the Presidio.
*San Francisco popcornflower	*Plagiobothrys diffusus*	FSC	Found at elevations >200 feet in Presidio. Last seen - 1933.
*San Mateo thornmint	*Acanthomintha duttonii*	FE, SE	Found at Crystal Springs Reservoir.
San Mateo tree lupine	*Lupinus arboreus* var. *eximius*	FSC	Not in CNDDB.
*San Mateo woolly sunflower	*Eriophyllum latilobum*	FE, SE	Grassy hillsides in San Mateo between I-280 and Merner Road (2 occurrences).
*Santa Cruz microseris	*Microseris (Stebbinoseris) decipiens*	FSC	All 16 occurrences in Santa Cruz County.
*Santa Cruz tarweed	*Holocarpha macradenia*	FC, SE	Uplands: coastal, prairie, foothill, grassland. Most 39 occurrences in Santa Cruz County.
Sebastopol meadow foam	*Limnanthes vinculaus*	FE	Vernal pools, Sonoma County.
Showy Indian clover	*Trifolium amoenum*	FPE	Found at elevations 20-65 feet, Napa Junction and Buchli Station Road (LS-1952).
*Slough thistle	*Cirsium crassicaule*	FSC	Two sites near San Joaquin River (rest of 17 occurrences in Kern County).
Soft bird's beak	*Cordylanthus mollis* ssp. *mollis*	FE	Coastal salt marsh habitat. Point Pinole Regional Shoreline (Contra Costa County), Jersey Island, Grizzly Island.
*Sonoma ceanothus	*Ceanothus sonomensis*	FSC	Southwest-facing slopes in Sonoma (15 occurrences).
*Sonoma spineflower	*Chorizanthe valida*	FE, SE	Present at Point Reyes National Seashore >40 feet.

Table J-1. Species of Concern
(page 8 of 8)

Common Name	Scientific Name	Status	Comments
Plants (continued)			
*South Bay clarkia	*Clarkia concinna* ssp. *automixa*	FSC	Zero occurrences in CNDDB.
Suisun Marsh aster	*Aster lentus*	FSC	Nearshore marsh vegetation, grows along bank or shore in tidally influenced coastal and valley freshwater marshes. Northeast of Fagan Slough, Jersey Island.
Suisun thistle	*Cirsium hydrophilum* var. *hydrophilum*	FE	Dense salt marsh vegetation, Grizzly Island.
*Tamalpais lessingia	*Lessingia micradenia* var. *micradenia*	FSC	Zero occurrences in CNDDB.
*Tamalpais manzanita	*Arctostaphylos hookeri* ssp. *montana*	FSC	Serpentine slopes of Mount Tamalpais.
*Tamalpais streptanthus	*Streptanthus batrachopus*	FSC	Hillsides, ridges of Mount Tamalpais.
*Tiburon jewelflower	*Streptanthus niger*	FE, SE	Serpentine outcrops, cliffs, grasslands along Tiburon ridge.
Tiburon mariposa lily	*Calochortus tiburonensis*	FT, ST	Serpentine grassland habitat - one occurrence.
Tiburon paintbrush	*Castilleja affinis* ssp. *neglecta*	FE	Serpentine grassland habitat. Six occurrences from Napa (American Canyon) to Tiburon.
Tiburon tarweed	*Hemizonia multicaulis* ssp. *vernalis*	FSC	Not in CNDDB.
*Two-carpeled dwarf-flax	*Hesperolinon bicarpellatum*	FSC	Zero occurrences in CNDDB.
*Valley sagittaria (Sanford's arrowhead)	*Sagittaria sanfordii*	FSC	Vernal marsh and muddy slough habitat (south and north of Central Valley - too far east of area).
Valley spearscale (San Joaquin saltbush)	*Atriplex joaquiniana*	FSC	Coastal prairie, alkaline-saline flat (Montezuma area). Also northeast of Slaughterhouse Point, Napa River.
*White-rayed pentachaeta	*Pentachaeta bellidiflora*	FE, SE	Grassy slopes in Marin, Greenbrae, and Larkspur and east edge of San Bruno Mountain.

Key:
- * Indicates species not in the LTMS Planning Area.
- FE: Federally listed Endangered
- FT: Federally listed Threatened
- FC: Federal Candidate
- FPE: Federally proposed for listing as Endangered
- FPT: Federally proposed for listing as Threatened
- FSC: Federal Species of Concern (former candidate)
- SE: State-listed Endangered
- ST: State-listed Threatened
- SR: State-listed Rare
- SSC: State-listed Species of Special Concern
- PE: Presumed Extinct
- CNDDB: California Natural Diversity Database
- LS 1992: Last seen 1992

dredged material is likely to be used and/or have not been observed in the region for several decades. The results of this review are noted on the list of species shown in Table J-1. Updated lists were provided by the USFWS in November 1997. These lists were reviewed for any new species that could be affected within the Planning Area, and appropriate additions made to Table J-1. The state and federal regulatory status as of December 1997 is also provided for each species in the table. Species that are not likely to be affected by the proposed policies are noted with an asterisk (*) in Table J-1.

J.3 FISH HABITAT AND ENDANGERED SPECIES — MATRICES OF CONCERNS RELATED TO DREDGING AND DISPOSAL

Since 1993, federal and state lead agencies involved in the development of the LTMS EIS/EIR have been informally consulting with the USFWS, the National Marine Fisheries Service (NMFS), and the CDFG to identify the species of concern located within the LTMS Planning Area. The purpose of these consultations was to provide the LTMS agencies, the resource agencies, and the dredging community a set of common guidelines to avoid adverse impacts on species of concern from dredging and disposal activities, and to establish a more predictable regulatory environment for dredging and aquatic disposal.

The participating agencies evaluated the dredging and aquatic disposal activities in the Bay and developed a list of sensitive species that could be adversely affected by such activities. (The LTMS agencies have not prepared a similar list for species of concern related to development of upland/wetland reuse [UWR] sites. Any potential impacts would depend on the number and exact locations of such sites, which are not defined in this EIS/EIR. The effects on endangered species from the development of specific UWR sites are appropriately addressed in site-specific environmental reviews. However, some non-aquatic species that could be impacted by UWR projects are discussed in section J.4.) This list currently includes the following species: Winter-run chinook salmon, Delta smelt, Sacramento splittail, longfin smelt, Pacific herring, Dungeness crab, steelhead trout, coho salmon, recreational marine fishes, California least tern, California clapper rail, western snowy plover, California brown pelican, and salt marsh harvest mouse.

The agencies identified the potential impacts to the sensitive species during dredging and aquatic disposal and the critical locations of the species within the Bay during different life stages. Dredging and disposal operations may affect water circulation patterns and degrade water quality by increasing concentrations of suspended particulates and contaminants, increasing sedimentation rates, and reducing dissolved oxygen. These physical and chemical changes can affect the respiration, feeding, spawning, and migration of sensitive fish and invertebrate (Dungeness crab) species, as well as the survival of their early (egg through juvenile) life stages. Larval and juvenile stages in particular are vulnerable to entrainment in dredging equipment. Dredging and disposal operations could eliminate or degrade adjacent marsh and mudflat habitats that sensitive bird and mammal species depend on. Finally, the disturbance associated with dredging and disposal activities may cause sensitive bird species to avoid or abandon important foraging or resting sites.

From this information, the agencies developed the following three tables (J-2, J-3, and J-4), which summarize the agencies' conclusions and describe proposed restrictions that affect the timing and design of dredging and disposal projects. The tables outline time periods during the year when dredging and aquatic disposal activities can occur without affecting sensitive species. The tables also indicate the appropriate times when the agencies must be consulted under the Endangered Species Act.

The three subjects covered by the tables are:

Table J-2: Areas and Times of Restricted DREDGING Activity

Table J-3: Areas and Times of Restricted DISPOSAL Activity

Table J-4: Legend for Tables J-2 and J-3, Consultation and Permit Requirements

The tables provide an administrative tool to make decisions about sensitive species. It is meant to be a flexible tool, subject to change as the state or federal governments list new species as endangered or threatened or remove species

from the current list, or as new information is gathered on species that will refine the requirements for protection. The tables will be revised as needed and will evolve with the LTMS for the Bay Area. While the intent of the LTMS EIS/EIR is to establish a strategy for sediment disposal, the matrix has been expanded to include dredging activities as well. As jointly agreed upon by the resource agencies, expansion of this framework will directly benefit the dredging community.

Table J-2 Areas and Times of Restricted DREDGING Activity in the San Francisco Bay/Delta Estuary for Species of Special Concern

Table J-2 presents the resource agencies' analysis of the concerns for special status species related to dredging activities.

At the critical locations and within the restricted periods defined in Table J-2, dredging is not allowed unless dredgers consult with the resource agencies and approval is obtained. In cases where species of concern are not present and not expected to be present, normal dredging during these restricted periods may be approved on a case-by-case, limited basis by the appropriate agencies. In cases where the species of concern are present, the use of special mitigation measures may also enable dredging during restricted periods without undue adverse effects. The mitigation measures are noted as consultation and permit requirements. These requirements are explained in Table J-4.

For each species of concern, Table J-2 presents:

- A ranking of the species' status;
- Critical locations where dredging may affect the species;
- Potential impacts of dredging on the species;
- Recommended restrictions and consultation/permit requirements (explained in Table J-4) to avoid adverse impacts; and
- Period during which recommended actions are necessary.

This information was developed through informal consultation among the resource agencies as follows.

Species Ranking

Species were ranked based on their status in the Estuary. Not all of the species listed in the table are federally or state listed as endangered or threatened, and therefore are not offered the same level of protection under the Endangered Species Act. Yet, resource agencies identified the need to address these specific species in the matrix due to potential impacts upon the species' recreational and commercial value and their ecological function. Definition of species' ranks is provided in Table J-4.

Critical Location

The agencies have identified the critical locations where dredging activities are likely to disrupt the species of concern. The critical areas identified in Table J-2 are drawn from the entire LTMS Planning Area. In addition, areas outside of the planning area in the Delta are included. Restrictions noted for these areas are suggested and could be superseded based on consultation between the resource agencies and other parties.

Table J-2. Areas and Times of Restricted DREDGING Activity in the San Francisco Bay/Delta Estuary for Species of Special Concern

(page 1 of 4)

Species	*Rank (1)*	*Critical Location*	*Potential Impacts*	*Dredging Restriction (2)*	*Period of Restriction*
Chinook Salmon (ADULTS)	1	Pinole Shoal (San Pablo Bay), Suisun Bay channel	Interference with migration; degradation of water quality	Restrict dredging in these areas during period of restriction. Otherwise, individual Consultation with NMFS is REQUIRED.	January 1 - May 31
		East of Sherman Island, along migratory corridors to and from the Sacramento River	Interference with migration; degradation of water quality	Restrict dredging in these areas during period of restriction. Otherwise, individual Consultation with NMFS is REQUIRED.	November 1 - May 15
Chinook Salmon (JUVENILES)	1	SF Bay Bridge upstream to Sherman Island, including sloughs	Direct habitat loss or degradation; water quality degradation; interference with foraging or food resources; entrainment by dredge	Restrict dredging in these areas when species is present. Otherwise, see Consultation and Permit requirements: A, B (re. entrainment); C, D (re. habitat loss); and E (re. habitat/water quality degradation).	January 1 - May 31
		East of Sherman Island, along migratory corridors to and from the Sacramento River	Direct habitat loss or degradation; water quality degradation; interference with foraging or food resources; entrainment by dredge	Restrict dredging in these areas when species is present. Otherwise, see Consultation and Permit requirements: A, B (re. entrainment); C, D (re. habitat loss); and E (re. habitat/water quality degradation).	October 1 - May 31
Steelhead Trout	1	SF Bay Bridge upstream to Sherman Island, including sloughs	Interference with migration; degradation of water quality; direct habitat loss or degradation; interference with foraging or food resources	Restrict dredging in these areas during period of restriction. Otherwise, individual Consultation with NMFS is REQUIRED.	January 1 - May 31
		Napa River, Petaluma River, Sonoma Creek	Habitat degradation; adverse effects on life stages	Restrict dredging in these areas during period of restriction. Otherwise, individual Consultation with NMFS is REQUIRED.	October 15 - June 15

Table J-2. Areas and Times of Restricted DREDGING Activity in the San Francisco Bay/Delta Estuary for Species of Special Concern

(page 2 of 4)

Species	*Rank (1)*	*Critical Location*	*Potential Impacts*	*Dredging Restriction (2)*	*Period of Restriction*
Steelhead Trout	1	East of Sherman Island, along migratory corridors to and from the Sacramento River	Interference with migration; degradation of water quality; direct habitat loss or degradation; interference with foraging or food resources	Restrict dredging in these areas during period of restriction. Otherwise, individual Consultation with NMFS is REQUIRED.	October 1 - May 31
Delta Smelt	1	Suisun Bay including marshes, from Carquinez Bridge east to Collinsville	Direct entrainment by dredge; spawning ground habitat degradation	NOTE: Formal ESA Consultation is REQUIRED for any dredging project in this area, at any time.	January 1 - December 31 (all year)
		Southern Delta (see Figure J-1)	Direct entrainment by dredge; spawning ground habitat degradation	Restrict dredging in these areas when species is present. Otherwise, see Consultation and Permit requirements: A, B, (re. entrainment); E (re. habitat degradation).	February 1 - June 30
		Central Delta (see Figure J-1)	Direct entrainment by dredge; spawning ground habitat degradation	Restrict dredging in these areas during period of restriction. Otherwise, individual Consultation with FWS and CDFG is REQUIRED.	December 1 - June 30
		Northern Delta (see Figure J-1)	Direct entrainment by dredge; spawning ground habitat degradation	Restrict dredging in these areas during period of restriction. Otherwise, individual Consultation with FWS and CDFG is REQUIRED.	September 15 - July 31
Sacramento Splittail (JUVENILES)	2	North San Pablo Bay, Napa and Petaluma Rivers	Direct entrainment by dredge	Restrict dredging in these areas during period of restriction. Otherwise, individual conferencing (consultation if species is listed as endangered) with FWS and CDFG is REQUIRED.	February 1 - July 31
		Suisun Bay including marshes, from Carquinez Bridge east to Collinsville	Direct entrainment by dredge	NOTE: ESA conferencing (consultation if species is listed as endangered) is REQUIRED for any dredging project in this area, at any time.	January 1 - December 31 (all year)

Table J-2. Areas and Times of Restricted DREDGING Activity in the San Francisco Bay/Delta Estuary for Species of Special Concern
(page 3 of 4)

Species	*Rank (1)*	*Critical Location*	*Potential Impacts*	*Dredging Restriction (2)*	*Period of Restriction*
Sacramento Splittail (JUVENILES)	2	Delta	Direct entrainment by dredge	Restrict dredging in these areas during period of restriction. Otherwise, conferencing (consultation if species is listed as endangered) with FWS and CDFG is REQUIRED.	December 1 - July 31
Longfin Smelt	3	San Pablo Bay	Direct entrainment of juveniles by dredge	Restrict dredging in these areas as much as possible during period of restriction.	February 1 - July 31
		Suisun Bay including marshes, from Carquinez Bridge east to Collinsville	Direct entrainment by dredge; spawning ground habitat degradation	Restrict dredging in these areas as much as possible during period of restriction.	December 1 - August 31
		Western (= Northern) Delta (see Figure J-1)	Direct entrainment by dredge; spawning ground habitat degradation	Restrict dredging in these areas as much as possible during period of restriction.	December 1 - February 28
Pacific Herring	3	Historical spawning areas in Central San Francisco Bay and Richardson Bay (see Figure J-2)	Interference with spawning activity; reduced hatching success and larval survival	Restrict dredging in these areas when species is present; see Consultation and Permit requirement G.	December 1 - February 28
Recreational marine fishes	3	None for dredging	None for dredging	None for dredging	N/A
Dungeness Crab	4	Shallow berthing areas and channels, North San Francisco Bay and San Pablo Bay	Direct entrainment by dredge of early juvenile stages	Consultation and Permit requirements A and B apply when juveniles are present	May 1 - June 30
California Least Tern	1	All eelgrass beds from San Francisco Bay east through Suisun Marsh (Figure J-3)	Loss of eelgrass bed foraging habitat	Consultation with FWS and CDFG is REQUIRED for any direct or indirect impacts to this habitat	January 1 - December 31 (all year)
		Coastal waters and sloughs within 1 mile of the coastline from Berkeley Marina south through San Lorenzo Creek.	Turbidity effects on foraging success	Restrict dredging within 3 miles of active nesting areas during Tern foraging period, and when prey species are at critical life stages (see Consultation and Permit Requirement G).	April 1 - August 31

Table J-2. Areas and Times of Restricted DREDGING Activity in the San Francisco Bay/Delta Estuary for Species of Special Concern

(page 4 of 4)

Species	*Rank (1)*	*Critical Location*	*Potential Impacts*	*Dredging Restriction (2)*	*Period of Restriction*
California Least Tern	1	Coastal waters, sloughs, and salt ponds in South San Francisco Bay south of the Highway 92 bridge.	Turbidity effects on foraging success	Restrict dredging when foraging Tern are present (see Consultation and Permit Requirement G).	June 1 - September 7
California Clapper Rail	1	In and adjacent to tidal salt marshes throughout San Francisco Bay and Suisun Marsh	Destruction of breeding and nesting habitat, and/or loss of upland refugial cover	Consultation with FWS and CDFG is REQUIRED for projects that will result in direct habitat loss; see Consultation and Permit requirements D and F.	January 1 - December 31 (all year)
		In and adjacent to tidal salt marshes throughout San Francisco Bay and Suisun Marsh	Disturbance during breeding season (without direct habitat loss)	Restrict dredging in these areas when species is present; see Consultation and Permit requirements D and F.	February 1 - August 31
Snowy Plover	1	South San Francisco Bay, San Pablo Bay	Loss of mudflat foraging habitat (new-work projects)	NOTE: Consultation is REQUIRED with FWS and CDFG for any new-work projects that will cause a direct loss of mudflat habitat in these areas (LTMS working to conclude "programmatic consultation" for inclusion in a future LTMS Management Plan).	January 1 - December 31 (all year)
California Brown Pelican	1	Significant roost sites at: Alameda breakwater; Angel Island; Brooks Island; and Sisters Island	Disturbance of individuals at large communal roosts	No dredging within 300 feet of known roost sites when species is present.	April 1 - November 30
Salt Marsh Harvest Mouse	1	In and adjacent to diked and tidal salt marshes throughout San Francisco Bay and Suisun Marsh east to Collinsville	Loss of salt marsh habitat and adjacent upland refugial cover	NOTE: Consultation is REQUIRED with FWS and CDFG for any project that will cause a direct loss of salt marsh habitat in these areas.	January 1 - December 31 (all year)

Notes: 1. Refer to Table J-4 for definitions of species' ranks and for consultation and permit requirements identified under *Dredging Restriction*.

2. Dredging permits will not be issued during periods of restriction unless approved via a project-specific consultation conducted by the applicant, except as noted under the specified consultation and permit requirements (Table J-4).

Table J-3. Areas and Times of Restricted DISPOSAL Activity in the San Francisco Bay/Delta Estuary for Species of Special Concern

(page 1 of 3)

Species	*Rank (1)*	*Critical Location*	*Potential Impacts*	*DISPOSAL Restriction (2)*	*Period of Restriction (3)*
Chinook Salmon (ADULTS)	1	SF-8 (Suisun Bay disposal site), and SF-9 (Carquinez Strait disposal site)	Degradation of water quality; interference with migration	Minimize disposal at these sites during period of restriction	January 1 - May 31
		Aquatic disposal east of Sherman Island, along migratory corridors to and from the Sacramento River	Degradation of water quality; interference with foraging habitat and food resources	Restrict disposal to the extent feasible in these areas during period of restriction. Otherwise, Consultation and Permit Requirements A, B, C, D and E apply.	November 1 - May 15
Chinook Salmon (JUVENILES)	1	SF-8 (Suisun Bay disposal site), and SF-9 (Carquinez Strait disposal site)	Degradation of water quality; interference with foraging habitat and food resources	Minimize disposal at these sites during period of restriction.	January 1 - May 31
		East of Sherman Island, along migratory corridors to and from the Sacramento River	Degradation of water quality; interference with foraging habitat and food resources	Restrict disposal to the extent feasible in these areas during period of restriction. Otherwise, Consultation and Permit Requirements A, B, C, D and E apply.	October 1 - May 31
Steelhead Trout	1	SF-9, SF-10 (San Pablo Bay), & SF-11 (Alcatraz) disposal sites	Degradation of water quality; interference with foraging habitat and food resources	Minimize disposal at these sites during period of restriction.	January 1 - May 31
		East of Sherman Island, along migratory corridors to and from the Sacramento River	Degradation of water quality; interference with foraging habitat and food resources	Restrict disposal to the extent feasible in these areas during period of restriction. Otherwise, Consultation and Permit Requirements A, B, C, D and E apply.	October 1 - May 31
Delta Smelt	1	All Delta critical habitat (see Figure J-4)	Spawning ground habitat degradation	Formal Consultation with FWS and CDFG is REQUIRED for any aquatic disposal outside of levees in this area, at any time. No restrictions on upland disposal relative to this species.	January 1 - December 31 (all year)
Sacramento Splittail	2	SF-8, SF-9, SF-10, SF-11, and SF-12 (San Francisco Bar Channel) disposal sites	None	None	N/A

Table J-3. Areas and Times of Restricted DISPOSAL Activity in the San Francisco Bay/Delta Estuary for Species of Special Concern

(page 2 of 3)

Species	*Rank (1)*	*Critical Location*	*Potential Impacts*	*DISPOSAL Restriction (2)*	*Period of Restriction*
Sacramento Splittail	2	North San Pablo Bay, Napa and Petaluma Rivers, Suisun Bay including marshes, and Delta (all), other than SF-8, SF-9, SF-10, SF-11, SF-12	Habitat degradation	Formal conferencing (consultation if listed) with FWS and CDFG is REQUIRED for any aquatic disposal outboard of levees in this area, at any time. No restrictions on upland disposal relative to this species.	January 1 - December 31 (all year)
Longfin Smelt	3	San Pablo Bay (other than SF-10) and Suisun Bay (other than SF-8) including marshes from Benicia Bridge east to Collinsville, and Western (= Northern) Delta (see Figure J-1)	Spawning ground habitat degradation	Minimize disposal in these areas as much as possible.	January 1 - December 31 (all year)
Pacific Herring	3	None	None	None	N/A
Recreational marine fishes	3	SF-10 and SF-11 disposal sites	Habitat degradation	Minimize disposal at these sites during peak sportfishing season.	May 1 - October 31
Dungeness Crab	4	None	None	None	N/A
California Least Tern	1	All eelgrass beds from San Francisco Bay east through Suisun Bay (see Figure J-3)	Potential direct habitat loss of eelgrass habitat associated with in-Bay disposal	None at SF-8, SF-9, SF-10, SF-11, SF-12. However, Consultation with FWS and CDFG is REQUIRED for other nearshore, upland, or beneficial use disposal activities that may affect eelgrass habitat.	January 1 - December 31 (all year)
Delta Smelt	1	Suisun Bay including marshes, from Carquinez Bridge east to Collinsville (other than SF-8)	Rearing and limited spawning habitat degradation	Formal Consultation with FWS and CDFG is REQUIRED for any aquatic disposal in this area, at any time.	January 1 - December 31 (all year)
	1	Coastal waters, sloughs, and salt ponds within 3 miles of nesting area at NAS Alameda (see Consultation and Permit Requirement I for other possible restriction areas)	Potential direct habitat loss associated with nearshore or upland disposal or beneficial use projects	None at SF-8, SF-9, SF-10, SF-11, SF-12. However, Consultation with FWS and CDFG is REQUIRED for other nearshore, upland, or beneficial use disposal activities that may affect this habitat.	January 1 - December 31 (all year)

Table J-3. Areas and Times of Restricted DISPOSAL Activity in the San Francisco Bay/Delta Estuary for Species of Special Concern

(page 3 of 3)

Species	*Rank (1)*	*Critical Location*	*Potential Impacts*	*DISPOSAL Restriction (2)*	*Period of Restriction*
Delta Smelt (continued)	1	Coastal waters, sloughs, and salt ponds in South San Francisco Bay	Potential direct habitat loss associated with nearshore or upland disposal or beneficial use projects	None at SF-8, SF-9, SF-10, SF-11, SF-12. However, Consultation with FWS and CDFG is REQUIRED for other nearshore, upland, or beneficial use disposal activities that may affect this habitat.	January 1 - December 31 (all year)
California Clapper Rail	1	In and adjacent to tidal salt marshes throughout San Francisco Bay and Suisun Marsh	Potential direct habitat loss associated with nearshore or upland disposal or beneficial use projects	None at SF-8, SF-9, SF-10, SF-11, SF-12. However, Consultation with FWS and CDFG is REQUIRED for other nearshore, upland, or beneficial use disposal activities that may affect this habitat.	January 1 - December 31 (all year)
Western Snowy Plover	1	South San Francisco Bay, San Pablo Bay	Potential direct habitat loss associated with nearshore or upland disposal or beneficial use projects	None at SF-8, SF-9, SF-10, SF-11, SF-12. However, Consultation with FWS and CDFG is REQUIRED for other nearshore, upland, or beneficial use disposal activities that may affect this habitat.	January 1 - December 31 (all year)
California Brown Pelican	1	Significant roost sites at: Alameda breakwater; Angel Island; Brooks Island; and Sisters Island	Disturbance of individuals at large communal roosts	No disposal within 300 feet of known roost sites when species is present	April 1 - November 30
Salt Marsh Harvest Mouse	1	In and adjacent to tidal salt marshes throughout San Francisco Bay and Suisun Marsh east to Collinsville	Potential direct habitat loss associated with nearshore or upland disposal or beneficial use projects	None at SF-8, SF-9, SF-10, SF-11, SF-12. However, Consultation with FWS and CDFG is REQUIRED for other nearshore, upland, or beneficial use disposal activities that may affect this habitat.	January 1 - December 31 (all year)

Notes: 1. Refer to Table J-4 for definitions of species' ranks and for consultation and permit requirements identified under *Disposal Restriction*.

2. Disposal permits will not be issued during periods of restriction unless approved via a project-specific consultation conducted by the applicant, except as noted under the specified consultation and permit requirements (Table J-4). At sites where disposal is to be minimized, the LTMS agencies will establish lower disposal volume limits as appropriate and will encourage disposal during times of the year outside of the restricted period.

Table J-4. Legend for Tables J-2 and J-3

Species Ranking	*Consultation and Permit Requirements (Dredging and Disposal Restrictions)*	
1. Federal or state-listed endangered or threatened species. Consultation is required with USFWS, and possibly CDFG, if dredging or disposal is proposed during the period of restricted activity in critical locations.	A. Clamshell dredging shall be required whenever practicable in areas within 250 feet of a shoreline OR in depths less than 20 feet.	E. Best Management Practices to reduce turbidity (including silt curtains or other physical or operational measures) shall be required for these projects.
2. Species proposed for listing under the federal ESA, candidate for listing under the California ESA, or CDFG Species of Special Concern for which impacts from dredging or disposal could pose significant problems to existing or future population levels.	B. If hydraulic dredging in depths less than 20 feet, dredge head must be maintained at or below substrate surface. Head may not be raised more than 3 feet off bottom for flushing; shut off pump when raising head more than 3 feet off bottom (e.g., at end of dredging).	F. Restriction applies within the identified critical period, and within 250 feet of emergent vegetation. USFWS and CDFG must be contacted in these circumstances.
3. Status reviews are being conducted. Species with established recreational or commercial value or ecological function for which impacts from dredging or disposal may pose significant problems to existing or future population levels.	C. For new-work projects where eelgrass will be unavoidably affected, a compensatory mitigation plan must be submitted and approved by USFWS, NMFS, CDFG, USACE, and EPA prior to permitting.	G. If dredging must be conducted during this period, CDFG must be contacted and the permittee must provide an observer to identify herring spawning activity. Dredging must stop immediately if herring are within 200 m of the work site, and may not until hatch-out is complete (approximately 10-14 days).
4. Species with established recreational or commercial value or ecological function for which impacts from dredging or disposal should pose only minor problems to existing or future population levels.	D. If project will cause unavoidable direct or indirect effects to submerged or emergent aquatic vegetation, compensatory mitigation at 3:1 ratio is required for lost functions and values. Other proposed ratios require consultation with USFWS and CDFG.	H. Other historically used nesting areas include Bair Island, Oakland Airport, Alvarado salt ponds, PG&E Pittsburg, and Port Chicago. Contact USFWS to determine whether species may be present; if present, dredging restriction in Table applies.

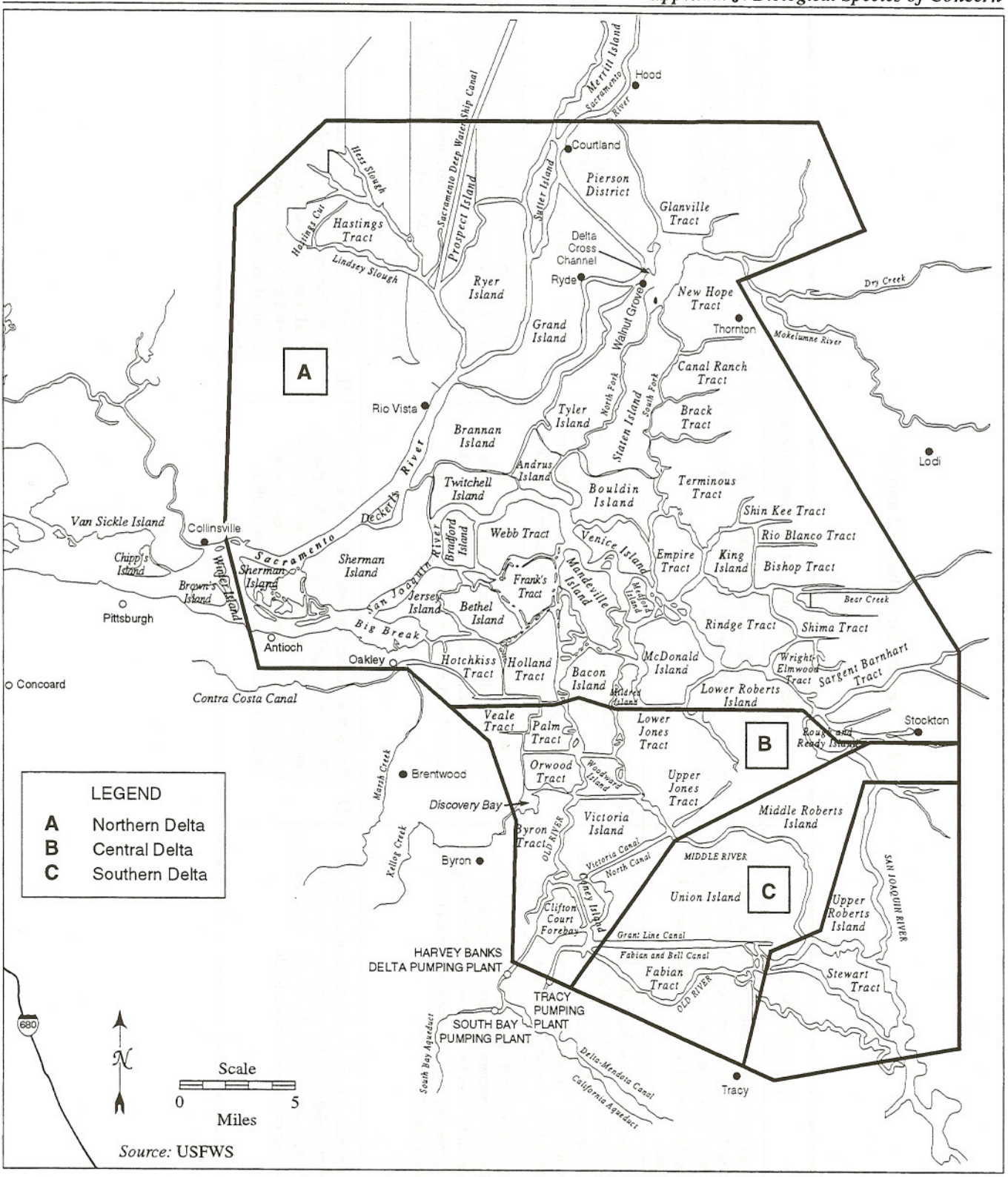

Figure J-1. Delta Subareas Where Dredging Restrictions to Protect Delta Smelt Apply (see Table J-2)

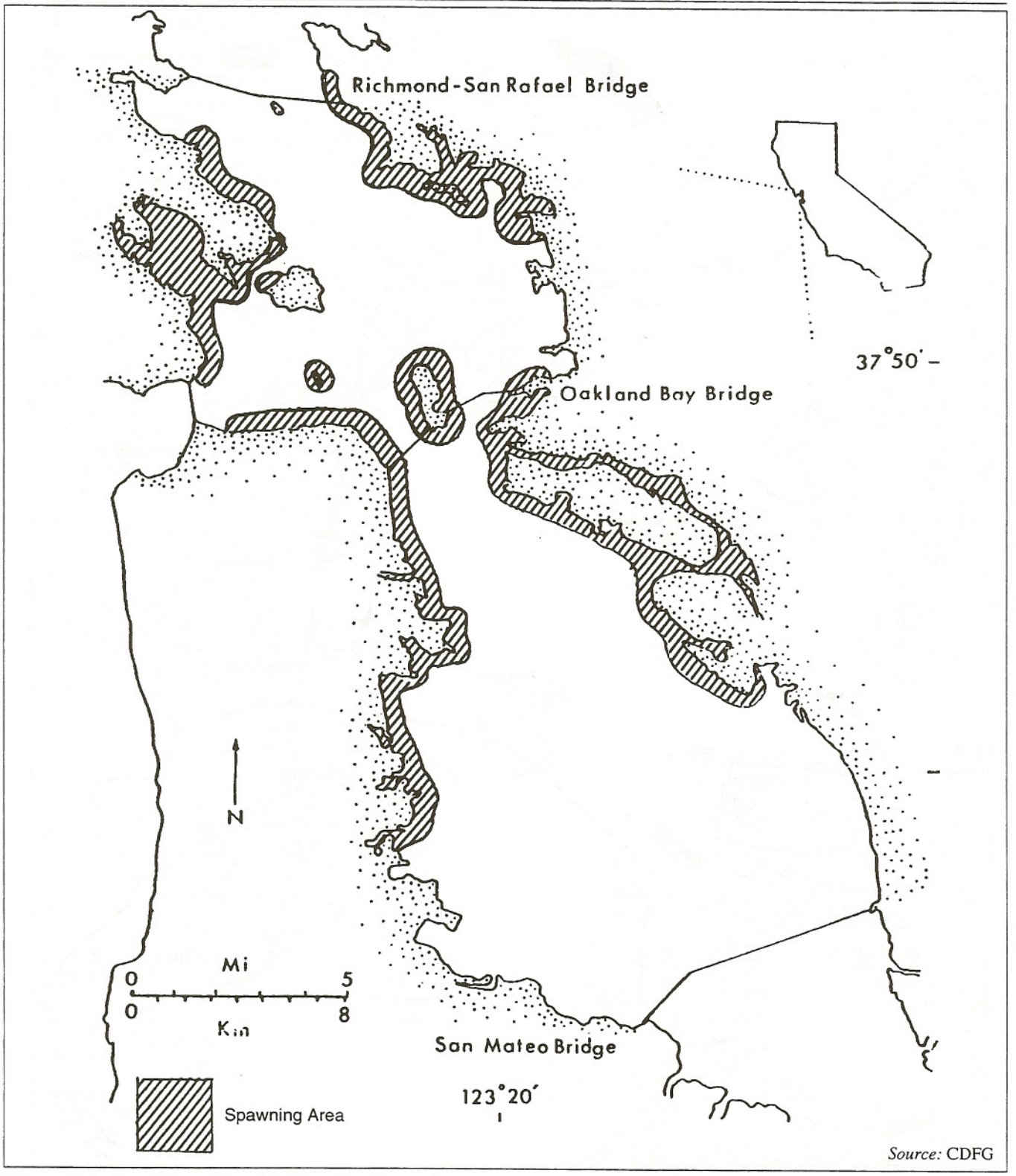

Figure J-2. Traditional Pacific Herring Spawning Areas in Central San Francisco Bay

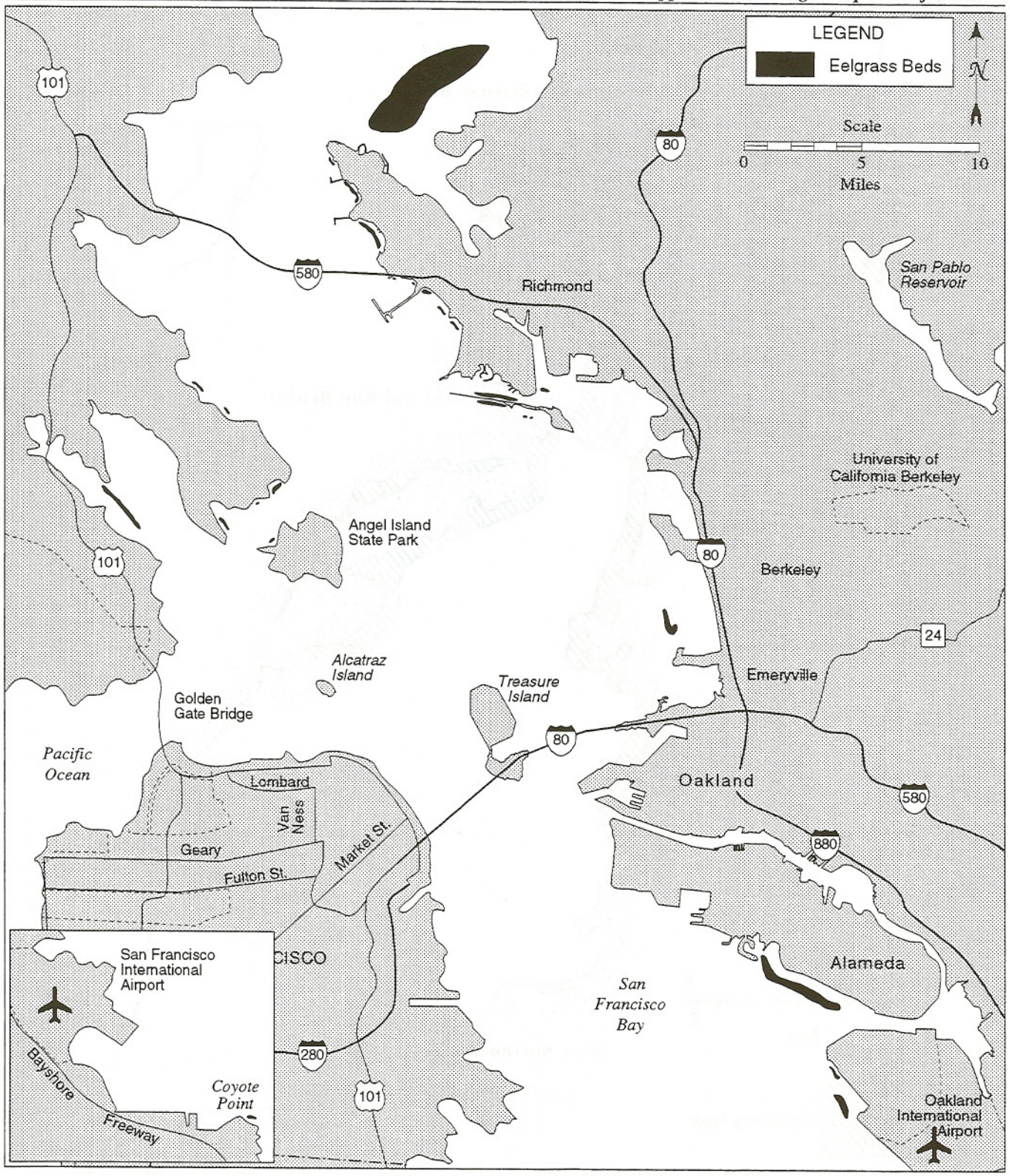

Figure J-3. Eelgrass Beds in San Francisco Bay

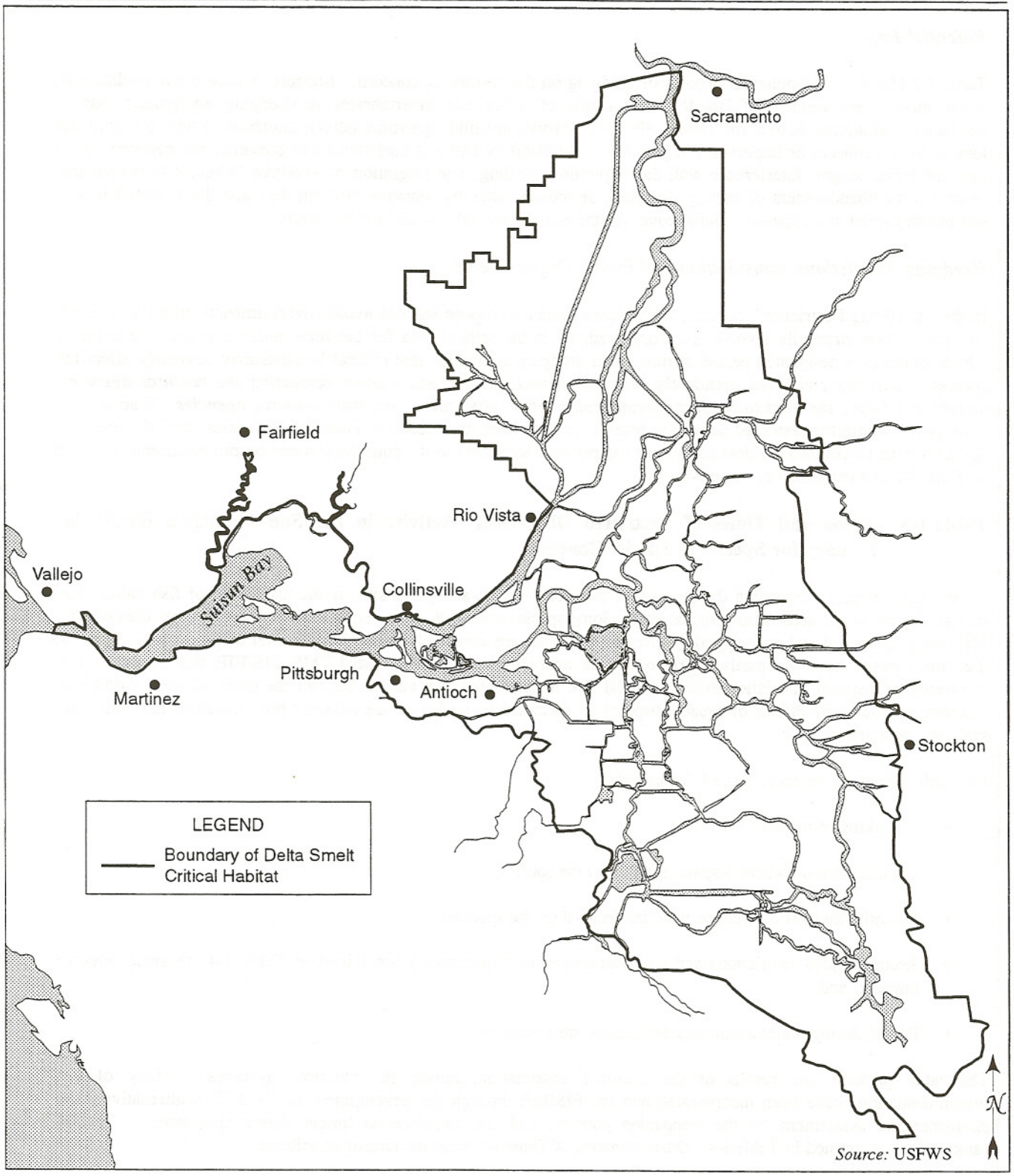

Figure J-4. Delta Smelt Critical Habitat

Potential Impact

Table J-2 identifies the potential impacts of dredging on the species of concern. Impacts include the degradation of water quality; entrainment of larval/juvenile stages of fishes and invertebrates in dredging equipment; loss or degradation of aquatic habitat for various life stages (larval, juvenile, spawning adult); interference with foraging and loss of food resources or important foraging habitats utilized by fish and bird species of concern; reduced survival of egg and larval stages; interference with the respiration, feeding, and migration of sensitive fishes; disturbance that results in the abandonment of nesting, foraging, or roosting sites by sensitive bird species; and the potential loss of salt marsh habitat and adjacent refugial cover for the endangered salt marsh harvest mouse.

Dredging Restrictions/Consultation and Permit Requirements

In the "Dredging Restriction" column, the resource agencies propose ways to avoid adverseimpacts on the species of concern. These primarily involve restricting dredging in the critical area for the time outlined in the next column, which identifies a designated period of time when dredging activity in that critical location may adversely affect the species. *Activities conducted outside the restricted period can proceed without contacting the resource agencies, thereby precluding the need to conduct a formal consultation with federal and state resource agencies.* If an activity is proposed within the restricted period for federal- or state-listed threatened or endangered species, then the resource agencies must be contacted unless the project can proceed according to the consultation and permit requirements noted in Table J-2 and explained in Table J-4.

Table J-3 Areas and Times of Restricted DISPOSAL Activity in the San Francisco Bay/Delta Estuary for Species of Special Concern

A significant concern regarding the disposal of dredged material at aquatic sites is the disruption of fish habitat and fish avoidance of the areas near disposal sites. Some species are much more sensitive to habitat changes than others. Migrating threatened and endangered species, for example, are accorded a much higher level of protection. Some of the issues raised here are partly addressed in the alternatives analysis in the LTMS EIS/EIR that considers the frequency of disposal in relation to the potential risk for changing fish habitat beyond the disposal site. Additional concerns surround the effects of aquatic disposal on species that inhabit or use adjacent tidal marshes, mudflats, and shallow water areas.

For each species of concern, Table J-3 presents:

- A ranking of the species' status;
- Critical location where disposal may affect the species;
- Potential impacts of dredged material disposal on the species;
- Recommended restrictions and consultation/permit requirements (explained in Table J-4) to avoid adverse impacts; and
- Period during which recommended actions are necessary.

The table presents the results of the informal consultation among the resource agencies. Many of the recommendations have been incorporated into the EIS/EIR through the development of the LTMS alternatives, the environmental assessment, or the companion policies, and are therefore no longer outstanding issues. Species rankings are as defined in Table J-4. Other elements of Table J-3 were developed as follows:

Critical Location

The agencies have identified the critical locations where disposal activities are likely to disrupt the species of concern. The critical areas identified in Table J-3 are drawn from the entire LTMS Planning Area, but some areas are not