

V. PROPOSED BAY FILL & HABITAT MITIGATION

Description of Existing Site Prior to Mitigation

The site is bordered by Suisun Bay on the south, import auto fleet parking to the west, Southern Pacific Railroad to the North, and an adjacent Department of Fish and Game (DFG)-managed diked tidal wetland fed by Goodyear Slough to the east.

It measures roughly 60 acres and encompasses a diked pond which was once a part of a duck club parcel. It has two tide gates, partially blocked, that access narrow channels connected to Suisun Bay. The site is now owned and monitored by the California Department of Fish and Game (DFG). Habitat on the site is a brackish diked tidal wetland. Roughly 70% of the site, the area closer to Suisun Bay, is below MHW. The levees surrounding the pond are above HTL.

The site's elevation and the lack of sufficient flooding from the neighboring DFG-managed pond do not allow DFG to maintain the quality and volume of water required for preferred waterfowl vegetation such as fat hen and brassbuttons. Thick grasses and pepperweed encroaching from the upland portion of the pond and levees are engulfing intertidal and diked tidal vegetation because of the lack of sufficient flooding. Historic perimeter and interior channels are becoming clogged with bulrushes as sediment is trapped in the pond. The tidal gates carry in sediment that is deposited in the channels and ebb velocities are insufficient to scour the channels. Currently, channels and ponds on the site total about two acres with the remainder of the bayward portion being diked tidal marsh.

Dominant plant species in the site include *Lepidium latifolium* (pepperweed), *Scirpus californicus* and *Scirpus acutus* (tules), *Scirpus robustus* (alkali bulrush), and *Typha angustifolia* (cattail), with sub-dominants *Distichlis spicata* (salt grass), *Salicornia virginica* (pickleweed), *Juncus balticus* (Baltic rush), *Baccharis donglassi*, and *Cotula coronopifolia* (brass buttons). Cattails and tules are most abundant along the banks of channels and ditches. Alkali bulrush is abundant around depressions and near channels. Other species occupy the diked high marsh plain, which is being invaded by pepperweed. Shallow open water is becoming crowded by tules, cattails, and bulrush. The vegetation mirrors that of the adjacent tidal marsh on the shoreline of Suisun Bay.

VI. IMPLEMENTATION PLAN

Restoration Effort

For habitat and net bay fill mitigation directed at providing increased habitat for endangered species, tidal restoration of the site is proposed (fig.3). Implementation of this plan will occur during the clapper rail window, September 1 to February 1 as the site is adjacent to clapper rail territory. The restoration effort will breach the outboard levee at the two tide gates, creating openings equal to the width of the outer channels. The breaches will be cut with 1:3 sideslopes (fig.4). The contractor will attempt to salvage vegetation at levee toes for replanting at the toe of the cut. The material from the breaches would be placed at a low section on top of the levee separating the neighboring pond managed with Goodyear Slough from the mitigation site to minimize overtopping now occurring between the ponds and provide increased refuge habitat during high water events. A dump truck and backhoe will create the breach and move the excess soil to the adjacent levee. No irrigation or planting is required for the breaches as the site is fully vegetated and the breaches will adjust to tidal flow, eroding or accreting to adjust to flow conditions.

Tidal data for the site vicinity are MHHW = 2.97 ft. NGVD and MHW = 2.44 ft. NGVD. The average site elevation is 2.10 ft. NGVD, only 0.34 ft below MHW. Existing pickleweed-dominated vegetation onsite occurs at elevations predominantly above MHW and also above MHHW. Therefore levee breaching is not likely to cause significant submergence or conversion of pickleweed-dominated vegetation (potential salt marsh harvest mouse habitat) to other vegetation types. Increased tidal circulation would probably alter the distribution and abundance of other vegetation types on the site, but would not cause the loss of any existing vegetation types present. The tidal restoration would cause the site's vegetation to approximate that of the outboard tidal marshes.

Past Examples

Similar projects have succeeded on the south side of Suisun Bay in the diked area between Hastings Slough and Tosco Refinery according to Department of Fish and Game (DFG) and conversations with Department of Water Resources. DFG has breached bayside levees at tide gates and achieved beneficial effects due to increased tidal action in previously-diked ponds.

VII. MAINTENANCE DURING MONITORING PERIOD

No maintenance is planned as the site is expected to develop naturally.

VIII. MONITORING PLAN

Monitoring will consist of random sampling in habitat zones on the site as well as along defined transects of channels in the site. Zones, transects, and the scale of sampling will be determined empirically in the field during baseline monitoring. In each of the habitat zones, annual monitoring will consist of random sampling of dominant vegetation types, the extent each type covers a zone, and observations of physical changes in topography in each zone especially channel creation or development.

Monitoring at chosen existing and developing channels along transects crossing the channels at 500 ft intervals will record wetted surface, width, depth, and perimeter vegetation types. In most cases only one transect will be required per channel because of channel length.

Surveys will occur initially to set baseline condition prior to construction and annually thereafter until the site shows development corresponding to the final success criteria.

IX. REPORTING

A report will be prepared after each survey documenting site progress. Photos of the site at each visit shall be included in the report reflecting material discussed in the report. Reports on mitigation progress will be submitted annually in March after monitoring visits in January until approval of mitigation success is received from the Corps Regulatory Branch (See section IX). Other agencies receiving copies of the report will include BCDC, California Fish & Game, U.S. Fish & Wildlife Service.

X. COMPLETION OF MITIGATION

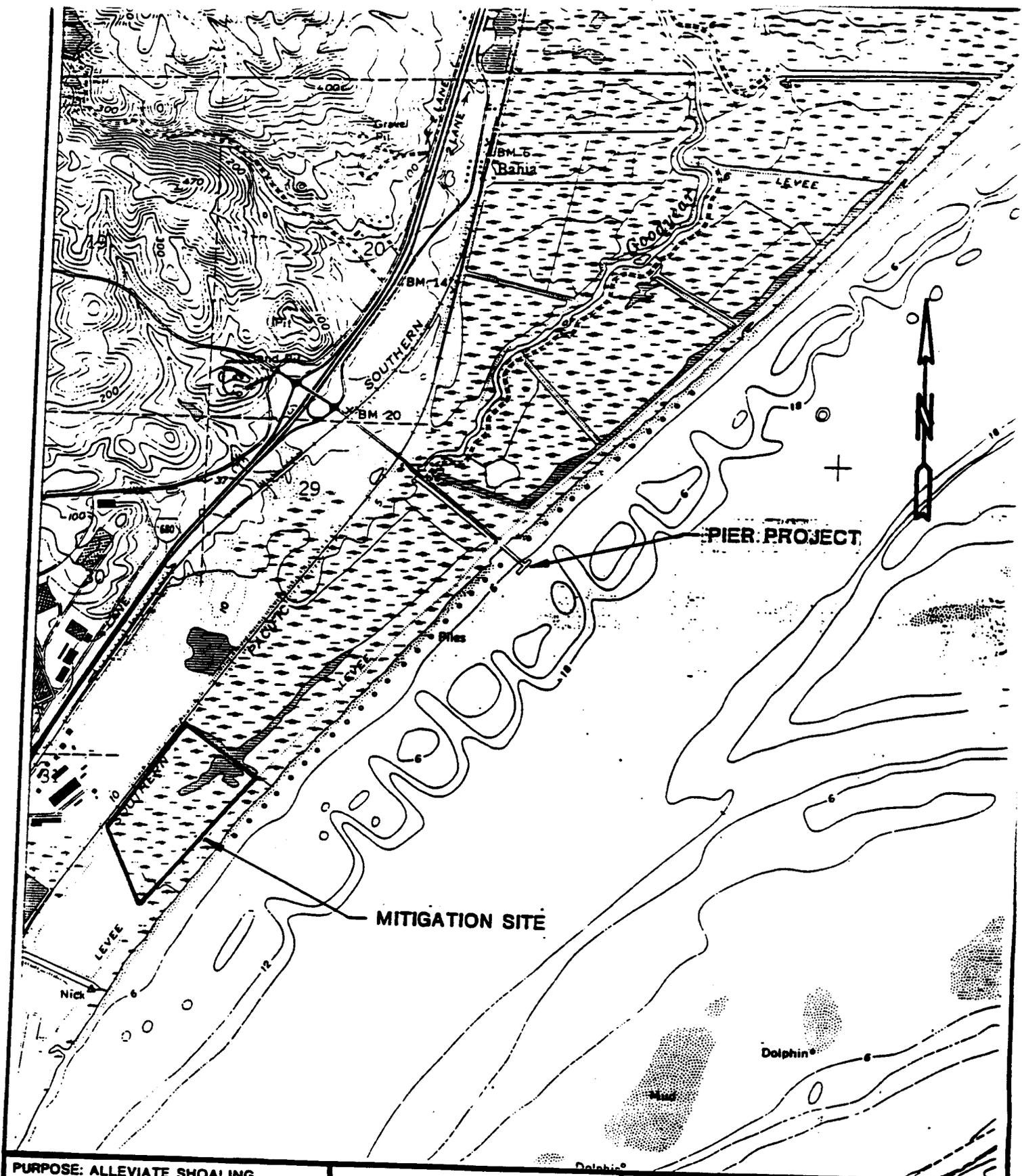
When the monitoring contractor believes that the mitigation success criteria have been met as listed in the special conditions in the regulatory permit, the contractor shall notify Corps Regulatory Branch for confirmation of that assessment.

XI. CONTINGENCY MEASURES

In the event that the special conditions concerning habitat mitigation are not met by judgement of the Corps Regulatory Branch, the site will be evaluated for remedial action to resolve the issue. Remedial action could consist of enlarging the breaches or creating channels inside the site to increase tidal influence, or other actions such as non-native plant control, planting native vegetation depending on the degree of mitigation success.

Appendix

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PURPOSE: ALLEVIATE SHOALING PROBLEM. PREVENT VESSEL GROUNDING

ADJACENT PROPERTY OWNERS:

1. STATE LANDS COMMISSION
2. FLEETSIDE DUCK CLUB
3. CA. DEPT OF FISH & GAME

PLAN VIEW

SCALE: 1" = 2000'

**NORTH SIDE OF SUISUN BAY
SOLANO COUNTY, CA**

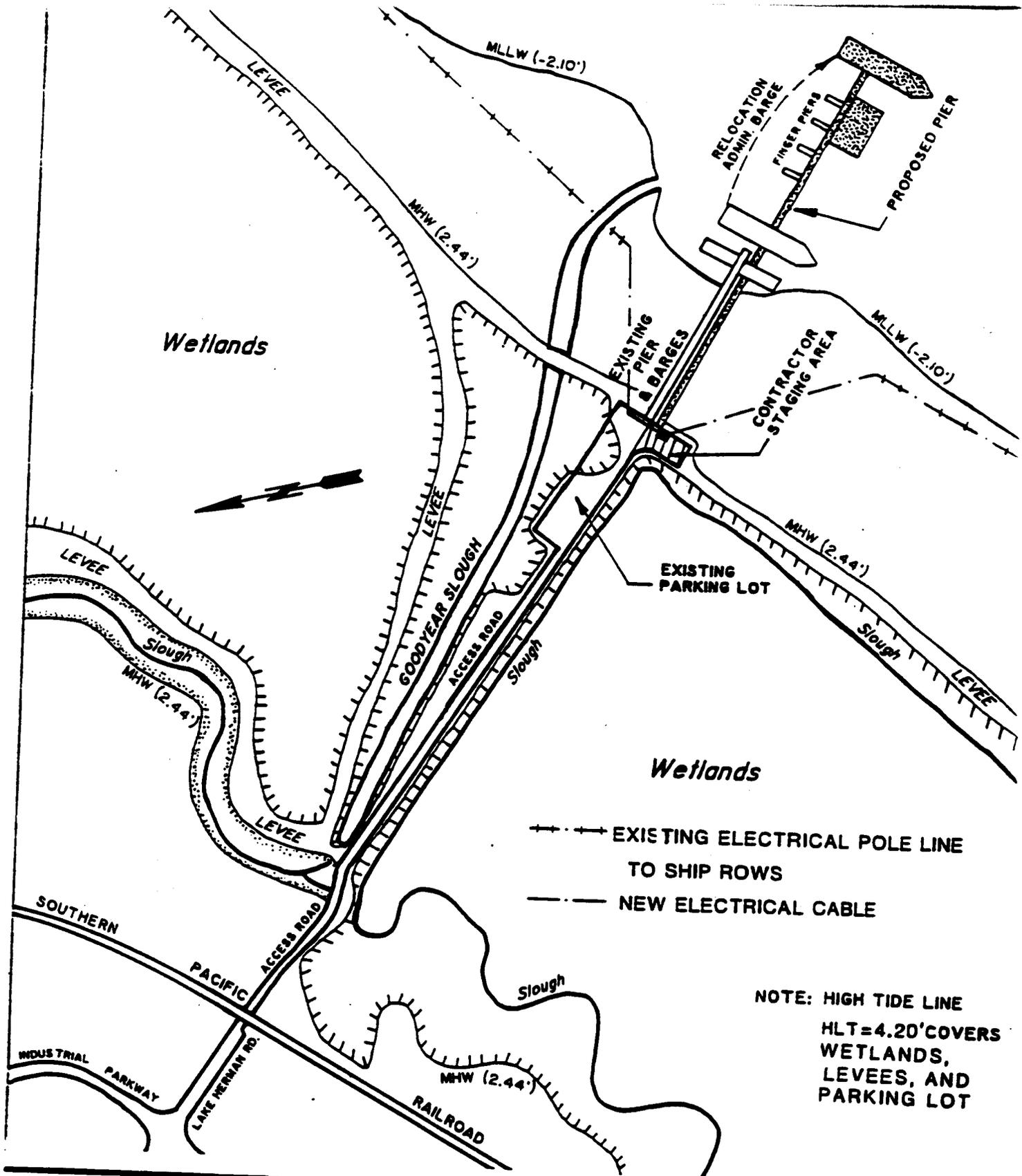
PROPOSED MARITIME ADMINISTRATION PIER VICINITY MAP IN: SUISIN BAY

~~AT FOOT OF LAKE HERMAN RD.~~

CADDENAB: PAGE NO 456 DATE: C

APPLICATION BY: U.S. MARITIME ADMINISTRATION

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PURPOSE: ALLEVIATE SHOALING PROBLEM, PREVENT VESSEL GROUNDING

DATUM: NGVD

ADJACENT PROPERTY OWNERS:

1. STATE LANDS COMMISSION
2. FLEETSIDE DUCK CLUB
3. CA. DEPT OF FISH & GAME

PLAN VIEW

SCALE 1" = 400'

NORTH SIDE OF SUISUN BAY
SOLANO COUNTY, CA

PROPOSED MARITIME ADMINISTRATION PIER

IN: SUISUN BAY

AT FOOT OF LAKE HERRMAN RD.

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STATE: CA

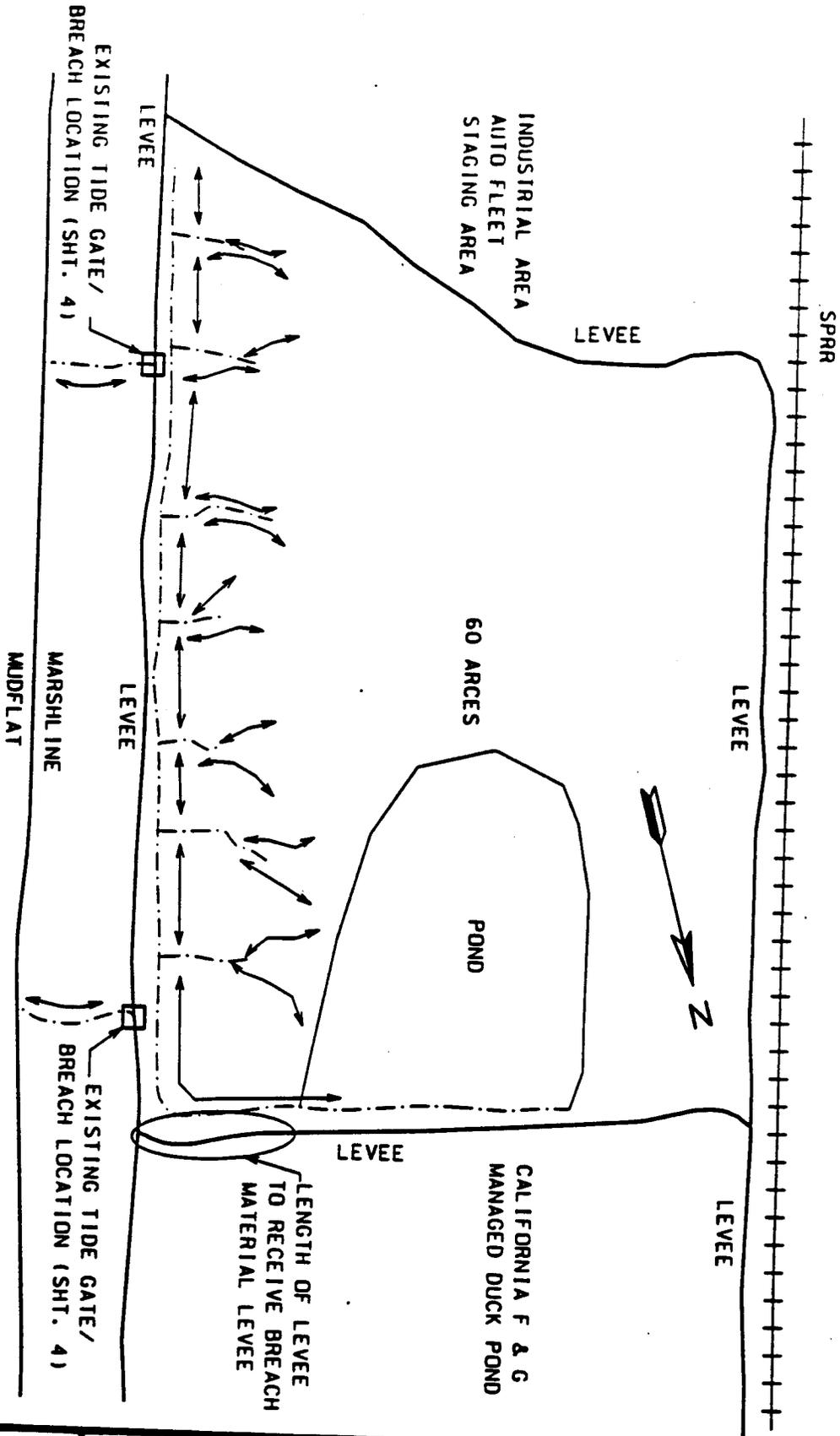
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SUISUN BAY

TIDAL/POND CHANNELS
TIDAL FLOW PATTERN EXPECTED
AFTER BREACHING LEVEE



INDUSTRIAL PARK

PURPOSE: ALLEVIATE SHOALING
PROBLEM. PREVENT VESSEL
GROUNDING

DATUM:

- ADJACENT PROPERTY OWNERS:
1. STATE LANDS COMMISSION
 2. FLEETSIDE DUCK CLUB
 3. CA. DEPT OF FISH & GAME

PLAN VIEW

SCALE: 1" = 600'

NORTH SIDE OF SUISUN BAY
SOLANO COUNTY, CA

PROPOSED MARITIME
ADMINISTRATION PIER
MITIGATION SITE
IN: SUISUN BAY

AT FOOT OF LAKE HERMAN RD.

COUNTY OF SOLANO STATE OF CALIFORNIA

APPLICANT: MARITIME ADMINISTRATION

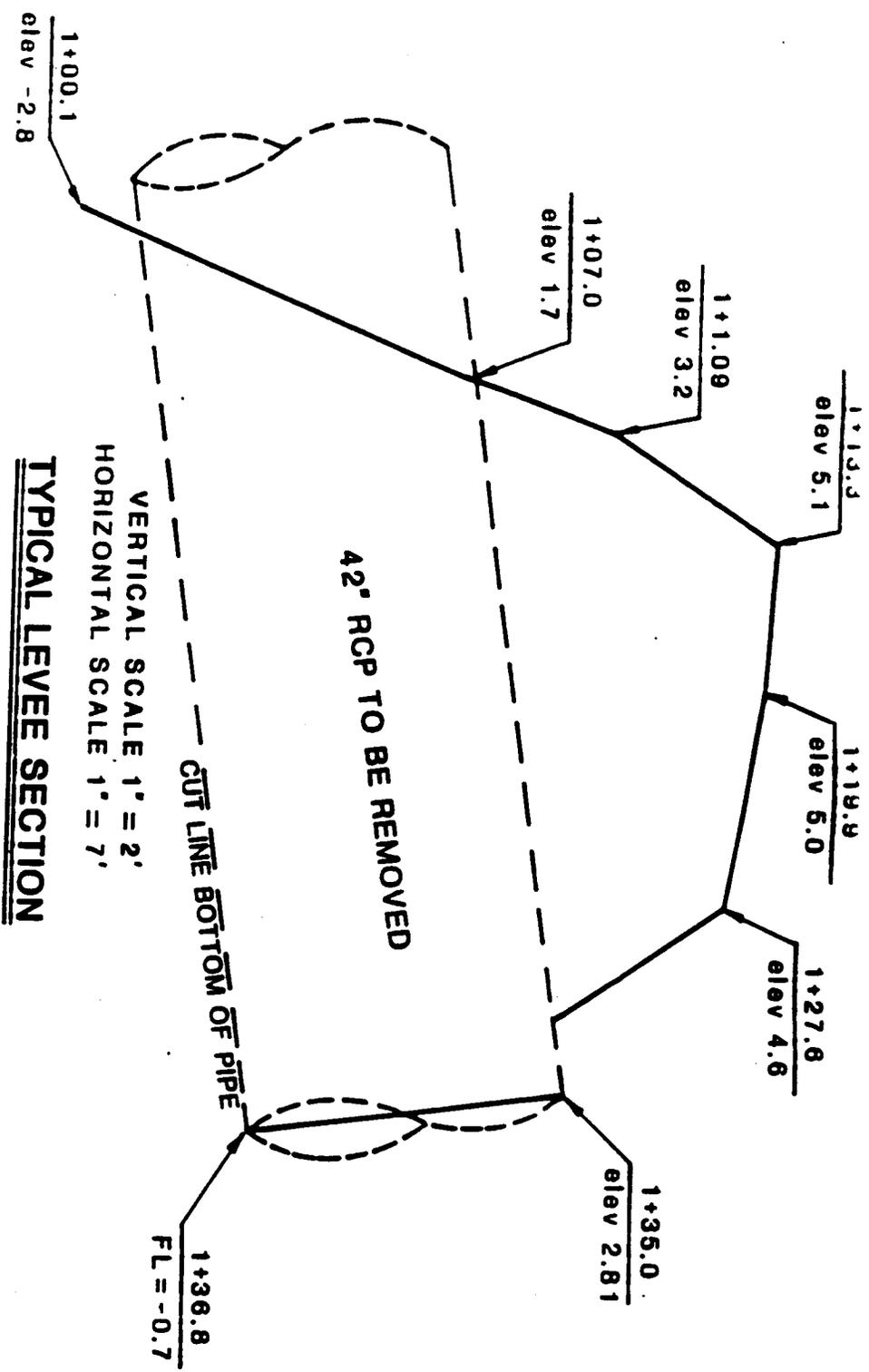
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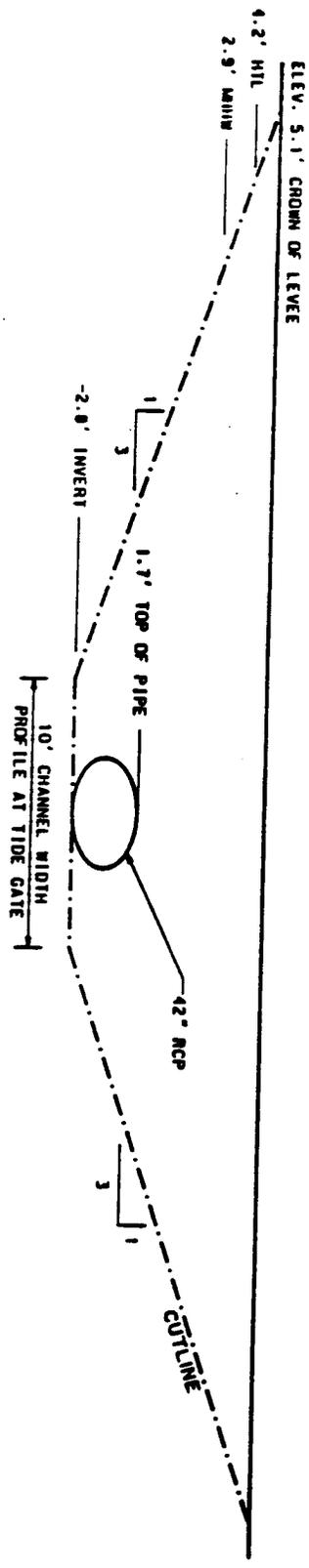
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ADMINISTRATION



TYPICAL LEEVEE SECTION

VERTICAL SCALE 1" = 2'
 HORIZONTAL SCALE 1" = 7'



TYPICAL LEEVEE PROFILE

SCALE 1" = 7'

PURPOSE: ALLEVIATE SHOALING PROBLEM, PREVENT VESSEL GROUNDING

DATUM: NGVD

ADJACENT PROPERTY OWNERS:

1. STATE LANDS COMMISSION
2. FLEETSIDE DUCK CLUB
3. CA. DEPT OF FISH & GAME

PLAN VIEW

EXISTING TIDEGATE AND BREACH LOCATION

NORTH SIDE OF SUISUN BAY
 SOLANO COUNTY, CA

PROPOSED MARITIME ADMINISTRATION PIER MITIGATION SITE IN: SUISIN BAY

AT FOOT OF LAKE HERMAN RD.
 CALIFORNIA OFFSHORE AND COASTAL STATE, CA
 APPLICATION BY: U.S. MARITIME ADMINISTRATION

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SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION

THIRTY VAN NESS AVENUE, SUITE 2011

SAN FRANCISCO, CA 94102-6080

PHONE: (415) 557-3686

LETTER OF AGREEMENT FOR CONSISTENCY
DETERMINATION NO. CN 8-85

December 9, 1985

U. S. Department of Transportation
Maritime Administration, Western Region
211 Main Street, Room 1112
San Francisco, California 94105

ATTENTION: S. W. Galstan
Western Region Director

Gentlemen:

I. Agreement

A. The San Francisco Bay Conservation and Development Commission agrees with the determination of the U. S. Department of Transportation, Maritime Administration, Western Region, that the following project is consistent with the Commission's Amended Coastal Zone Management Program for San Francisco Bay:

Location: In the Bay, at the Suisun Bay Reserve Fleet (the "mothball fleet") on the north shore of Suisun Bay, Solano County.

Description: Dredge approximately 83,000 cubic yards of sediment from the "mothball fleet" area with disposal of the dredge spoils at the federally-approved Carquinez Disposal Site.

B. This agreement is given based on the information submitted by or on behalf of the U. S. Department of Transportation, Maritime Administration, Western Region, in its consistency determination dated September 23, 1985, as revised by its letter dated November 19, 1985.

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II. Findings and Declarations

On behalf of the Commission, I find and declare that:

A. On September 23, 1985, the U. S. Department of Transportation, Maritime Administration, Western Region, submitted a description of the project and requested that the Commission concur that the proposed project is consistent with its Amended Coastal Zone Management Program for San Francisco Bay. On November 19, 1985, the Maritime Administration revised their consistency determination slightly to reduce the amount of dredging and the size of the area to be dredged. Based on the information contained in those revised materials, the Commission finds the proposed project to be consistent with the provisions of the McAteer-Petris Act and the policies of the San Francisco Bay Plan in that the spoils from the project site will be deposited at a federally-approved disposal site within the Bay so the maximum amount of deposited dredged spoils will be carried out of the Bay.

The project will result in the destruction of some tidal marsh and mudflat. The Commission's policies clearly state that marshes and mudflats should be maintained to the fullest possible extent. The staff has worked with the Maritime Administration to reduce the area of marsh to be destroyed to the maximum extent. However, the Maritime Administration has indicated this is an area of high siltation and colonization of marsh plants and that future dredging may be required which will require the destruction of marsh. The Commission advises the Maritime Administration that the Maritime Administration should investigate alternatives to the dredging that would not result in the loss of such habitat. The Commission believes that hydrological studies of the site should be conducted by the Maritime Administration to determine the best long-range solution to the siltation problem at the pier. The Commission finds that the results of such a study and the Maritime's efforts to implement the study's recommendations will be important factors in the Commission's findings of consistency with regard to future dredging proposals at this site.

B. The proposed project is categorically exempt from the requirement to prepare an environmental impact report, pursuant to Regulation Section 10910, because the project is equivalent to a "minor repair or improvement," as defined in Regulation Section 10122(a)(1), which authorizes "all routine maintenance dredging of whatever amount," and Regulation Section 10122(a)(3), which authorizes "the deposit of dredged spoils in a dumping grounds in the amounts and manner and at the times set in the specific policy adopted by the U. S. Army District Engineer, San Francisco District, and by the Regional Water Quality Control Board, San Francisco Region."placing utility cables on or under the bottom of the Bay.

LETTER OF AGREEMENT FOR CONSISTENCY
DETERMINATION NO. CN 8-85
U. S. Department of Transportation
Maritime Administration
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C. The Commission, pursuant to the Coastal Zone Management Act of 1972, as amended (16 USC Section 1451), and the implementing Federal Regulations in 15 CFR Part 930, is required to review Federal projects within San Francisco Bay and agree or disagree with the Federal agency's determination that the project is consistent with the Commission's Amended Coastal Zone Management Program for San Francisco Bay. This letter constitutes such review and comment.

D. This project was listed with the Commission on November 7, 1985, at which time no Commissioner or other party objected to this project.

Executed in San Francisco, California, on behalf of the San Francisco Bay Conservation and Development Commission on the date first above written.


ALAN R. FENDLETON
Executive Director

ARP/LP/mm

cc: U. S. Army Corps of Engineers, Attn: Regulatory Functions Branch
San Francisco Bay Regional Water Quality Control Board,
Attn: Certification Section

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TABLE C NET AREA OF IMPACT (FT²)

PROJECT FEATURE	RUDERAL	BRACKISH MARSH	MUD FLAT	OPEN BAY	NET CHANGE
PIER/ CAUSEWAY	0	-1,476	-646	+21,120	+18,968
APL	0	0	0	12,689	0
MOORING DOLPHINS	0	-60	-60	-307	-427
FLOATING DOCKS AND BARGES	0	0	0	-9,820	-9,820
UTILITY LINES	10,920	304	0	0	+11,224
ELECTRICAL SUBSTATION	0	-2,615	0	0	-2,615
TOTAL	10,920	-3,847	-736	+10,993	+17,330

*Gray shading indicates no change.

TABLE D TEMPORARY CONSTRUCTION IMPACT AREA (FT²)

PROJECT FEATURE	RUDERAL	BRACKISH MARSH	MUD FLATS	OPEN BAY	TOTAL
CONSTRUCTION PATHWAY	0	8,339	5,239	0	13,578

**Disturbance width (50 feet -19 feet= 31 feet).



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Sacramento Field Office
2800 Cottage Way, Room E-1823
Sacramento, California 95825-1846

In Reply Refer To:
1-1-94-F-19

August 17, 1994

Lt. Colonel Michael J. Walsh
U.S. Army Corps of Engineers
Regulatory Branch (Attn: Mark Bartholomew)
211 Main Street
San Francisco, California 94105-1905

Subject: Endangered Species Formal Consultation on the Proposed
Modifications to the Maritime Administration Suisun Bay Reserve
Fleet Maintenance Facility Pier

Dear Lt. Colonel Walsh:

This responds to your request for formal consultation on issuance of a permit to the U.S. Department of Transportation, Maritime Administration to construct a new pier and remove the existing pier at the Reserve Fleet maintenance facility in Suisun Bay. The U.S. Army Corps of Engineers (Corps) submitted a biological assessment with this request on March 1, 1994. Your request for formal consultation and conferencing was received by the U.S. Fish and Wildlife Service (Service) on March 3, 1994.

This biological opinion addresses the effects of pier and associated facilities construction and pier removal on the endangered California clapper rail (*Rallus longirostris obsoletus*), threatened delta smelt (*Hypomesus transpacificus*), and proposed threatened Sacramento splittail (*Pogonichthys macrolepidotus*).

This biological opinion is based on (1) An Environmental Assessment of the Proposed Modifications to the Maritime Administration Suisun Bay Reserve Fleet Maintenance Facility Pier, dated February 1994, (2) the Maritime Administration Maintenance Facility Project Description, dated April 8, 1994, (3) information in Service files; and (4) additional communications between the Corps, the Maritime Administration, and the Service.

Biological Opinion

It is our biological opinion that the proposed action is not likely to jeopardize the continued existence of the endangered California clapper rail, threatened delta smelt, or proposed threatened Sacramento splittail. Critical habitat for the California clapper rail and Sacramento splittail has not been

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designated; therefore, none will be adversely modified or destroyed. Critical habitat has been proposed for delta smelt but is not likely to be adversely modified or destroyed.

Description of the Proposed Action

The Suisun Bay National Defense Reserve Fleet is located in northwestern Suisun Bay just north of the Carquinez Strait in Solano County, California. Maintenance of the Reserve Fleet is accomplished from an Administration Barge which is anchored about 475 feet offshore. The Barge acts as a docking facility for the various work vessels that maintain and repair the Reserve Fleet vessels. A floating causeway connects the Administration Barge to the shore.

Over the years shoaling between the shoreline and the Administration Barge has created operational problems for the Fleet. Dredging was performed in 1973 and 1986. As an alternative to costly maintenance dredging, the Maritime Administration now proposes to construct a 1,400 foot elevated pier into Suisun Bay. The Administration Barge would be located at the bayward end of the pier. Work vessels associated with the Barge would be berthed at floating finger docks extending from the sides of the pier. The pier would be constructed out of precast concrete piers and a cast-in-place concrete deck. Vehicle traffic as well as water, sewer, and electrical lines would be supported by the pier.

The new pier would be constructed next to the existing floating causeway. Once the new pier is completed, the old causeway would be removed in sections. Floating sections would be salvaged and towed from the site. Damaged sections would be demolished and removed. The existing electrical substation, which is located in the tidal marsh, would be removed and a new substation constructed in the parking lot of the facility.

Construction supplies and materials would be stored in the parking lot adjacent to the tidal marsh. A land-based piledriving rig would be used to drive piles close to shore. For those piles that the land-based rig could not reach, a pile-driving barge would be floated into the site. Electrical lines to the ship rows east and west of the Administration Barge would be laid 600 feet on the wetlands from the new substation to the existing power pole lines. Utilities and lighting would be installed on the pier after the structural work is substantially completed. During construction activities, intrusion into the wetland would be limited to foot traffic.

Construction is projected to begin in August, 1994, with project completion within about 8 months or March, 1995.

Species Account/Environmental Baseline

California Clapper Rail

Please refer to U.S. Fish and Wildlife Service (1984) for biological information on the California clapper rail. Additional information is taken from a previous biological opinion prepared by the Service dated August 1985.

1990, on Department of the Army permit application no. 15283E49, however, certain sections on the distribution, abundance, and status of the rail contained in that opinion are updated below to reflect current information.

Of the 193,800 acres of tidal marsh that bordered San Francisco Bay in 1850, about 30,100 acres currently remain (Dedrick 1993). This represents an 84 percent reduction from historical conditions. In Suisun Marsh alone, about 56,300 acres of tidal marsh occurred historically. Only 6,900 acres or 12 percent remain today. A number of factors influencing remaining tidal marshes limit habitat values for clapper rails. In Suisun Marsh as well as other portions of the Bay, habitat suitability of many marshes for clapper rails is limited or precluded by small size, fragmentation, and lack of tidal channel systems and other microhabitat features. Of the 6,900 acres of tidal marsh in Suisun Marsh, only about 3,000 acres or 43 percent provide what would be considered suitable habitat for nesting clapper rails. Remaining tidal marsh habitat is comprised of narrow strips adjacent to levees. Although unsuitable for nesting, these narrow strips of marsh provide movement corridors for rails dispersing from existing nesting areas. In addition, the majority of tidal marsh in the eastern portions of Suisun Marsh is comprised of primarily freshwater vegetation which is unsuitable for the clapper rail. In other portions of the Bay, marsh erosion and conversion to freshwater habitat are eliminating or limiting available habitat for clapper rails. These limitations render much of the remaining tidal marsh acreage in San Francisco Bay unsuitable or of low value for the species.

Throughout the Bay, the remaining California clapper rail population is besieged by a suite of mammalian and avian predators. At least twelve native and three non-native predator species are known to prey on various life stages of the rail in the south Bay (Albertson et al., in prep.). Albertson et al. (in prep.) reported nest predation as high as 64 percent in some south Bay marshes. Red fox, Norway rats, and various raptors are the most common predators of clapper rails in the south Bay. Suisun Marsh provides habitat for a wide range of potential clapper rail predators (California Department of Fish and Game (CDFG) 1975), but no studies have been done in the Marsh on the effects of predators on clapper rails. Populations of Norway rats and red fox are probably lower in Suisun Marsh than in other portions of the Bay because urban centers are more remote and because the Marsh supports coyotes, a natural predator of foxes.

Mercury accumulation in eggs is perhaps the most significant contaminant affecting clapper rails in San Francisco Bay, with the south Bay containing the highest mercury levels. Mercury is extremely embryo toxic and has a long biological half-life. The Service collected data from 1991 and 1992 on mercury concentrations in rail eggs in the southern portion of the estuary and found that the current accumulation of mercury in rail eggs occurs at potentially harmful levels. The percentage of non-viable eggs ranged from 24 to 38 percent (mean = 29 percent). No similar studies of contaminants and their effects on clapper rails have been done in Suisun Marsh.

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Gill (1979) estimated the total California clapper rail population in San Francisco Bay in the mid-1970's at 4,200 to 6,000 birds. Surveys conducted by the CDFG and the Service estimated that the clapper rail population approximated 1,500 birds in the mid-1980s (Harvey 1988). In Suisun Marsh, Harvey (1988) estimated a population of only 25 clapper rails. In 1988, the total San Francisco Bay clapper rail population was estimated to be 700 individuals with 200-300 rails in the north Bay and Suisun Marsh (Foerster 1989). The total rail population reached an estimated all-time historical low of about 500 birds in 1991 with the greatest recorded declines occurring in the south Bay (USFWS unpubl. data; E. Harding-Smith, pers. comm., 1993). In response to predator management, the south Bay rail population has since rebounded and is now estimated to be approximately 600 individuals (USFWS unpubl. data). A preliminary estimate of the north Bay and Suisun Marsh population is 195-422 pairs (Evens and Collins 1992).

Recent clapper rail surveys conducted exclusively in Suisun Marsh by the California Department of Water Resources (CDWR) since 1991 estimate a population of about 50 rails in the Marsh (B. Grewell, pers. comm., 1994). Nesting clapper rails occur in four locations in the Marsh: (1) Hill Slough, (2) Cutoff Slough or Rush Ranch, (3) tidal marshes fronting Suisun Bay at the mouth of Suisun Slough, and (4) Goodyear Slough adjacent to the Mochball Fleet. Nesting rails in Suisun Marsh are associated with large stands of bulrush. In the north and south Bay, clapper rails nests are most commonly observed in pickleweed, cordgrass, and gumplant. An estimated 6 pairs of clapper rails nest in tidal marshes in the Goodyear Slough area (B. Grewell, pers. comm., 1993). The existing pier at the Maritime Administration Facility is apparently within a clapper rail nesting territory. Clapper rails have been heard vocalizing from underneath the pier during the breeding season (B. Grewell, pers. comm., 1993).

In a north Bay marsh, Evens and Page (1983) concluded that the breeding season, including pair bonding and nest construction, may begin as early as February. Field observations in south Bay marshes suggest that pair formation also may occur in February in some areas (J. Takekawa, pers. comm., 1993). Similar observations have been made in Suisun Marsh (B. Grewell, pers. comm., 1993). The end of the breeding season is typically defined as the end of August, which corresponds with the time when eggs laid during re-nesting attempts have hatched and young are mobile. Young may fledge as late as mid September (J. Takekawa, pers. comm., 1993).

Delta Smelt

Please refer to the final rule to list the delta smelt as a threatened species (58 FR 12854), and the May 26, 1993, CVP-OCAP biological opinion for delta smelt (Case No. 1-1-93-F-32) and the draft Biological Assessment 1993, for additional information on the biology and ecology of this species.

Historically, the delta smelt is thought to have occurred from Suisun Bay upstream to the city of Sacramento on the Sacramento River.

San Joaquin River (Moyle *et al.* 1992). The delta smelt is an euryhaline species (tolerant of a wide salinity range) that spawns in fresh water and has been collected from estuarine waters up to 14 grams per liter (parts per thousand, ppt) salinity (Moyle *et al.* 1992). For a large part of its annual life span, this species is associated with the freshwater edge of the entrapment zone (mixing zone at the saltwater-freshwater interface), where the salinity is approximately 2 ppt (Ganssle 1966, Moyle *et al.* 1992, Sweetnam and Stevens 1993).

The delta smelt is adapted to living in the highly productive Sacramento-San Joaquin River Estuary where salinity varies spatially and temporally according to tidal cycles and the amount of freshwater inflow. Despite this tremendously variable environment, the historical Estuary probably offered relatively constant suitable habitat conditions to delta smelt, which could move upstream or downstream with the entrapment zone (P. Moyle, pers. comm., 1993). The final rule to list the delta smelt as a threatened species (58 FR 12854) describes in detail the factors that have lead to this species' decline.

Shortly before spawning, adult delta smelt migrate upstream from the highly productive brackish-water habitat associated with the entrapment zone to disperse widely into river channels and tidally-influenced backwater sloughs (Moyle 1976, Radtke 1966, Wang 1991). Migrating adults with nearly mature eggs have been taken at the Central Valley Project's Tracy Pumping Plant from late December 1990 to April 1991 (Wang 1991).

Delta smelt spawn in shallow, fresh or slightly brackish water upstream of the entrapment zone (Wang 1991). Most spawning occurs in tidally-influenced backwater sloughs and channel edgewater (Moyle 1976; Moyle *et al.* 1992; Wang 1986, 1991). Although delta smelt spawning behavior has not been observed (Moyle *et al.* 1992), the adhesive, demersal eggs are thought to attach to substrates such as cattails and tules, tree roots, and submerged branches (Moyle 1976, Wang 1991). In the Delta, spawning is known to occur in the Sacramento River, Barker Slough, Lindsey Slough, Cache Slough, Georgiana Slough, Prospect Slough, Beaver Slough, Hog Slough, and Sycamore Slough (D. Sweetnam, pers. comm. 1993; Wang 1991). Delta smelt also spawn north of Suisun Bay in Montezuma and Suisun sloughs and their tributaries (L. Meng, pers. comm. 1993, D. Sweetnam pers. comm. 1993).

The spawning season varies from year to year and may occur from late winter (December) to early summer (July). Moyle (1976) collected gravid adults from December to April, although ripe delta smelt were most common in February and March. In 1989 and 1990, Wang (1991) estimated that spawning had taken place from mid-February to late June or early July, with the peak spawning period occurring in late April and early May.

Based on data for a closely related species, delta smelt eggs probably hatch in 12-14 days (Moyle *et al.* 1992). After hatching, larvae are transported downstream toward the entrapment zone where they are retained by the vertical circulation of fresh and salt waters (Stevens *et al.* 1993).

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larvae and juveniles feed on zooplankton. When the entrapment zone is located in a broad geographic area with extensive shallow-water habitat within the euphotic zone (depths less than four meters), high densities of phytoplankton and zooplankton are produced (Arthur and Ball 1978, 1979, 1980), and larval and juvenile fish, including delta smelt grow rapidly (Moyle *et al.* 1992, Sweetnam and Stevens 1993). In general, estuaries are among the most productive ecosystems in the world (Goldman and Horne 1993). Estuarine environments produce an abundance of fish as a result of plentiful food and shallow, protective habitat for young.

When the entrapment zone is contained within Suisun Bay, young delta smelt are dispersed widely throughout a large expanse of shallow-water and marsh habitat. Dispersion in areas downstream from the State and Federal water pumps and in-Delta agricultural diversions protects young smelt from entrainment and distributes them among the extensive, protective, and highly productive shoal regions of Suisun Bay. In contrast, when located upstream, the entrapment zone becomes confined in the deep river channels, which are smaller in total surface area, contain fewer shoal areas, have swifter, more turbulent water currents, and lack high zooplankton productivity.

In studies by the CDFG, CDWR, and Bureau of Reclamation, larval and juvenile delta smelt were collected from Roe Island in Suisun Bay north to the confluence of the Sacramento and Feather Rivers and east to Medford Island on the San Joaquin River (Wang 1991). These studies were conducted during the months of April through mid-July in 1989 and 1990. Through these distribution surveys, Wang (1991) was able to document the movement of juvenile delta smelt from the Delta to Suisun Bay in late-June to early July. In 1990, young delta smelt were taken at the Tracy Pumping Plant at the end of February (Wang 1991).

The existing environmental baseline includes CVP/SWP operations modified by D-1485, the February 12, 1993, winter-run chinook salmon biological opinion, and the Service's February 4, 1994, delta smelt biological opinion. The Service's 1994 opinion addressed effects of CVP/SWP project operations from February 4, 1994 to February 15, 1995.

The delta smelt is adapted to living in the highly productive Sacramento-San Joaquin River estuary where salinity varies spatially and temporally according to tidal cycles and the amount of freshwater inflow. Despite this tremendously variable environment, the historical estuary probably offered relatively constant suitable habitat conditions to delta smelt, which could move upstream or downstream with the entrapment zone (P. Moyle, pers. comm., 1993). Since the 1850's, however, the amount and extent of suitable habitat for the delta smelt has declined dramatically. The advent in 1853, of hydraulic mining in the Sacramento and San Joaquin Rivers, lead to increased siltation and alteration of the circulation patterns of the Estuary (Nichols *et al.* 1986, Monroe and Kelly 1992). The reclamation of Merritt Island for agricultural purposes, in the same year, marked the beginning of the present-day cumulative loss of 94 percent of the estuary's tidal marshes (Nichols *et al.* 1986, Monroe and Kelly 1992).

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In addition to this degradation and loss of estuarine habitat, the delta smelt has been increasingly subject to entrainment, upstream or reverse flows of waters in the Delta and San Joaquin River, and constriction of low salinity habitat in the less productive, deep-water river channels of the Delta (Moyle *et al.* 1992). These adverse conditions are primarily a result of the steadily increasing proportion of water diverted from the Delta by the Federal and State water projects (Monroe and Kelly 1992). Water delivery through the Federal Central Valley Project began in 1940. The State Water Project began delivering water in 1968. However, the proportion of fresh water being diverted has increased since 1983, and has remained at extremely high levels ever since (Moyle *et al.* 1992). The high proportion of fresh water exported has exacerbated the already harsh environmental conditions experienced by the delta smelt during the last six drought years. As a result of the 1993 above-normal water year and implementation of the 1993 delta smelt biological opinion mitigation requirements, low salinity habitat was pushed westward of Roe Island at the beginning of the year and gradually has been pulled eastward to its present position in the western Delta as inflow has decreased and water exports have increased. As a result, of this more favorable placement of low salinity habitat in 1993, the fall midwater trawl index shows that adult delta smelt abundance has increased.

Several monitoring studies conducted by CDFG and the University of California, Davis (Moyle and Herbold 1989, Stevens *et al.* 1990, Moyle *et al.* 1992) have demonstrated that from 1983 to 1992, the delta smelt population had remained at consistently low levels. Seven abundance indices used to record trends in the status of the delta smelt showed that this species had not previously suffered as consistently low population levels as those experienced in the last ten years (Stevens *et al.* 1990). These same indices also show a pronounced decline from historical levels of abundance. The summer tow net abundance index is thought to be one of the more representative indices since data has been collected over a wide geographic area (from San Pablo Bay upstream through most of the Delta) for the longest period of time (since 1959). Figure 1 shows the distribution of summer tow net sampling sites. The summer tow net abundance index measures the abundance and distribution of larval delta smelt and provides data on the recruitment potential of the species. Except for one year (1986), this index has remained at low levels since 1983 (Figure 2).

The second longest running study (since 1967), the fall midwater trawl abundance index, measures the abundance and distribution of adult delta smelt in a large geographic area (San Pablo Bay upstream to Rio Vista on the Sacramento River and Stockton on the San Joaquin River, Figure 3) and provides an indication of their survivorship to the later months of their one-year life span. Figure 4 shows that until recently, this index has dropped over the past 20 years.

Figure 5 summarizes the results of seven surveys currently done by the Interagency Ecological Study Program (IESP) that illustrate the dramatic declines in delta smelt that can be attributed to existing baseline conditions. Existing baseline conditions do not provide

outflows (6,800 cfs to 12,000 cfs) from February 1 through June 30 to transport larval and juvenile delta smelt to Suisun Bay or provide them low salinity, productive rearing habitat in this area (B. Herbold, pers. comm., 1993). Transport to the shallow reaches of Suisun Bay also allows delta smelt to disperse in a wide geographic area, thus increasing their chances for survival to adulthood.

Sacramento splittail

The Sacramento splittail, (*Pogonichthys macrolepidorus*), is a large cyprinid that can reach greater than 12 inches in length (Moyle 1976). Adults are characterized by an elongated body, distinct nuchal hump, and a small blunt head with barbels usually present at the corners of the slightly subterminal mouth. This species can be distinguished from other minnows in the Central Valley of California by the enlarged dorsal lobe of the caudal fin. Splittail are a dull, silvery-gold on the sides and olive-grey dorsally. During the spawning season, the pectoral, pelvic and caudal fins are tinged with an orange-red color. Male develop small white nuptial tubercles on the head.

Splittail are endemic to California's Central Valley where they were once widely distributed (Moyle 1976). Historically, splittail were found as far north as Redding on the Sacramento River and as far south as the site of Friant Dam on the San Joaquin River (Rutter 1908). Rutter (1908) also found splittail as far upstream as the current Oroville Dam site on the Feather River and Folsom Dam site on the American River. Anglers in Sacramento reported catches of 50 or more splittail per day prior to damming of these rivers (Caywood 1974).

In recent times, dams and diversions have increasingly prevented upstream access to large rivers and the species is restricted to a small portion of its former range (Moyle and Yoshiyama 1992). Splittail enter the lower reaches of the Feather (Jones and Stokes 1993) and American Rivers (Charles Hanson, State Water Contractors, *in litt.*, 1993) on occasion, but the species now largely is confined to the Delta, Suisun Bay, Suisun Marsh, and Napa Marsh.

Splittail are long lived, frequently reaching five to seven years of age. Females are highly fecund and each produces over 100,000 eggs. Populations fluctuate annually depending on spawning success. Spawning success is highly correlated with fresh water outflow and the availability of shallow-water habitat with submerged vegetation (Daniels and Moyle 1983). Splittail usually reach sexual maturity by the end of their second year. There is some variability in the reproductive period since older fish reproduce before younger individuals (Caywood 1974). The onset of spawning is associated with rising temperature and peaks from the months of March through May, although there are records of spawning from late January to early July (Wang 1986). Spawning occurs over flooded vegetation in tidal freshwater and euryhaline habitats of estuarine marshes and sloughs and slow-moving reaches of large rivers. Larvae remain in shallow, weedy areas close to spawning sites and move into deeper water as they mature (Wang 1986).

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Splittail are benthic foragers that feed on opossum shrimp, although detrital material makes up a large percentage of their stomach contents (Daniels and Moyle 1983). Earthworms, clams, insect larvae, and other invertebrates are also found in the diet. Predators include striped bass and other piscivores. Splittail are sometimes used as bait for striped bass. Although this occurs it is not a common practice.

Splittail can tolerate salinities as high as 10-18 parts per thousand (Moyle 1976, Moyle and Yoshiyama 1992). Splittail are found throughout the Delta, Suisun Bay and the Suisun and Napa marshes. They migrate upstream from the brackish areas to spawn in freshwater. Because they require flooded vegetation for spawning and rearing, splittail are frequently found in areas subject to flooding.

The 1983-1992 decline in splittail abundance is concurrent with hydrologic changes to the Sacramento-San Joaquin Estuary. These changes include increases in water diversions during the spawning period of January through July and dams that limit upstream migration. Diversions, dams and reduced outflow, coupled with severe drought years, introduced aquatic species such as Asiatic clam (Nichols *et al.* 1990), and loss of wetlands and shallow-water habitat (CDFG 1992) appear to have reduced the species' capacity to reverse its decline.

Effects of the Action

Disturbance to Clapper Rail Breeding Territories

According to the Biological Assessment, the proposed pier construction and demolition could disrupt clapper rails breeding within the vicinity of the pier. The degree of this disturbance likely would depend upon the proximity of individual rails and nests and the timing within the breeding season, and could result in increased competitive interactions, territory boundary shifts, or territory abandonment.

During a recent telemetry study of clapper rails in south San Francisco Bay, researchers observed an individual rail leaving an established territory in the Laumeister Marsh during the breeding season when apparently disturbed by a PG&E work crew in April 1992. The rail disturbed in Laumeister Marsh left a small, well-defined territory and subsequently moved throughout a large 37-acre area within the marsh and was unable to establish a new territory within the breeding period (USFWS, unpubl. data). As a result of this territorial abandonment, the opportunity for successful reproduction during the breeding season was eliminated (J. Takakawa, pers. comm., 1993). Data from this telemetered rail suggest that increased human activity and associated noise within a rail's established territory can significantly alter the normal behavioral patterns of rails during the breeding season, possibly resulting in extensive movements, lack of reproductive success, or territory abandonment.

Disturbance to rails inhabiting territories adjacent to the pier could be significant if pier construction or demolition occurs during the clapper rail breeding season. The level of disturbance to the additional breeding pairs located within the tidal marsh at Goodyear Slough may be buffered to some extent by distance.

Approximately 108 acres of tidal marsh habitat suitable for rails lies in the vicinity of the Reserve Fleet Maintenance Facility at Goodyear Slough. Based on past breeding season call counts by the CDWR, 6 pairs of rails may inhabit this marsh area (B. Grewell, pers. comm., 1994). Preliminary analysis of data from telemetry work conducted by San Francisco Bay Refuge staff show the average size of rail breeding territories monitored in the south Bay to be 15.7 acres (USFWS, unpubl. data). Based on this information and the observation of rails calling from underneath the pier during the breeding season, it is likely that the pier lies within a territory of one pair of clapper rails and may lie near several additional rail territories.

Construction and demolition of the pier during the breeding season could cause rails to shift or abandon their territories. The ability of rails to reestablish new breeding territories could be severely hampered by limited habitat available in the vicinity of the pier to establish a new territory and the fact that rails tenaciously defend established breeding territories from intrusions by other rails. Furthermore, suitable tidal marsh habitat along remaining portions of Goodyear Slough also is limited and disturbed rails could be forced to move considerable distances across marginal habitat in search of suitable unoccupied habitat. Such movement by a pair of rails from its established territory could significantly increase the risk of predation and mortality. Survival of displaced rails likely would be less than survival of rails that remain in established territories. In a telemetry study of light-footed clapper rails in southern California, Zembal and Massey (1988) found that three out of six telemetered rails that moved extensively were preyed upon within a relatively short period of time. By comparison, seven other rails that remained sedentary within established territories were not preyed upon during the telemetry period. Loss of one female rail also would constitute the loss of potential progeny to the Suisun Marsh population into the future.

Loss of Marsh Habitat

According to the Maritime Administration Maintenance Facility Project Description, dated April 1994, construction of the new pier and associated facilities would directly impact or disturb about 9,100 square feet (0.21 acre) of tidal marsh. This habitat provides foraging and possibly nesting habitat for clapper rails currently occupying a territory at this location. Demolition of the existing pier would temporarily expose an area of 12,450 square feet (0.29 acre). This footprint area would be expected to revegetate naturally within an estimated 2 to 4 years. Thus, once revegetation occurred, there would be a net increase of 3,350 square feet (0.08 acre) of tidal marsh at the project site.

Before the old pier footprint revegetates, however, this area would be unsuitable habitat for clapper rails. Any rail attempting to cross the unvegetated pier footprint would be subject to an increased risk of predation until revegetation occurred, further adding to predation threats to rails described above. There would also be a temporary deficit of 0.21 acre of available foraging and possibly nesting habitat within the territory. The loss of 0.21 acre of habitat within an established rail territory and the temporary exposure of 0.29 acre of mudflat in the territory could compromise the territory's overall value in the year that these impacts occurred. These impacts could result in temporary (2-4 years) or permanent abandonment of the territory by the current occupants.

Loss/Disturbance of Subtidal, Shallow-water Habitat

Construction of the new pier will destroy an undetermined amount of shallow-water habitat which may be used by delta smelt and splittail for spawning, rearing, and refugial habitat. Removal of the existing pier would also result in an undetermined amount of destruction.

*How will it
destroy?*

Construction of the new pier and removal of the old pier would result in sediment mobilization which would interfere with fish movement, result in losses of deposited eggs, cover submersed aquatic plants and other substrates that provide spawning and refugial habitat, and mobilize contaminants that would have acute and chronic effects on various life-stages of delta smelt and Sacramento splittail. Food organisms of delta smelt and Sacramento splittail would also be effected by mobilized sediments. These sediments would move due to tidal, wind and current action, and effect habitat, fish, and food organisms outside of the immediate project area.

Summary

- 1) Disturbances from construction and demolition activities during the breeding season from February through August create the likelihood for rails to abandon one to two breeding territories within the tidal marsh surrounding the Facilities Maintenance pier. The Service assumes this could result in the loss of reproductive success during the breeding season, and/or possible mortality of displaced individual birds. Any combination of the above would result in a net reduction in the long-term reproductive contribution to the population.
- 2) Construction of the new pier would result in the loss of about 0.21 acre of tidal marsh habitat currently available to clapper rails for foraging and possibly nesting. Demolition of the existing pier would result in a temporary exposure of 0.29 acres of unvegetated mudflat that would be unsuitable clapper rail habitat and expose any rails remaining in the pier area to an increased risk of predation until

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- 3) Construction of the new pier and removal of the old pier would result in an undetermined loss of spawning, rearing, and refugial habitat for delta smelt and Sacramento splittail.
- 4) Construction of the new pier and removal of the old pier would result in mobilization of sediments that would effect fish, food organisms, and habitat within and outside of the project area.

Based on our analyses above, the increased probability of adverse effects to a low number of individuals, including progeny, and temporary loss of a small area of habitat, the proposed project would not appreciably reduce the likelihood of survival and recovery of the endangered California clapper rail, delta smelt, or Sacramento splittail in the wild.

Cumulative Effects

Cumulative effects are those impacts of future non-Federal actions affecting listed species that are reasonably certain to occur in the action area. Future Federal actions are subject to the consultation requirements under section 7 of the Act and, therefore, are not considered cumulative to the proposed action.

Cumulative effects on the clapper rail include ongoing habitat conversion from salt to brackish conditions by fresh water effluent from the San Jose/Santa Clara Water Pollution Control Plant. The San Francisco Bay Regional Water Quality Control Board routinely renews discharge permits that allow marsh conversion to continue. Although the most recent permit renewal contained a mitigation measure to replace about 275 acres of former salt marsh that has converted to largely unsuitable brackish marsh conditions, it has yet to be implemented. Other cumulative effects include chemical contamination from point and non-point discharges that may adversely affect survival rates and reproductive success.

Cumulative effects on the delta smelt and Sacramento splittail include any future diversions of water that may entrain adult, juvenile or larval fish or that may decrease outflows incrementally, thus shifting the position of the delta smelt's preferred habitat, identified as the "entrapment zone." Water diversions through intakes serving numerous small, private agricultural and duck clubs in the Delta, upstream of the Delta, and in Suisun Bay contribute to these cumulative effects. These diversions also include municipal and industrial uses, as well as providing water for power plants. State or local levee maintenance and channel dredging activities would also contribute to cumulative effects.

Associated with decreased Delta outflow is increased salt water intrusion, which facilitates incursion of and an increase in the range and population of competing organisms, such as the asian clam. These organisms compete with the delta smelt for food microorganisms.

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Cumulative effects include point and non-point source chemical contaminant discharges. These contaminants include selenium and numerous pesticides and herbicides associated with discharges related to agricultural and urban activities. Implicated as potential sources of mortality or sublethal effects in delta smelt, these contaminants may adversely affect smelt reproductive success and survival rates.

Cumulative effects also include destruction of habitat and mobilization of sediments through dredging and pile driving as part of channel maintenance, levee maintenance, and marina construction.

Cumulative effects, operating together with those of the proposed action, are not likely to appreciably reduce the likelihood of survival and recovery of the California clapper rail, delta smelt, or Sacramento splittail.

Incidental Take Statement

Sections 4(d) and 9 of the Act, as amended, prohibit taking (i.e., to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct) of listed species of fish or wildlife without special exemption. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Harass is defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Under the terms of §7(b)(4) and §7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered a prohibited taking provided that such taking is in compliance with the terms and conditions of this incidental take statement. The measures described below are nondiscretionary, and must be undertaken by the agency so that they become binding conditions of any authorization granted to the applicant for the exemption under §7(o)(2) to apply.

The Federal agency has a continuing duty to regulate the activity that is covered by this incidental take statement. If the agency fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the authorization, the protective coverage of §7(o)(2) may lapse.

For the California clapper rail, we anticipate that harassment and/or harm of one to two pairs of rails would result from the proposed action. Reduced availability of refugial habitat would subject rails to increased risk of predation. Territorial abandonment by rails could result in harassment and/or harm of individual rails and breeding failure. Construction activities would directly impact about 0.21 acre of rail foraging and possibly nesting habitat. Demolition activities would result in the temporary exposure of 0.29 acres of

mudflat within an occupied rail territory, thereby increasing the risk of predation to rails in this area.

For delta smelt and Sacramento splittail, we anticipate the loss, harassment, and/or harm of an undetermined number of egg, larval, juvenile, and adult fish from the proposed action. Reduced availability of refugial habitat would subject delta smelt and Sacramento splittail to increased risk of predation. Construction and pier removal activities would destroy an undetermined amount of spawning and rearing habitat for these fish. Construction and pier removal activities would result in sediment mobilization that would result in loss, harassment, and/or harm of an undetermined number of egg, larval, juvenile, and adult delta smelt and Sacramento splittail.

The Service establishes the following reasonable and prudent measures to minimize the impact of incidental take. The measures described below are nondiscretionary, and must be implemented by the Department of the Army.

- 1) The potential for harassment, harm (including habitat modification), or mortality to California clapper rails shall be minimized.
- 2) Measures shall be taken to offset the temporary loss of California clapper rail and delta smelt/Sacramento splittail habitat.
- 3) Measures shall be taken to minimize mobilization of sediments within and outside the project area.

To be exempt from the prohibitions of Section 9 of the Act, the following terms and conditions, which implement the reasonable and prudent measures described above, must be complied with, and included as special conditions in any permit granted by the Department of the Army for this project.

The following term and condition implements reasonable and prudent measure #1:

Pier construction and demolition activities on the landward side of the Administration Barge (at its current location) shall not occur during the period from February through August within any given year to avoid possible disruption of breeding activities by rails.

The following terms and conditions implement reasonable and prudent measure #2:

- a) The applicant shall prepare and implement a detailed California clapper rail habitat restoration plan which compensates for the temporary loss of rail habitat associated with the proposed action. The plan shall describe all measures to be taken to restore rail habitat conditions within the footprint of the old pier. Suitable

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for the temporal loss of this habitat (12,450 square feet) shall be incorporated into the plan. The plan shall be submitted to the Service and Corps for review and approval within six months of commencement of pier construction work. An approved rail habitat restoration plan shall be implemented by December 31, 1995.

*Sacramento
Pier Dist.
15100
FLOOD*

b) The applicant shall survey for delta smelt and Sacramento splittail spawning and rearing habitat and replace losses at a 3:1 in-kind ratio and maintained in perpetuity. The 3:1 replacement ratio results from lack of full restoration of lost habitat for a number of years and with replaced habitat potentially having lesser value than that lost. A plan for this replacement and maintenance shall be submitted to the Service and Corps for review and approval prior to construction or demolition work. The timeframe for replacement shall be the same as that contained within the rail plan of approval by the Service within 6 months of commencement of pier construction work.

The following term and condition implements reasonable and prudent measure #3:

*minimize
disturbance
FEB - AUG*

A plan shall be submitted to the Service before construction or demolition activities begin that details practices that will be used to minimize mobilization of sediments within or outside of the construction area.

If, while constructing the new pier and related facilities or demolishing the old pier, the amount or extent of incidental take of the California clapper rail or delta smelt is exceeded, the causative action shall cease and consultation shall be reinitiated immediately.

*UNUSUAL
7/1/95
1/1/96*

The Service shall be notified within twenty-four (24) hours of the finding of any injured or dead California clapper rail or their eggs, or delta smelt, or any unanticipated damage to clapper rail or delta smelt habitat associated with project construction. Notification must include the date, time, and precise location of the specimen/incident, and any other pertinent information. The Service contact persons are Karen Miller or Bob Pine (916/978-4866). Any dead or injured specimens shall be repositied with the Service's Division of Law Enforcement, 2800 Cottage Way, Sacramento, California 95825-1846 (916/978-4860).

This concludes formal consultation on the proposed work described above. Reinitiation of formal consultation is required if (1) the amount or extent of incidental take is exceeded, as previously described; (2) new information reveals effects of the actions that may affect listed species or critical habitat in a manner that was not considered in this opinion; (3) if the project is substantially modified in a manner that causes an effect to listed

species that was not considered in this opinion; and/or (4) if a new species is listed or critical habitat is designated that may be affected by the action. If you have any questions regarding this opinion, please contact Karen Miller or Bob Pine of my staff at (916) 978-5408.

Jim B...
REPLACED KAREN

Sincerely,

Joel A. Medlin
Joel A. Medlin
Field Supervisor

Enclosures

- cc: RD (ARD-ES), Portland, OR
- DHC, Washington, D.C.
- CDFG, Region III, Yountville, CA
- CDFG, Environmental Services, Sacramento, CA

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Zembal, R. and B.W. Massey. 1988. Light-footed clapper rail census and study, 1988. Contract Final Report (FG 7609) to Calif. Dept. Fish and Game under agreement with Calif. State Univ. Long Beach Foundation: Long Beach, CA. 29 pp.

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Personal Communications

Grewell, B., California Department of Water Resources, 3251 S Street,
Sacramento, California 95816.

Harding-Smith, E., U.S. Fish and Wildlife Service, San Francisco Bay National
Wildlife Refuge, P. O. Box 524, Newark, California 94560.

Herbold, B., Environmental Protection Agency, 1235 Mission Street, San
Francisco, CA 94103.

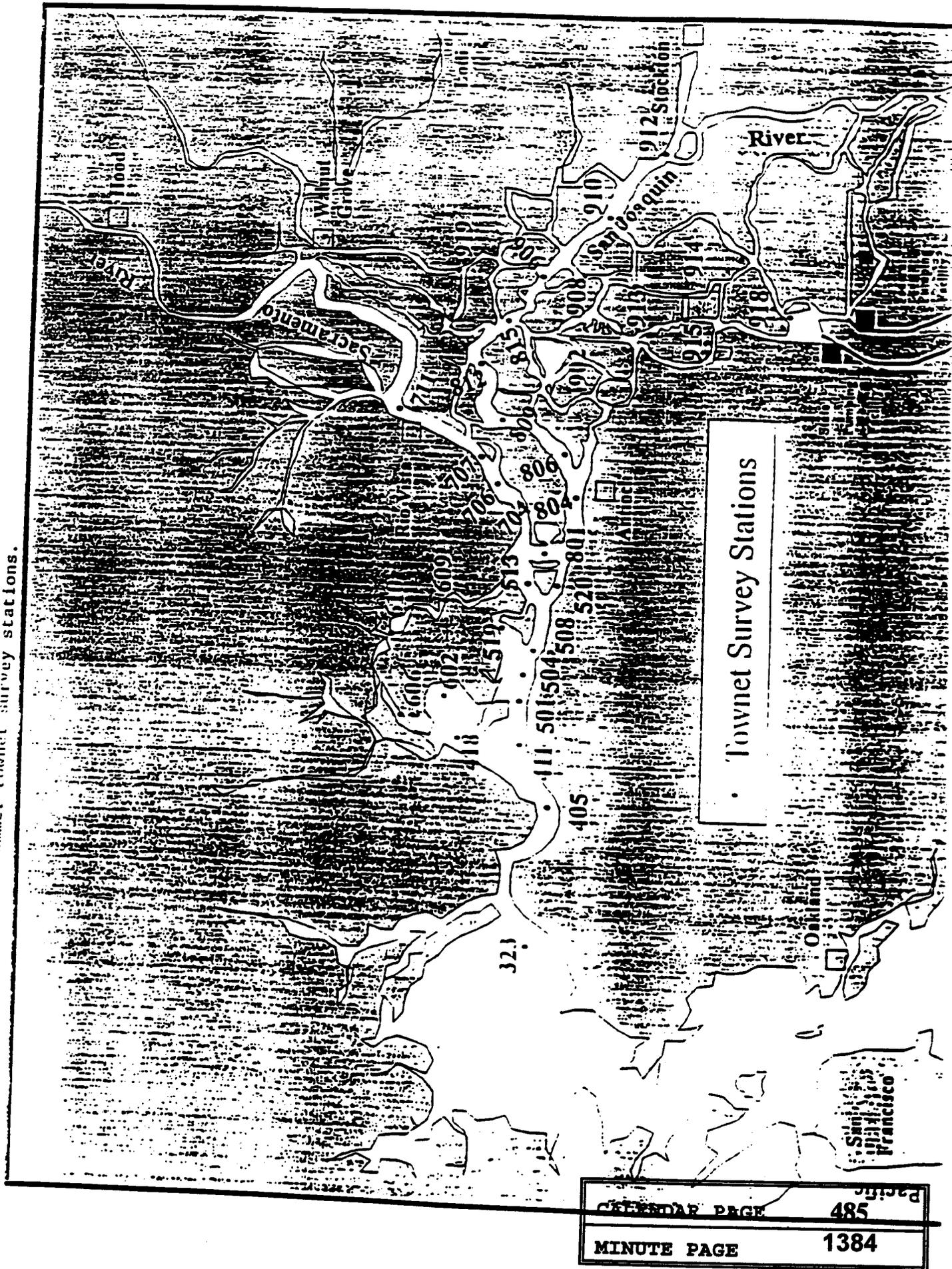
Meng, L., U.S. Fish and Wildlife Service, 2800 Cottage Way, Sacramento,
California 95825.

Moyle, P., University of California, Davis, California 95616.

Sweetnam, D., California Department of Fish and Game, Bay-Delta and Special
Water Projects Division, 4001 N. Wilson Way, Stockton, CA 95205-2424.

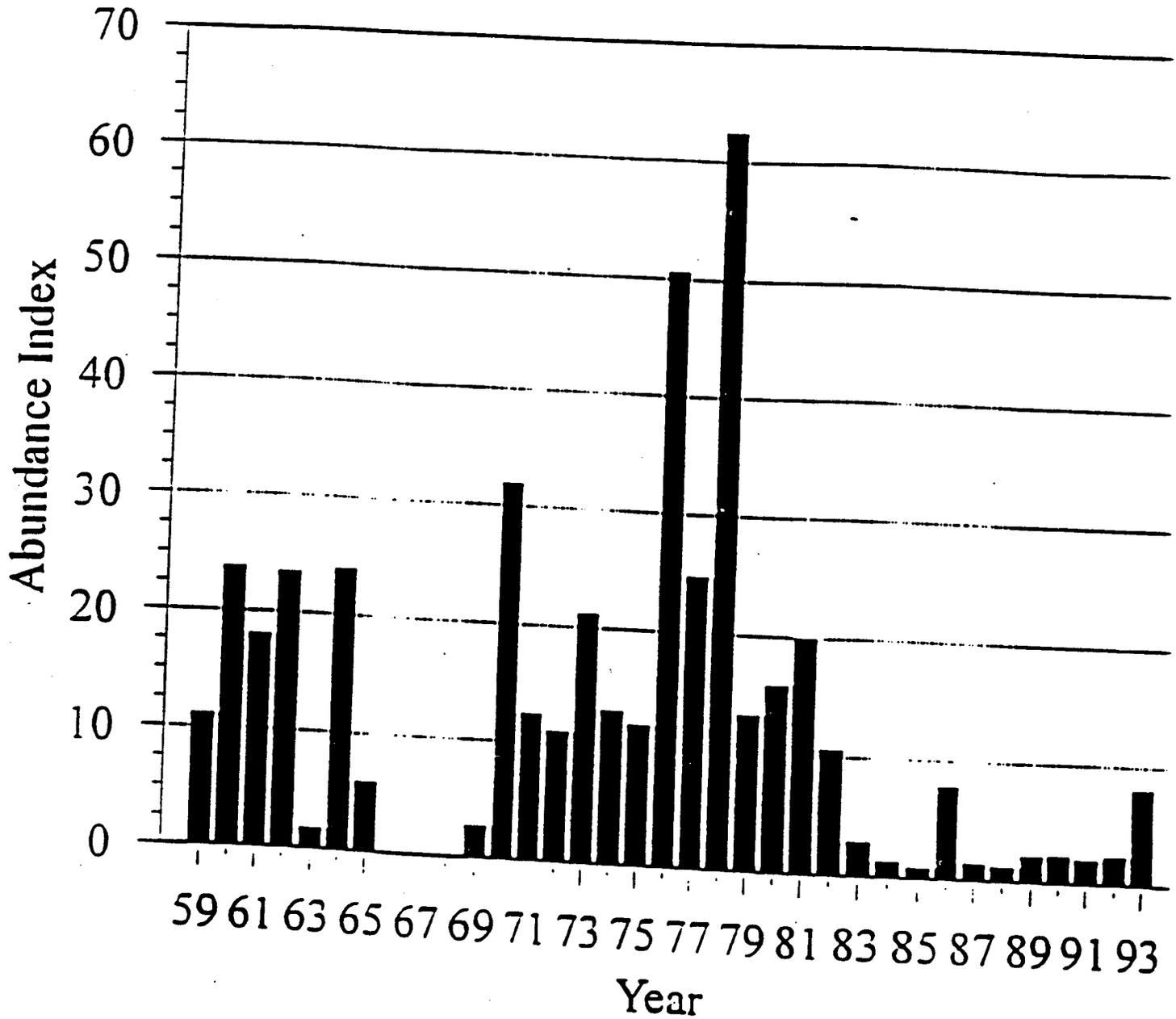
Takekawa, J., U.S. Fish and Wildlife Service, San Francisco Bay National
Wildlife Refuge, P. O. Box 524, Newark, California 94560.

Figure 1. Summer Townet survey stations.



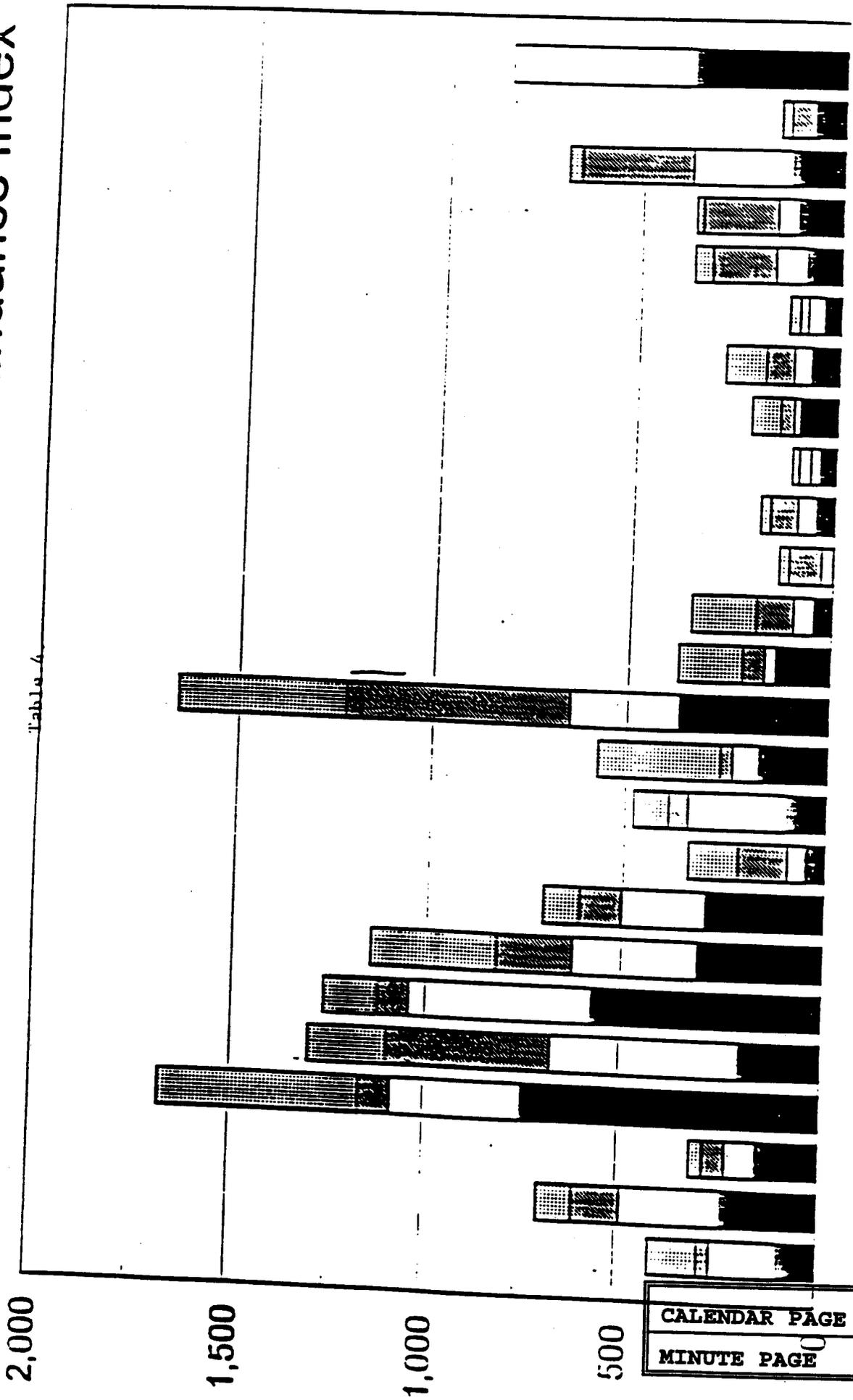
Summer Tournet Abundance Index

Delta Smelt



Delta Smelt Fall Midwater Trawl Abundance Index

Table 4



Year	67	68	69	70	71	72	73	75	76	77	78	80	81	82	83	84	85	86	87	88	89	90	91	92	93
Abundance Index	934	2347	1498	7416	1974	5716	3079	2905	498	975	1669	3686	1324	448	21	470	407	921	710	416	881	1095	1259	715	3746
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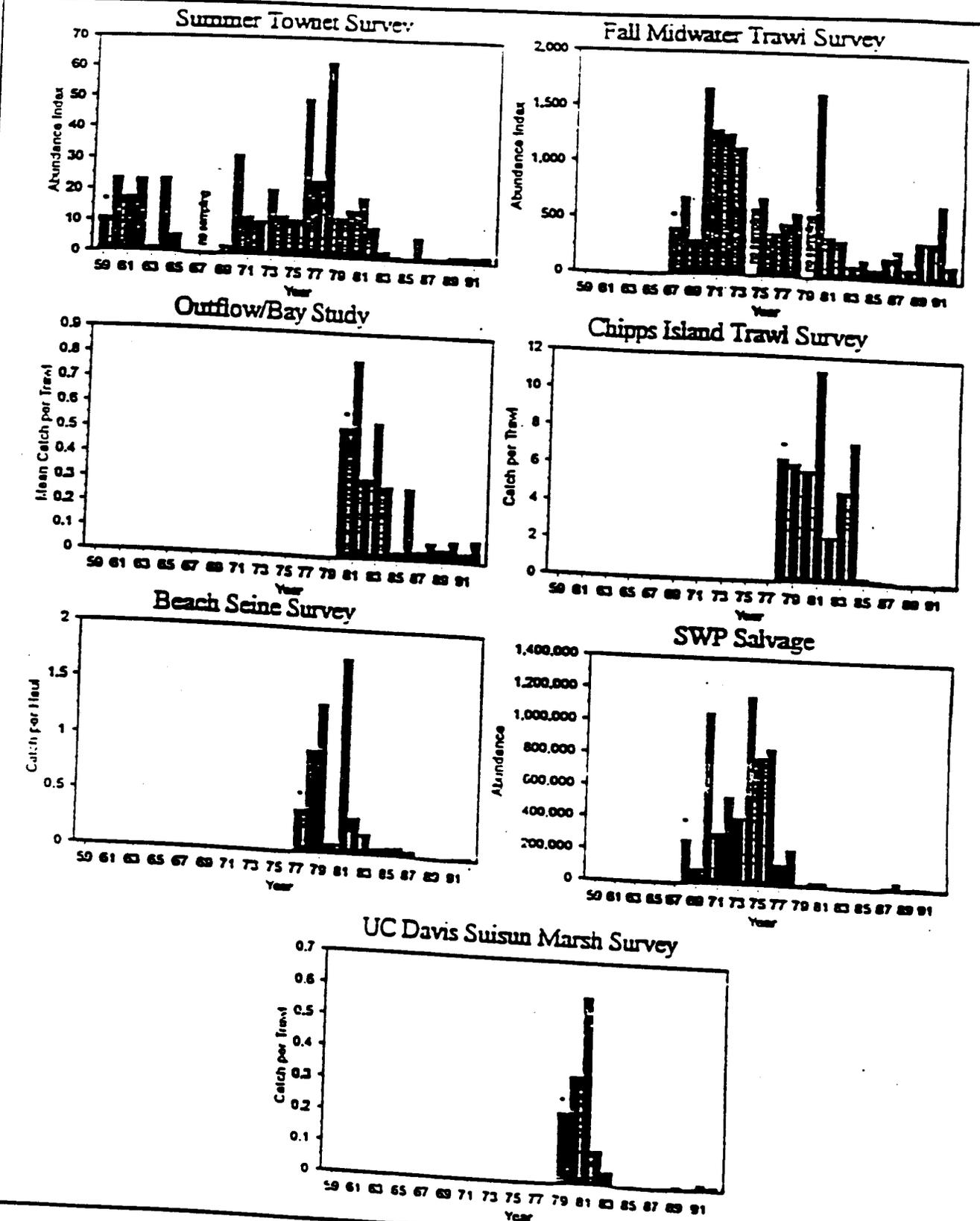


Figure 5. TRENDS IN DELTA SMELT POPULATIONS, AS INDEXED BY SEVEN INDEPENDENT SURVEYS

Note that not all surveys were conducted in all years shown. Source: Swadlow and Stevens 1993, updated from Stevens et al. 1990

Summary of Effects due to Mitigation

Short term/ immediate effects

increase in tidal circulation
drown minimal lower marsh vegetation
increase current velocities
increase nutrient exchange
reduce sedimentation rate
increase tidal inundation of higher marsh

Long term effects

create availability for rail, smelt, other estuarine fish species
increase marsh productivity
not affect composition of marsh vegetation, but alter distribution and abundance
probably reduce mosquito production in marsh
probably slow or reverse invasion of marsh by exotic Pepperweed

Memorandum

To : Ms. Judy Brown
State Lands Commission
Division of Environmental
Planning and Management

Date : April 25, 1995

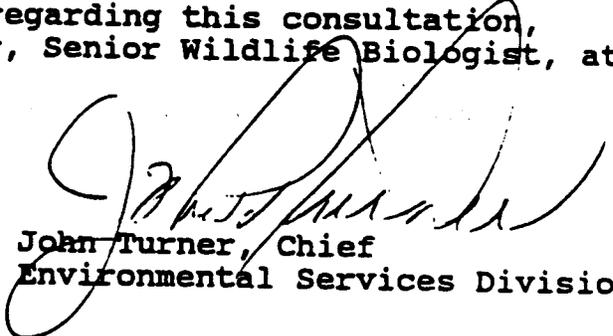
From : Department of Fish and Game

Subject: State Lands File Ref: W251121

Attached is the Department of Fish and Game's informal consultation for the Maritime Administration's proposed project at the Reserve Fleet, Solano County. This project is further referenced as U.S. Army Corps of Engineers (Corps) Public Notice 20525E10.

Included as part of the Department's informal consultation is the January 1995 mitigation plan for the project. This plan was developed by Corps staff.

If you have any questions regarding this consultation, please contact Mr. Dennis Becker, Senior Wildlife Biologist, at (707) 425-3828.



John Turner, Chief
Environmental Services Division

Attachment

cc: Mr. David Ammerman
U.S. Army Corps of Engineers
San Francisco

Mr. Dennis Becker
Department of Fish and Game
Yountville

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CALIFORNIA ENDANGERED SPECIES ACT (CESA)
BIOLOGICAL OPINION FOR

CALIFORNIA STATE LANDS COMMISSION

Maritime Administration Pier Project, Solano County

SUMMARY

Pursuant to Section 2090 of the California Endangered Species Act (CESA) the California State Lands Commission (hereinafter "commission") has requested consultation with the California Department of Fish and Game (hereinafter Department) to determine if the Maritime Administration (MARAD) project to demolish an existing wooden pier and causeway; to construct a new 1,400 foot long pile supported pier, and other related facilities at the Suisun Bay National Defense Reserve fleet (hereinafter "Project") would jeopardize the continued existence of any State-listed rare, threatened, or endangered species or result in the destruction and adverse modification of habitat essential to the continued existence of any listed species. The State (and Federally)-listed endangered California clapper rail (*Rallus longirostris obsoletus*), the threatened Delta smelt (*Hypomesus transpacificus*), the proposed for listing Sacramento splittail (*Pogonichthys macrolepidotus*); and the endangered Winter run chinook salmon (*Oncorhynchus tshawytscha*) occur in the project area. It is the Department's determination that the project would not likely jeopardize the continued existence of any listed or sensitive species, provided the conditions to avoid jeopardy and minimize take identified in this Biological Opinion are fully implemented and adhered to. The protection, enhancement, and long-term management of habitat for the California clapper rail, Delta smelt, and Sacramento splittail at a location described in the attached mitigation plan which is acceptable to the Department will offset the project impacts and will result in preserving core areas for the species in order to achieve sustainable populations. For the winter run salmon the National Marine Fisheries Service (NMFS), in their letter dated April 25, 1994, indicated Section 7 formal consultation is concluded with no jeopardy since the activities are limited to the installation of concrete pilings and that a new pier should reduce the long-term impacts to the salmon since the need for periodic dredging would be eliminated. The Department concurs with this determination.

PROJECT DESCRIPTION

The project consists of the following major features: (1) a 1,400 foot long concrete pile-supported pier with a concrete pile-supported pier head; (2) two mooring dolphins (pile clusters) for

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the APL vessel; (3) a series of five floating finger docks connected by a floating pier; (4) utility lines for water and sewer; (5) construction of a new electrical substation and associated electrical system; and (6) to demolish an existing wooden pier, causeway, electrical substation and associated power poles.

The Suisun Bay National Defense Fleet (Reserve Fleet) is located in northwest Suisun Bay, Solano County. It is north of Army Point and the Carquinez Strait.

The vegetative community on and adjacent to the site consists of northern coastal salt marsh and coastal brackish marsh. Ruderal or disturbed habitat landward of the site has saltgrass, gumplant, and prickly lettuce, but is largely dominated by non-native plants.

The project will result in temporary construction impacts to 8,339 square feet of brackish marsh and 5,239 square feet of mudflats. Long-term impacts are to: 10,920 square feet of ruderal habitat with utility lines; decreased net impacts to brackish marsh of 3,847 square feet by removing the pier/causeway, dolphins, and substation and adding utility lines; decreased impact to mudflats by removing the pier/causeway and, dolphins; and increased net impact to open water of 10,993 square feet by the new pier/causeway, and removing dolphins and floating docks and barges.

The above temporary and long-term habitat impacts may affect California clapper rail, Delta smelt and Sacramento splittail.

LISTED SPECIES

Based on biological studies of the project site and adjacent areas, the following State-listed threatened and/or endangered and/or candidate species, more specifically, the California clapper rail, Delta smelt and Sacramento splittail may use the project area. A summary of the life history information for each species follows:

California Clapper Rail

The California clapper rail is a State and Federally listed endangered species. Habitat is tidal salt marshes around San Francisco, Suisun, San Pablo, and Southhampton Bays and Elkhorn Slough. Surveys in the Suisun Marsh have shown limited populations in both numbers and distribution.

In the Suisun Marsh, Cut-Off Slough, Hill Slough, Goodyear Slough and Suisun Bay, and tidal marshes in the southwest Suisun Bay are breeding and nesting areas for California clapper rail.

Generally, it forages in higher marsh vegetation, along the mud flat and vegetation interface. It eats clams, mussels, crabs,

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snails, insects, spiders and worms. It prefers mature stands of cattails and tules along the bays and tidal sloughs.

In general, the rail breeds from mid-March through July with peaks in May and June. Breeding activity has been recorded as late as the end of August and in February.

Delta Smelt

The following information was consolidated from the U.S. Fish and Wildlife Service Biological Opinion to the U.S. Corps of Engineers on PN R20066-E98, August 29, 1994.

Historically, the delta smelt is thought to have occurred from Suisun Bay upstream to the City of Sacramento on the Sacramento River and Mossdale on the San Joaquin River. The delta smelt is a euryhaline species (tolerant of a wide salinity range) that spawns in fresh water and has been collected from estuarine waters up to 14 parts per thousand (ppt) salinity. For a part of its annual life span, the distribution of juvenile smelt tends to be centered near the freshwater edge of the entrapment zone (EZ) (mixing zone at the saltwater-freshwater interface), where the salinity is approximately 2 ppt.

The Delta smelt is adapted to living in the highly productive Sacramento-San Joaquin River Estuary (Estuary) where salinity varies spatially and temporally according to tidal cycles and the amount of freshwater inflow. Shortly before spawning, adult Delta smelt migrate upstream from the brackish-water habitat associated with the entrapment zone to disperse widely into river channels and tidally influenced backwater sloughs. Delta smelt spawn in shallow, fresh or slightly brackish water and most spawning occurs in tidally influenced backwater sloughs and channel edgewater. The adhesive, demersal eggs are thought to attach to substrates such as cattails and tules, tree roots, and submerged rocks and branches.

Delta smelt may spawn north of Suisun Bay in Montezuma and Suisun sloughs and their tributaries as well as many sloughs and channels in the Delta.

The spawning varies from year to year and may occur from late winter (December) to early summer (July) Gravid adults have been collected from December to April, although ripe Delta smelt were most common in February and March. It was estimated that spawning had taken place from mid-February to late June or early July, with the peak spawning period occurring in late April and early May in 1989 and 1990.

Delta smelt eggs hatched in 9-14 days at temperatures from 13-16°C during laboratory observations. After hatching, larvae and juveniles are transported downstream toward the entrapment zone

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where they tend to be retained by the vertical circulation of fresh and salt waters. The pelagic larvae and juveniles feed on zooplankton. When the entrapment zone is located in a broad geographic area with extensive shallow-water habitat within the euphotic zone (depths less than four meters), high densities of phytoplankton and zooplankton accumulate.

Sacramento Splittail

The following information was consolidated from the U.S. Fish and Wildlife Service Biological Opinion the U.S. Corps of Engineers on PN R20066-E98, August 29, 1994.

The Sacramento splittail is a large cyprinid that can reach greater than 12 inches in length. Adults are characterized by an elongated body, distinct nuchal hump, and a small blunt head with barbels usually present at the corners of the slightly subterminal mouth.

Splittail are endemic to California's Central Valley where they were once widely distributed. In recent times, dams and diversions have increasingly prevented upstream access to large rivers and the species is restricted to a small portion of its former range. Splittail enter the lower reaches of the Feather and the American Rivers on occasion, but the species now largely is confined to the Delta, Suisun Bay, Suisun Marsh, and Napa Marsh.

Splittail are long lived, frequently reaching five to seven years of age. Spawning success is highly correlated with fresh water outflow and the availability of shallow-water habitat with submerged vegetation. Splittail migrate upstream to spawn, similar to delta and longfin smelt. The onset of spawning is associated with rising temperature and peaks from the months of March through May, although there are records of spawning from late January to early July. Spawning occurs over flooded vegetation in tidal freshwater and euryhaline habitats of estuarine marshes and sloughs and slow-moving reaches of large rivers. Larvae remain in shallow, weedy areas close to spawning sites and move into deeper water as they mature.

Splittail are benthic foragers that feed on opossum shrimp, although detrital material makes up a large percentage of their stomach contents. Earthworms, clams, insect larvae, and other invertebrates are also found in the diet. Predators include striped bass and other piscivores. Splittail are sometimes used as bait for striped bass. Although this occurs it is not a common practice.

EFFECTS ON LISTED SPECIES

The California clapper rail, Delta smelt, and Sacramento splittail may be subject to direct and indirect adverse impacts and potential take associated with the construction of Maritime Administration

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pier project. The project area where impacts to these species may occur encompasses about two acres.

Following is a more detailed discussion of potential impacts:

1. Pier construction and demolition activities landward of the existing Administration Barge may temporarily impact habitat of the California clapper rail. Noise during these activities may interfere with breeding activities.
2. Piling placement may cause turbidity which may impact fish species and spawning habitat.
3. Removal of the existing causeway will impact brackish marsh and mudflat. Turbidity may impact fish species. Vegetation will be disturbed.
4. All construction and human presence has the potential to disturb rails using adjacent brackish marsh.

CONDITIONS TO AVOID JEOPARDY AND MINIMIZE INCIDENTAL TAKE

Fish and Game Code Section 2091 requires the Department to determine and specify to the State lead agency reasonable and prudent alternatives consistent with conserving the species which would avoid jeopardizing the continued existence of the species. Section 2091 also requires the Department to specify reasonable and prudent measures to minimize the adverse impacts of taking which occurs incidental to the project. The following provisions constitute our conditions pursuant to CESA, and if fully implemented, the project is unlikely to jeopardize the continued existence of the listed (and sensitive) species identified above, and the adverse impacts from incidental take of the species will be minimized.

REASONABLE AND PRUDENT MEASURES

1. Implement the Mitigation Plan for this project (see attached).
2. Pier construction and demolition activities landward of the Administration Barge shall not take place from February through August to avoid impacting nesting activities of rails.
3. Placement of pilings should be accomplished with the placement of sediment curtains to minimize movement of sediments. This activity should not occur between the months of mid-December to July in order to avoid spawning season of the Delta smelt and Sacramento splittail.

INCIDENTAL TAKE STATEMENT

Pursuant to Section 2090 of CESA, the Department determines that the potential to take California clapper rail, Delta smelt, and Sacramento splittail incidental to the project does exist. Loss of individuals may occur as result of project construction and operation. Section 2091 of CESA requires the Department to determine and specify to the State lead agency "reasonable and prudent measures that are necessary and appropriate to minimize the adverse impacts of the incidental taking." The department has determined that if the project conditions identified in this Biological Opinion are fully implemented and adhered to, then the adverse impacts of any incidental take will be minimized.

DEPARTMENT FINDINGS

If the above-written conditions of this CESA Biological Opinion are implemented in a timely manner, as provided herein, the Department finds that the construction of the project will not result in jeopardy to the continued existence of the listed and candidate species and may, through the acquisition of habitat lands, protect the species from further degradation.

**CALIFORNIA DEPARTMENT
OF FISH AND GAME**

BY: _____

TITLE: _____

DATED: _____

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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213
TEL (310) 980-4000; FAX (310) 980-4018

APR 25 1994

F/SW022:CTM

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

Dear Mr. Angeloni:

This letter responds to your request for the National Marine Fisheries Service's (NMFS) concurrence that the construction of a new maintenance facility pier for the Suisun Bay Fleet will not adversely affect the Federally endangered winter-run chinook salmon or its critical habitat.

Based on the available information, the winter-run chinook salmon is expected to occur seasonally at the proposed project site, which is within the species designated critical habitat. However, since the project's water-related activities are limited to the installation of concrete pilings, no adverse impacts are expected to occur to the winter-run chinook salmon or its critical habitat. Moreover, construction of the new pier should reduce long-term impacts to winter-run chinook salmon habitat since the need for periodic dredging will be eliminated. Accordingly, this concludes section 7 consultation for the proposed project. If new information becomes available indicating that winter-run chinook salmon may be adversely affected by the proposed project, further consultation will be necessary.

If you have questions concerning these comments, please contact Mr. Chris Mobley at (707) 578-7513.

Sincerely,

Gary Matlock
for Gary Matlock, Ph.D.
Acting Regional Director

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Historical
Resources
File System



ALAMEDA
COLUSA
CONTRA COSTA
DEL NORTE
HUMBOLDT
LAKE

MARIN
MENDOCINO
MONTEREY
NAPA
SAN BENITO
SAN FRANCISCO

SAN MATEO
SANTA CLARA
SANTA CRUZ
SOLANO
SONOMA
YOLO

Northwest Information Center
Foundation Center, Bldg. 300
Sonoma State University
Rohnert Park, California 94928-3609
(707) 664-2494 - Fax (707) 664-3947

Ammerman

November 23, 1994

File No.: 94-SL-2

Dave Ammerman
U.S. Army Corps of Engineers
Attn: Regulatory Branch
San Francisco District
211 Main Street
San Francisco CA 94105-1905

re: No. 20525E10
The Maritime Administration

Dear Mr. Ammerman:

Records at this office were reviewed to determine if this project could adversely affect historical resources. The review for possible historic structures, however, was limited to references currently in our office. The Office of Historic Preservation has determined that any building or structure 45 years or older may be of historic value. Therefore, if the project area contains such properties they should be evaluated prior to commencement of project activities. Please note that the use of the term historical resources includes both archaeological sites and historic structures.

The proposed project area contains or is adjacent to the historical resource(s) (). A study is recommended prior to commencement of project activities.

The proposed project area has the possibility of containing historical resources. A study is recommended prior to commencement of project activities.

Comments: If archaeological resources, including items associated with shipwrecks, are encountered during the project, work in the immediate vicinity of the finds should be halted until a qualified archaeologist has evaluated the situation. If you have any questions please give us a call (707) 664-2494.

Sincerely,

Katherine Johnson
Leigh Jordan
Assistant Coordinator

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