

Finding of No Significant Impact (FONSI)

Environmental Assessment

SAN RAFAEL CHANNEL & ACROSS THE FLATS

CALENDAR YEAR 2011

MAINTENANCE DREDGING

September 2011

- 1. Proposed Action.** For Calendar Year 2011, the U.S. Army Corps of Engineers, San Francisco District proposes maintenance dredging of both the Inner Canal (below Station 175+00) and Across the Flats reaches of the federal San Rafael Channel down to approximately -5 feet MLLW. Up to an estimated 100,000 cubic yards of shoaled sediment, including two feet of allowable overdepth, will be mechanically dredged. The dredged material will be placed in-Bay at the San Pablo Bay Disposal Site (SF-10), or at some other in-Bay disposal site. The in-water construction is scheduled to begin in October 2011 and will continue for approximately five weeks.
- 2. Reference.** Incorporated herein by reference is the *Environmental Assessment of San Rafael Channel & Across the Flats, Maintenance Dredging for Calendar Year 2011*, which is dated June 2011.
- 3. Factors Considered.** Factors considered for this FONSI include impacts on air quality; water quality; ambient dust and noise conditions; biological resources including threatened, endangered, and candidate species; fish and wildlife; and cultural resources.
- 4. Conclusion.** Based on the information obtained during preparation of the Environmental Assessment, the U.S. Army Corps of Engineers, San Francisco District concludes that the proposed action will not have a significant adverse impact on the San Rafael Channel Inner Canal and Across the Flats environments or on the quality of the human environment. Therefore, the preparation of an Environmental Impact Statement (EIS) is not necessary.

14 SEP 11

Date



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ENVIRONMENTAL ASSESSMENT

San Rafael Channel & Across the Flats

MAINTENANCE DREDGING **CALENDAR YEAR 2011**

**** REVISED (pages 2, 17, 27) September 2011 ****



U.S. Army Corps of Engineers

Environmental Section B

San Francisco District

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Acronyms

APE	Area of Potential Effects
AR	Army Regulation
ATF	Across the Flats
BCDC	Bay Conservation & Development Commission
BMP	Best Management Practices
BO	Biological Opinion
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CWA	Clean Water Act
CY	Cubic Yards
DFG	Department of Fish and Game
DMMO	Dredged Material Management Office
DOD	Department of Defense
DWR	California Department of Water Resources
EA	Environmental Assessment
EFH	Essential Fish Habitat
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ESU	Evolutionary Significant Unit
FMP	Fisheries Management Plans
HTW	Hazardous and Toxic Waste Assessment
HWRP	Hamilton Wetland Restoration Project
MLLW	Mean Lower Low Water
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
NOAA Fisheries	U.S. National Marine Fisheries Service
NRHP	National Register of Historic Places
NUAD	Not-suitable for Unconfined Aquatic Disposal
O&M	Operations and Maintenance
RWQCB	California Regional Water Quality Control Board
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SUAD	Suitable for Unconfined Aquatic Disposal
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WDO	Waste Discharge Order
WDR	Waste Discharge Requirements

San Rafael Channel & Across the Flats

MAINTENANCE DREDGING (CY2011)

ENVIRONMENTAL ASSESSMENT

1. Purpose and Need for Action

1.1. Purpose.

This Environmental Assessment (EA) has been prepared by the United States Army Corps of Engineers, San Francisco District (USACE), in accordance with the National Environmental Policy Act (NEPA) of 1969. Its purpose is to identify any possible direct, indirect, or cumulative significant impacts to the human environment resulting from the routine operations and maintenance (O&M) dredging of the federal navigation channels in San Rafael Creek that will occur between 1 September and 30 November 2011. The purpose of this activity is regular maintenance dredging to remove accumulated shoaling from the authorized federal channels and maneuvering area to ensure continued safe and efficient navigation.

1.2. Project Description and Proposed Action.

San Rafael Creek is located north of San Francisco in Marin County. The project consists entirely of a shallow-draft channel that serves both light commercial and recreational vessels. There are two major segments, known as the “Across the Flats” Channel and the “Inner Canal” Channel. The 1919 authorizing legislation for this project provided for dredging a channel 100 feet wide and 8 feet deep mean lower low water (MLLW) across the mud flats in San Francisco Bay to the mouth of San Rafael Creek, and thence an inner canal 60 feet wide and 6 feet deep (MLLW) in the creek to Irwin Street in the city of San Rafael with a turning basin 100 feet wide and 200 feet long (Figure 1).

Over time, sediment gradually accumulates (‘shoals’) on the bottom of the channels and maneuvering area, thereby constricting navigation and potentially creating a safety hazard. Periodic dredging is essential to maintain their safe and efficient operation; USACE has dredged the San Rafael channels since 1928.

The operations and maintenance schedule for this project provides for seven- and four-year cycle maintenance dredging, respectively, for the Across the Flats (ATF) Channel (to the project depth of 8 feet MLLW plus 2 feet of allowable overdepth) and for the Inner Canal Channel (to the project depth of 6 feet MLLW plus 2 feet of allowable overdepth).

This project has previously been authorized for unconfined in-Bay disposal at the Alcatraz Disposal Site (SF-11), which is just south of Alcatraz Island (Figure 2). In 2010, sampling and testing of the shoaled sediment revealed that upstream of Station 175+00 in the Inner Canal Channel, pesticide and PCB concentrations were at levels that are not suitable for in-Bay placement (NUAD). Downstream of Station 175+00, the shoaling is relatively 'clean' and has been deemed suitable for in-Bay placement (SUAD) by the DMMO. Follow-up analysis (June 2011) has confirmed that there has been no downstream migration of the contaminated sediment beyond Station 175+00 since the 2010 sampling and testing event.

The condition survey of 14-15 February 2011 identified nearly 300,000 CY of sediment down to project depths plus allowable overdepth (250,000 CY from ATF; 50,000 CY from the Inner Canal). Due to funding constraints, however, the proposed activity will have a dredging depth of approximately 5 feet (for both the ATF and Inner Canal) plus a 2-foot overdepth allowance. As such, it is anticipated that less than 100,000 CY total will actually be dredged. (Under no circumstance will the total exceed the 250,000 CY cap listed in the June 1, 2010 Letter of Agreement for Consistency Determination [*re*: BCDC document CN 2-10]).

All of the dredged material will be from downstream of Station 175+00, and it will be placed at the SF-10 (San Pablo Bay) or other in-Bay disposal site. It is anticipated that the dredging will take approximately five weeks (35 days) to complete, with dredging work occurring between 7:00am and 7:00pm daily.

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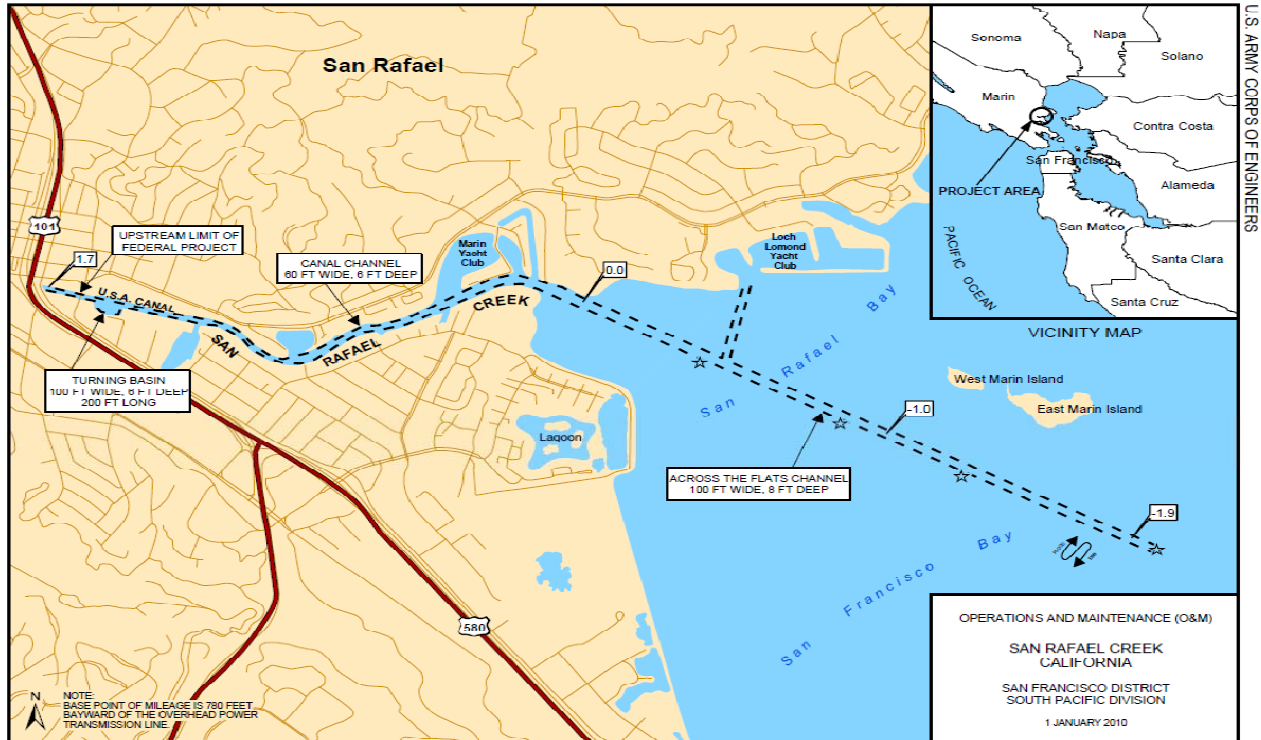


Figure 1: San Rafael Channel showing the 'Inner Canal' and 'Across the Flats.'



Figure 2: SF Bay Region Disposal Sites.

1.3. Overdepth Dredging.

USACE dredging guidance (Appendix A) allows for one-foot of paid overdepth and one-foot of unpaid overdepth (Figure 3). Due to the imprecision that is inherent with some forms of dredging, overdepth is authorized so as to ensure that project depths are achieved.

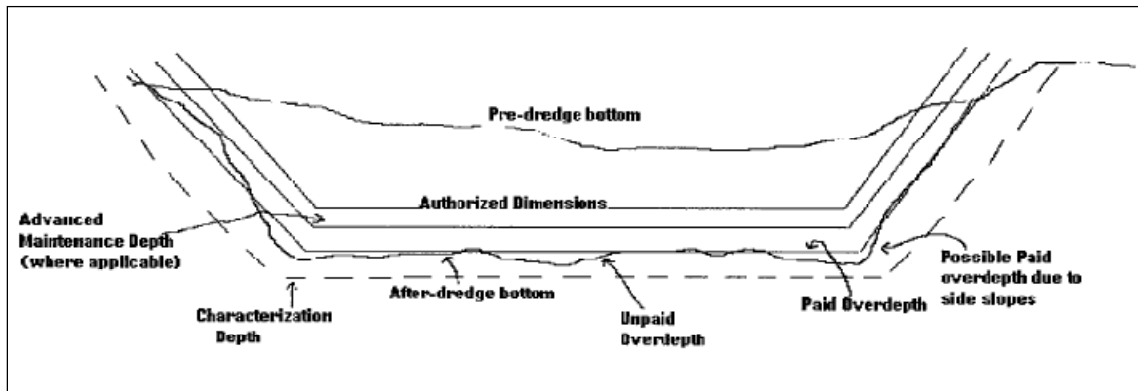


Figure 3: Dredge Profiles Illustrating Overdepth Dredging.

1.4. Project Authority.

The existing federal project for the construction and maintenance of the “Across the Flats” Channel, the “Inner Canal” Channel, and the turning basin was authorized by the River and Harbors Act of March 2, 1919. Previously—1891 to 1919—the channel was dredged by private citizens and the State of California. The work authorized is to dredge a channel 100 feet wide, 8 feet deep across the flats in San Francisco Bay to the mouth of San Rafael Creek, thence 60 feet wide, 6 feet deep in the creek to Irwin Street in San Rafael, with a turning basin at San Rafael (House Document 801, 63rd Congress, 2nd Session).

1.5. Previous Environmental Documents.

An Environmental Assessment (EA) is prepared for each dredging cycle of this project. Previous documents have been separately prepared and presented for San Rafael Channel dredging; the most recent episode for the Inner Channel was in 2003 and for the Across the Flats Channel was in 1998. For 2011 only, both projects will be dredged under one contract and are covered in this single Environmental Assessment document.

1.6. Historical Background.

THEN



Figure 4: West Francisco & Second Street in 1915 (File Photo).

At the turn of the century, the old canal extended parallel to Second Street. It was dredged at the Irwin Street Bridge to form “open air baths” 35 feet wide and 200 feet long. The San Rafael Municipal Bath House at Second Street and Lincoln Avenue opened in 1915.

NOW



Figure 5: West Francisco & Second Street in 2011.

The boundaries of the San Rafael Canal have changed considerably since the turn of the century. The end of West Francisco Boulevard at Second Street covers part of the area where open air baths and the San Rafael Municipal Bath House once flourished. In 1928, USACE widened straight areas of the San Rafael Canal, producing the 100-foot-wide main channel seen today. The Depression led to the closure of the bath house in the early 30s, and in 1949, the building was destroyed in a fire.

2. Environmental Compliance

2.1. Federal Laws.

2.1.1. National Environmental Policy Act (NEPA).

Maintenance dredging of the San Rafael Channel was described in the Final Composite Environmental Statement for Maintenance Dredging of Existing Navigation Projects, San Francisco Bay Region, December 1975 and previous Environmental Assessments and Reviews as the project has been routinely worked since 1975. The purpose of this EA is to determine if there are any significant impacts that differ from those described in previous NEPA documentation.

2.1.2. Clean Air Act.

This maintenance dredging is exempt from the requirement of a determination of conformity with the State Implementation Plan (SIP) because no new depths are dredged and disposal is at a designated site, pursuant to 40 C.F.R. § 51.853 © (2)(ix); 58 Fed. Reg. 63,249 (November 30, 1993).

2.1.3. Magnuson-Stevens Fishery Conservation and Management Act.

The 1996 amendments to the Magnuson-Stevens Conservation and Management Act set forth a number of new mandates for the NOAA Fisheries, regional fishery management councils, and other federal agencies to identify and protect important marine and anadromous fish habitat. The concept is similar to the critical habitat under the Endangered Species Act. The measures that are recommended by NOAA Fisheries for other agencies are advisory as opposed to being mandatory.

2.1.4. Impact of Dredging on Essential Fish Habitats (EFH).

The San Rafael Channel has been dredged on an irregular basis for decades. The channel bottom and maneuvering area have little if any habitat value for fish shelter, reproduction, and feeding.

Fish in the immediate area of the dredge pumps will be exposed to the noise of the clamshell operation. Both the noise and turbidity caused by dredging are of short duration, temporary, minor, and introduce nothing new to a normally noisy, turbid

shipping channel. (Section 5.0). Bottom fish—e.g., English sole *Parophrys vetulus*, starry flounder *Platichys stellatus*, pacific sandab *Chilharichthys sardidus*, curlfin sole—will avoid the project area because of the noise and impact of the bucket. The minimum mortality to these bottom species, if any, would have no significant effect on their population numbers or species survival (Section 6.0). This EA has determined that this project will have no adverse impacts on the fisheries or their habitats.

Programmatic EFH consultation is currently underway but remains incomplete. The USACE has therefore requested interim EFH consultation for this specific project (Appendix F) to address conservation recommendations 4, 5, 7, and 8 from the ongoing programmatic EFH consultation.

2.1.5. Impact of Dredged material Disposal on Essential Fish Habitat.

Should all or a part of the dredged material be placed at one of the historical disposal sites, the brief plumes caused by disposal has the potential to reduce food availability and foraging success for fish, marine mammals, and sea turtles that might be in the vicinity of the historical disposal sites. It is expected that these species will avoid the disposal plumes, which are ephemeral in nature. Species that might be affected can forage in the unaffected areas surrounding the disposal site, so any temporary reduction in food supply and foraging success would be insignificant (Section 6.0). No significant long-term effects to pelagic-based food resources are expected, because of the fairly rapid recovery expected in these communities and the small area affected.

2.1.6. Consistency Determination (CD).

Under the Coastal Zone Management Act of 1972, the San Francisco Bay Conservation and Development Commission (BCDC) requires the Corps to have a current Consistency Determination (CD) on file before dredging can commence. This project is in keeping with past CDs. The Corps submitted the 2010, 2011, and 2012 CD to BCDC, which they approved on June 2010.

2.1.7. Waste Discharge Orders (WDO).

Under the Clean Water Act of 1972, the San Francisco Regional Water Quality Control Board (RWQCB) requires the Corps to have a current Waste Discharge Order (WDO) on file before dredging can commence. The Corps submitted the 2007, 2008, and 2009 dredging program to RWQCB which was approved on March 14, 2007 and rolled over for 2011 in March 2011.

2.1.8. Marine Protection, Research, and Sanctuaries Act of 1972.

Under MPRSA (“the Ocean Dumping Act”), a permit is required for the disposal of dredged material in ocean waters beyond 3 nautical miles of the shoreline. This Act is not applicable to this EA because none of the dredged material from this project will be going to the ocean for disposal.

2.2. *California State Laws.*

2.2.1. California Environmental Quality Act (CEQA).

The California Environmental Quality Act (Public Resources Code 21000 *et seq.*) applies to actions directly undertaken, financed, or permitted by state lead agencies, and establishes state policy to prevent significant and avoidable damage to the environment. It requires any public agency to disclose the environmental impacts of its projects to the public through appropriate environmental documentation and to mitigate negative environmental impacts. This Act does not apply to federal actions.

2.2.2. California Endangered Species Act (CESA).

The California Endangered Species Act (Fish, and Game Code 2050 *et seq.*) requires mitigation for impacts to state-listed endangered, threatened, and candidate species. CESA mandates that state agencies should not approve projects that would jeopardize the continued existence of threatened or endangered species if reasonable and prudent alternatives are available that would avoid jeopardy, and requires state lead agencies to consult with the California Department of Fish and Game (CDFG) during the CEQA process. CDFG is required to issue a written finding as to whether a project would jeopardize listed species and to specify reasonable and prudent alternatives that would avoid jeopardy. This Act is not applicable to federal actions.

2.2.3. Native Plant Protection Act.

The Native Plant Protection Act (Fish, and Game Code 1900 *et seq.*) requires state agencies to utilize their authority to carry out programs to conserve endangered and rare native plants. The Act prohibits the taking of listed plants from the wild and requires notification of CDFG at least 10 days in advance of any change in land use. This Act is not applicable to federal actions.

2.3. Long-Term Management Strategy (LTMS).

The Long-term Management Strategy is a comprehensive collaboration between public resource agencies and other interests to manage dredging and placement of dredged material in the San Francisco Bay region. The Dredged Material Management Office (DMMO), which is part of the LTMS, is a joint program of the San Francisco District U.S. Army Corps of Engineers (USACE), San Francisco Bay Conservation and Development Commission (BCDC), San Francisco Bay Regional Water Quality Control Board (RWQCB), State Lands Commission (SLC), and the U.S. Environmental Protection Agency (EPA). Also participating are the California Department of Fish and Game (CDFG), the National Marine Fisheries Service (NMFS), and the U.S. Fish and Wildlife Service (USFWS), who provide advice and expertise to the process.

The purpose of the DMMO is to cooperatively review sediment quality sampling plans, analyze the results of sediment quality sampling, and to make suitability determinations for dredged material proposed for aquatic placement in San Francisco Bay. The goal of this interagency group is to increase efficiency and coordination between the member agencies and to foster a comprehensive and consolidated approach to handling dredged material.

Dredging and disposal restrictions (“work windows”) are mostly seasonal, and are applied to federally permitted dredging projects to protect sensitive life-history stages of aquatic animals from the physical alterations of aquatic habitats caused by dredging operations. Concerns are usually focused on the presence of specific target species. Concerns for fishes and shellfishes focus upon direct effects of suspended sediments on physiological effects, feeding disruptions, and impaired migration patterns. Work windows were put into effect to protect the sensitive life-history stages of endangered species in and around Bay.

3. Alternatives Including the Proposed Action

This section describes the No Action and Action alternatives. The No Action alternative (no dredging) serves as a baseline for evaluating the effects of the action alternatives.

3.1. No Action.

Under this alternative, the Corps would not dredge the San Rafael Channel at this time. No action would result in the continued shoaling of the channels and maneuvering area, making it difficult, dangerous, and eventually impossible for nautical traffic to safely enter and exit the channel.

3.2. Action Alternatives.

3.2.1. Maintenance Dredging and Disposal at Historical Disposal Sites.

Maintenance dredging in 2011 would take place, and the authorized channels and maneuvering area would remain economical and safe. Sediment would be removed from the channel bottom and deposited in a historical, designated disposal area. Dredging and disposal would have short-term effects on existing environmental parameters in San Francisco Bay.

Dredged material proposed for aquatic disposal must meet the stringent testing criteria under the Section 404 Guidelines, 40 CFR § 230, as promulgated by the USEPA under authority of the Federal Water Pollution Control Act (FWPCA) of 1972 as amended by the Clean Water Act (CWA) of 1977.

3.2.1.1. Maintenance Dredging and Ocean Disposal (SFDODS).

Maintenance dredging in 2011 would take place, and the authorized channels and maneuvering area would remain economical and safe. Sediment would be removed from the channel bottom and deposited in San Francisco Deep Ocean Disposal Site (SF-DODS), a designated deep-ocean, dredged-material disposal site located on the continental slope off San Francisco, about fifty-five nautical miles west of the Golden Gate Bridge, in 2,500 to 3,000 meters of water. The SFDODS site was designated by the U.S. Environmental Protection Agency (EPA) in 1993 and has received millions of cubic yards of dredged material, primarily from the Oakland and Richmond Harbors. For ocean disposal to take

place a project must demonstrate a need for ocean disposal, and material must be acceptable for ocean disposal as regulated by the Marine Protection, Research, and Sanctuaries Act (MPRSA) of 1972.

Because of its distance and stringent testing requirements, SF-DODS would be cost prohibitive to use for the financially modest maintenance project planned for San Rafael Creek. Furthermore, the ocean-going equipment necessary to use SF-DODS would be too large to fit inside the relatively small channels of San Rafael Creek, so deep ocean disposal is not considered further in this document.

3.2.1.1.1. Dredging and Disposal at the San Pablo Bay Disposal Site (SF-10).

Maintenance dredging in 2011 would take place, and the authorized channel and maneuvering area would remain economical and safe. Sediment would be removed from the channel bottom and deposited at the San Pablo Bay Disposal Site (SF-10), which lies five miles northeast of Point San Pedro. SF-10 is a rectangular 1500 by 3000-foot dispersive site. The LTMS plan allows disposal of 50,000 CY of dredged material per month at this site. Dredging and in-Bay disposal will have short-term effects on existing environmental parameters in San Pablo Bay.

3.2.1.2. Maintenance Dredging and Disposal at Alcatraz Site (SF-11).

Maintenance dredging in 2011 would take place, and the authorized channels and maneuvering area would remain economical and safe. Sediment would be removed from the channel bottom and deposited at the Alcatraz Disposal Site (SF-11), a circular area 2000 feet in diameter, located 0.3 miles south of Alcatraz Island in San Francisco Bay. SF-11 is the only in-Bay site that is near enough to the project area to enable cost-effective placement of the dredged material. It is also downstream of the project area, and the only disposal site that meets the State of California requirement to dispose of dredged material near the Golden Gate. Dredging and in-Bay disposal will have short-term effects on existing environmental parameters in San Francisco Bay.

3.2.2. Maintenance Dredging and Upland Disposal.

Maintenance dredging in 2011 would continue, and the authorized channels and maneuvering area would remain economical and safe. Sediment would be removed from the channel bottom and deposited in a designated upland reuse area, consistent with LTMS management practices.

3.2.2.1. Hamilton Airfield Wetland Restoration Site.

This project site is located on San Pablo Bay—four miles east of the city of Novato, in Marin County, California—and includes 988 acres of a former military airfield and adjacent California State Lands Commission areas. While this project would advance the beneficial use of dredged material and LTMS goals to reduce in-Bay disposal of dredged material, it will not be available during the 2011 dredging window (or anytime thereafter), and is therefore not considered further in this document.

Other upland disposal sites considered, but not proposed for the project, include:

3.2.2.2. Bair Island.

This site has been used in the past. The majority of the island is now protected and part of the San Francisco Bay National Wildlife Refuge. The USFWS is considering limited use of dredged material to recreate wetlands in the west end of the Island. This year, USACE is planning to deposit the dredged material from Redwood City Harbor at Bair Island.

3.2.2.3. Sherman Island Disposal Site.

Sherman Island is one of eight islands in the delta on which the Department of Water Resources was directed to develop and implement flood protection projects to comply with SB 34 as passed in 1988. The Sherman Island Demonstration Project began in late 1990 under a permit from the Central Valley Regional Water Quality Control Board (RWQCB) that required an extensive monitoring and testing program. At this time, however, the RWQCB has not approved Sherman Island for dredged material placement. Furthermore, transportation costs are high, which would restrict the use of Sherman Island to projects that are either nearby, or have special requirements. As such, the San Rafael Channel maintenance dredging does not qualify.

3.2.2.4. Winter Island Disposal Site.

Winter Island is a privately owned and operated site that is located at the confluence of the Sacramento and San Joaquin Rivers and Suisun Bay in Contra Costa County. The maximum depth for barges to access the site is 14 feet. Reclamation District #2122 has jurisdiction over Winter Island. The USACE is authorized under its Regulatory Branch permit # 22033S59, which allows 250,000 CY of material to be deposited to rehabilitate 4.75 miles of levees around

Winter Island. The site is permitted by the RWQBC and has specific material acceptance criteria established in its WDR that allows material with some levels of contaminants not normally suitable for unconfined aquatic disposal (NUAD) to be placed there. Around 2006, a levee breach occurred that might require dredged material for repair. In addition, there is a small upland area in the southeastern corner of the island that can also accept dredged material. However, like Sherman Island, placement of dredged material here would be cost prohibitive, so this site is not a viable alternative for the San Rafael Creek project.

3.2.2.5. Montezuma Wetlands Restoration Site.

This is a privately owned and operated site located in Solano County and adjacent to Montezuma Slough. Montezuma began accepting material in July 2003. Wetlands will be created from the imported material and will continue to be processed over the course of many years. All required permits have been attained; therefore, the site may accept “cover” and “non-cover” quality material as described in the SFBRWQCB draft guidance for beneficial use of dredged material. Montezuma has a docking area with off-loading equipment and has deep-water access. The off-loading equipment, however, is designed for large barges and volumes. Thus, this site may be unsuitable for small, shallow-draft barges that likely would be used for the San Rafael dredging.

Another problem is that a large tipping fee is charged for disposal at this site. This charge includes unloading costs and subsequent sediment management costs. Like other upland projects, high disposal and transportation costs limit the use of the Montezuma Wetlands Restoration Site either to nearby projects or to projects with chemically challenged material. As such, placement of dredged material here would be cost prohibitive, so this site is not a viable alternative for the San Rafael Creek project.

3.2.2.6. 3.2.2.5 Unnamed Upland Disposal Site.

Some upland sites (landfills) have specific material acceptance criteria established in their WDR that would allow material with slightly elevated levels of contaminants, not normally suitable for unconfined aquatic disposal (NUAD), to be placed there as daily cover material.

A project sponsor may propose an unnamed, permitted upland location as an alternative to those disposal sites identified in the solicitation for bids. The site would be expected to have in place all necessary environmental documentation

that would be required for any placement of dredged material. Award would be based on the bid that represents the least cost to the O&M program.

3.3. *Types of Dredges.*

3.3.1. Mechanical (Clamshell-Bucket) Dredge.

The mechanical clamshell dredge (*i.e.*, bucket dredge) removes loose or hard compacted materials by dropping an open clamshell bucket into the material (Figure 6). The shape and weight of the bucket allow penetration into the material where the bucket is closed and mechanically retrieved. The bucket is hoisted to an attending barge for unloading. Advantages include being well-suited for hard and compact material, the ability to excavate near structures, less excess water in the scow barge, effective control of turbidity near the dredge site, and improved economics using larger bucket sizes. Limitations include the inability to retain soft, semi-suspended, fine-grained materials in the standard bucket, increased turbidity (open bucket) in the area of the dredge site, and low production (compared with hydraulic cutterhead and hopper dredges) since material must be placed in scow barges for transport to disposal sites. This type of dredge has been used in the past for San Rafael Channel.

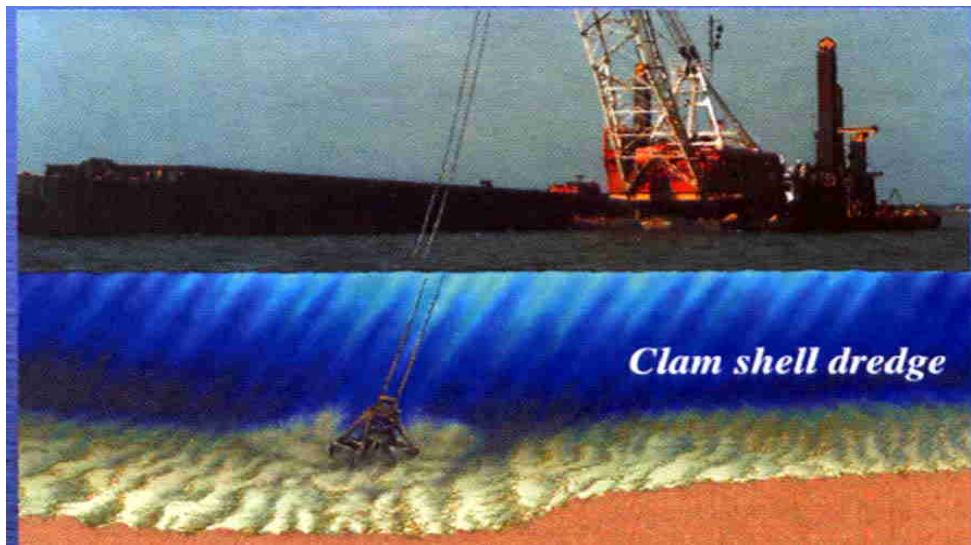


Figure 6: Clamshell Dredge.

3.3.2. Hydraulic Cutterhead Dredge.

The hydraulic cutterhead dredge removes loose or hard compacted sediments by loosening material with the cutterhead and then hydraulically lifting the material by suction through pipes to an attending barge or directly to a disposal or

beneficial use site. Advantages include the ability to excavate most types of material and pump it long distances, to operate continuously resulting in economic operation, and to dredge some rock formations using larger machines without blasting. Limitations include being unsuitable for open, rough water projects, increased turbidity during dredging, requiring towboats to move between locations, difficulties working in strong currents, and navigation problems caused by the pipeline from the dredge to the disposal site, especially in areas of confined, heavy traffic. Hydraulic dredging is not feasible for the San Rafael Channel because there is no adjacent upland site available for the dredged material.

3.3.3. Hopper Dredge.

The hopper dredge is a self-propelled, deep-draft vessel that both dredges and temporarily stores material. Dredging is performed using outboard suction pipes (dragarms) that hydraulically lift material as a mud-water slurry into holding cells, or hoppers, within the vessel where it collects and concentrates. After transport to an aquatic placement site, the sediment is released through the bottom of the vessel. Advantages of a hopper dredge include the ability to work in rough, open water, the ability to move quickly to a project site under its own power, not interfering with or obstructing traffic during operation, and effectively controlling turbidity near the dredge site. Limitations include a deep-draft that precludes use in shallow water, it cannot operate continuously, it excavates with less precision than other types of dredges, and it cannot operate effectively around structures.

The *Essayons* (Figure 7) is one of the Corps' hopper dredges that services ports along the Pacific Coast, Alaska, and Hawaii. The *Essayons* would not be feasible to use for the San Rafael maintenance dredging project because its draft is too deep for the channel.



Figure 7: Hopper Dredge Essayons.

3.4. Environmentally Preferred Project Alternative.

The preferred agency project alternative for San Rafael Channel and Across the Flats is to dredge the federal channel by clamshell and to dispose of the dredged material aquatically at the SF-10 legacy disposal site in San Pablo Bay (Table 1). The USACE intends to commence this project during the environmental work window that lies between June 1 and November 30.

Table 1: Disposal Site Practicability

Disposal Site	Practicable?
SF-10	Yes, selected as the alternative for San Rafael Channel and Across the Flats.
SF-11	Yes, but there is concern that this site will be overused during the work window.
SF-09	No, costs and distance not practical.
SF-DODS	No, ocean-going equipment can't fit into channels; distance/costs not practical.
Winter Island	No, costs and distance not practical.
Hamilton	No, not available for dredged material placement after March 2011.
Montezuma	No, costs and distance not practical.
Bair Island	No, costs and distance not practical.
Winter Island	No, costs and distance not practical.

4. Affected Environment

4.1. *Physical Factors.*

The assumed without-project conditions serves as the baseline against which the proposed and preferred Action Alternatives will be evaluated. Future without-project conditions are essentially the same as current existing conditions. Possible effects to these baseline conditions and cumulative effects are also presented.

4.2. *Environmental Setting.*

4.2.1. Dredging Location.

San Rafael Creek is fed by several small creeks that run through a primary urban residential area then through industrial areas, where the creek is channelized, into a canal and thence into San Francisco Bay. The canal is heavily affected by urban nonpoint run off.

The San Rafael Creek watershed encompasses 11 square miles that are densely developed from its hills to filled wetlands. The creek originates in the hills above Tamalpais Cemetery and flows through residential and industrialized areas before forming the San Rafael Canal in the vicinity of Highway 101. The upper stream corridor consists of short stretches of open stream channel, underground culverts, and trapezoidal open channels. The creek enters San Rafael Bay at Pickleweed Park. San Rafael Creek and Canal, once important commercial waterways in Marin, are currently used as marinas for recreational watercraft.

The watershed is highly urbanized, with small outcroppings of annual grasslands and oak-bay woodland. The upper slopes of the watershed adjacent to Mount Tamalpais Cemetery are Marin County Open Space District ridge lands. In the upper watershed, where the channel is open and not restricted to underground culverts, the banks are typically dominated by non-native plants. Developed often abuts the creek bank. The upper watershed is ephemeral to intermittent during higher flow years and currently does not support fish populations. Isolated wetlands along the bay provide the most important biological resources within the watershed.

Near downtown San Rafael and extending downstream of Highway 101, the creek is tidally influenced and contained within a man-made channel (the San Rafael Canal). During low tide, mudflats become exposed along the channel banks. The canal enters the bay near Pickleweed Park. A 4-acre tidal marsh at

the park supports a small population of California clapper rail. Marsh habitat along the bay is highly fragmented but still supports salt marsh harvest mouse, San Pablo song sparrow, and common yellowthroat—all salt marsh adapted species. The open bay, intertidal areas, and mudflats also provide habitat for migratory waterfowl, shorebirds, and wading birds.

Along the northern watershed boundary, upslope of Point San Pedro Road, Harry Barbier Park supports a number of intact plant communities including oak-bay and oak woodlands, grassy meadows, and coastal scrub. The park provides habitat connectivity between the San Rafael and Gallinas Creek watersheds. Sudden oak death (SOD) is prevalent in the park. Originating in the Harry Barbier Park, a small bay drainage, Glen Creek, supports threespine stickleback, Pacific treefrog, and the occasional river otter (Personal communication, L. Lewis 2008). The 140-acre Peacock Gap Golf and Country Club property supports a number of small freshwater ponds and a larger, 13-acre, tidal lagoon (Hydroikos Ltd. 2000 1). Areas of healthy, mature woodland habitats surround the club property.

Along the northern watershed boundary, there is a small bay drainage, Glen Creek, City of San Rafael owned Harry Barbier Park, and the privately owned Peacock Gap Golf Course and Country Club. Harry Barbier Park supports native woodland and grasslands and Peacock Gap Golf Course and Country Club supports some native woodlands, several freshwater ponds, and a 13-acre tidal lagoon. To the south of Pickleweed Park along the baylands, there is a small lagoon with several small islands that the City of San Rafael owns.

The Marin Islands sit off of San Rafael along the Marin County shoreline of San Francisco Bay. While they are not technically part of the watershed, they are ecologically connected. The two small islands and surrounding tidelands, which are protected by the Marin Islands National Wildlife Refuge and State Ecological Reserve, support one of the largest egret and heron rookeries in northern California. West Marin Island, the smaller of the two, provides nesting habitat for great egrets, snowy egrets, great blue herons, black-crowned night-herons, western gulls, and ravens. Its neighbor, East Marin Island, was once used as a vacation retreat and has been overrun with invasive species including Scotch broom, fennel, and eucalyptus. However, the larger island still provides valuable nesting material for the rookery next door.

Between the two Marin Islands is a small patch of eelgrass. However, it is more than 250 meters from the project site, so the project will have no impact on this eelgrass.

4.2.2. Disposal Locations.

The Alcatraz Dredged Material Disposal Site, SF-11, is located in open water in the San Francisco Bay. The site is a 2000-foot circle centered at 37°49'17"N and 122°25'23"W. The center is approximately 1500 feet south-southwest of Alcatraz Island. The site's dredged material mound is a dominant environmental feature. While biological resources in central San Francisco Bay are believed to be negatively affected by dredged material disposal activities at this site, no measurable impacts have been identified.

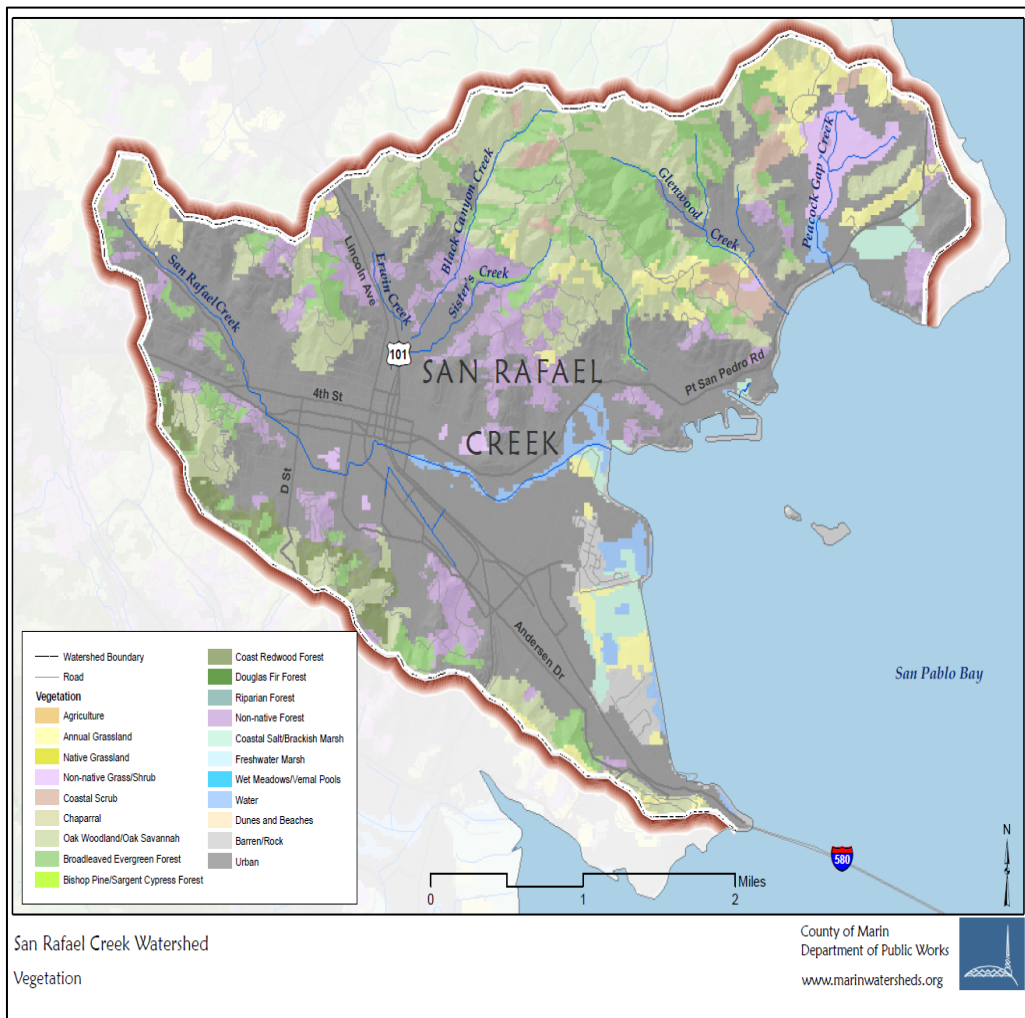


Figure 8: San Rafael Creek Watershed Land Use.

Five miles northeast of Point San Pedro, the San Pablo Bay Disposal Site (SF-10) is located in open water near the Pinole Shoals Channel. It is a rectangular, 1500- by 3000-foot, dispersive site situated between San Pedro Point and Point Richmond in

San Pablo Bay. The LTMS management plan permits disposal of 500,000 CY of dredged material per month at this site.

The Contractor may propose an unnamed site. Should the awarded contract include an alternative site, either the contractor or non-federal sponsor shall be responsible for all environmental compliances to be met for that site to be considered.

4.3. Sediment Testing and Evaluation.

4.3.1. Master Sampling and Analysis Plan (SAP).

In February 2004, the Dredged Material Management Office (DMMO) adopted a Master Sampling and Analysis Plan (Master SAP) to streamline the process for composing and reviewing sampling and analysis plans for individual USACE O&M dredging projects. The Master SAP describes the manner in which material should be collected, composited, shipped, stored, handled, and tested for certain physical, chemical, and biological analyses.

4.3.2. Sediment Suitability Status for Calendar Year 2011 Dredging.

The San Rafael Channel sediments were analyzed to determine their suitability to be dredged and placed in-Bay at the Alcatraz (SF-11) placement site. In this context, San Francisco District sought Tier I suitability status with confirmatory chemistry from the DMMO.

Sediment sampling for the confirmatory chemistry was performed May 19th, 2011 by USACE personnel. Sediment cores were collected from seven designated sites. Final site positions were determined with a differential global positioning system (DGPS) and are accurate to within 10 feet. Details on sample collection and processing, and on the analytical and testing methods used are provided in the final Sampling and Analysis Report (SAR) dated June 2011.

Data were analyzed primarily to ascertain if any of the pesticide- or PCB-contaminated material detected by the 2010 sampling event had migrated east of Station 175+00 in the channel. Analytical results for the seven samples indicate that the contaminated material has not migrated east past Station 175+00 since the 2010 sampling event was completed.

As such, Tier I sediment suitability status was approved at the June 22, 2011 meeting of the DMMO.

4.4. Water Quality.

The effect caused by dredging the San Rafael Channel and Across the Flat is a slight temporary increase in turbidity of the water column.

Should dredged material be disposed at SF-10 or SF-11, the effect of disposal is to cover the benthic habitat with a slurry of new dredged material. The overlying water at the site is not altered physically or chemically in a manner that is hazardous to pelagic species.

Should dredged material be disposed at SF-DODS, the effect of disposal is to cover the benthic habitat with a slurry of new dredged material. The overlying water at the site is not altered physically or chemically in a manner that is hazardous to pelagic species. The USACE and the EPA monitor SF-DODS to assure that there are no negative impacts.

4.5. Climate.

The overall climate in the project area is dominated by the semi-permanent eastern Pacific high-pressure system centered over the northeastern Pacific Ocean. The high is strongest in summer, when it moves to its northernmost position, which results in strong northwesterly airflow and negligible precipitation. A thermal low-pressure area from the Sonoran-Mojave Desert also causes air to flow onshore during parts of the summer. In winter, the high weakens and moves southwestward toward Hawaii, which allows storms originating in the Gulf of Alaska to reach California. Most precipitation occurs between November and March. The proposed project will have no effect on the climate.

4.6. Visual Resources and Aesthetics.

Aesthetics will be temporarily and slightly degraded while the dredge is present. Turbidity produced during the dredging process in the channel or disposal is slight and dissipates quickly. At an upland site, the presence of the pipeline, containment pond, and off loading equipment will slightly degrade aesthetics.

4.7. Cultural Resources.

Due to the fact that dredging is being conducted at previously dredged depths, annual maintenance dredging is not expected to affect cultural resources. There are no known cultural resources in the channels, maneuvering area or the historical disposal sites. A records search and fieldwork determined that no archaeological resources would be affected by the disposal of dredged material on the HWRP site. Historical architectural resources were identified in the areas surrounding the dredge disposal site, but it was concluded that disposal would cause no affect. Should dredging activity reveal any artifact of archeological or historical interest, work in the vicinity would cease. A qualified Corps archaeologist will evaluate the significance of the find and carry out the appropriate actions in accordance with federal laws and regulations. Work in the area will not be resumed until the archeologist has given clearance to proceed.

4.8. Air Quality.

Air emissions associated with the proposed project may be generated during sediment removal and tug transport of the scows to and from a disposal site. These emissions may consist of minor amounts of fugitive dust and vehicular exhaust fumes. This project is in open water well away from other human activity. These emissions are not anticipated to significantly contribute to ambient, background levels of either dust or vehicular exhaust fumes at either residential or industrial areas surrounding San Pablo and San Francisco Bays (Table 2). Any emissions release for the proposed federal action are considered *de minimis*, pursuant to the Clean Air Act, and do not require a conformity analysis with the Bay Area Air Quality Management District (BAAQMD).

There are no plans to dredge any chemically challenged material (identified as being upstream of Station 175+00). If chemically challenged material were to be dredged, there would be some air emissions associated with the hauling of these sediments by truck to a landfill. However, the truck routes to the landfill would be on established roads and highways, so any resulting air emissions from hauling the material would be minor and temporary.

Table 2: Maximum/Minimum Emission Values for San Rafael

Parameter:	June, 2010, Day																														Monthly		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Max	Min	
	Carbon	3	4	4	4	3	3	3	3	3	3	5	5	3	3	3	4	4	3	3	3	3	3	3	3	3							5

4.9.1.1. Disposal at SF-10.

Benthic organisms would suffer burial followed by prolonged exposure to anaerobic conditions after dumping has ceased. This would be a short-term effect, but it would kill most of the organisms within the footprint of the burial. Note that the site is disturbed each time disposal takes place.

4.9.1.2. Disposal at SF-11.

The existing benthic community at the SF-11 Site has, over the years, reached an equilibrium that adjusts to regular disposal of dredged material. Benthic organisms would suffer burial followed by prolonged exposure to anaerobic conditions after the dumping has ceased. This would be a short-term effect, but it would kill most of the organisms within the burial footprint. Each disposal project eliminates many benthic species and reduces others, as burial requires energy to recover. Other projects will continue to dispose at this site at least through November. This site has a re-colonization and recovery period of six months per year and therefore is a significantly reduced bay resource for the benthic community.

4.9.1.3. Unnamed Upland Site.

Some upland sites (landfills) have specific material acceptance criteria established in their WDR that would allow material with slightly elevated levels of contaminants, not normally suitable for unconfined aquatic disposal (NUAD), to be placed there as daily cover material. Chemically challenged material (NUAD) is required to go to landfills.

4.9.2. Fish Resources.

While the dredge engines are turned on, fish in the immediate area will be exposed to their noise. Both the noise and turbidity caused by dredging are of short duration, temporary, minor, and introduce nothing new to a normally noisy and turbid shipping channel.

Restrictions, which are mostly seasonal, are applied to federally permitted dredging projects to protect sensitive life-history stages of aquatic species from the physical alterations of aquatic habitats caused by dredging operations. Concerns are usually focused on the ecology of specific target species. For example, pelagic eggs and larvae of fishes and shellfishes depend on local hydrodynamic conditions

for transport into and out of dredging activity areas and have limited avoidance capabilities. Thus, they are considered to be more susceptible to dredging effects than motile juveniles and adults. Demersal eggs, such as those of herring, *Clupeo pollasii*, or life-history stages that are sessile or non-motile, are perceived as particularly susceptible. Because of their longer exposure to elevated suspended sediments the potential for smothering by temporary sedimentation is increased. Concerns for motile fishes and shellfishes focus upon direct effects of suspended sediments on survival, movement, and migration patterns. The main biological concern is the fact that endangered salmonids will be migrating through the area of dredging operations. The proposed project's dredging window should ensure that these species are unlikely to be affected by the proposed project.

Fish resources may be directly or indirectly affected by dredged material placement activities at the historical in-Bay disposal sites.

Suffocation of fish from excessive suspended solids can result from prolonged exposure from which fish are unable to escape. Potential direct impacts include burial of demersal fishes occupying the dredged material disposal sites; disruption of feeding grounds, spawning areas, and migration; and alteration of special habits. Indirect impacts occur when the prey of a species is directly affected. Benthic organisms would suffer burial followed by prolonged exposure to anaerobic conditions after the dumping has ceased. However, that too, would be a short-term effect.

One common concern in all dredging projects is the potential for dredged material disposal and resulting increases in turbidity (as suspended load) to affect the migratory patterns of fish species. Corps studies show turbidity plumes at disposal sites last only 20 minutes. Most estuarine fish are adapted to the turbid environments commonly associated with an estuary, having the ability to navigate and locate prey by means other than sight. Long-term impacts are difficult to evaluate because of the difficulty in separating dredging impacts from impacts created by other causes.

The direct impact of dredged material on the fisheries may be a short-term and localized exposure to a turbidity plume, and may result in loss of feeding, spawning, and migration areas. Most fish will be able to swim out of the path of the descending plume and avoid suffocation. The long-term effects of dredging have not been documented to date. Habitat destruction in the San Francisco Bay has taken place mainly because of the loss of intertidal marshes and mud flats, which were diked off and converted to other uses.

4.10. Noise.

The noise of the clamshell dredges while dredging will introduce construction noise to the canal and surrounding residential areas. The city of San Rafael has a noise ordinance (San Rafael Municipal Code Chapter 8.13) which limits construction noise to 90 dBA (decibels) at the project channel boundary. In light of this ordinance, the project will require an exemption/exception, and it will restrict the hours of construction to 12 hour work days (7:00am to 7:00pm) 7 days/week. Residents and businesses will experience short-term, intermittent disturbances from noise during in-water dredging activities. However, dredging the channel will take less than 5 weeks total, and dredging at any given station is expected to be no more than 2-3 days. A related note—when equipment operation exceeds 85 dBA, on-site personnel will be required to use appropriate hearing protection.

4.11. Utilities and Transportation.

4.11.1. Utilities.

No effect on utilities by the proposed project is anticipated.

4.11.2. Transportation.

No effect on transportation by the proposed project is anticipated.

4.12. Recreation.

The San Rafael Channel is used for light commercial and recreational traffic. Most land use adjacent to the San Rafael Channel is commercial or industrial, although there is some open space and water oriented housing and vacationing. Dredging may occasionally delay or impede recreational water craft, but this would be a temporary and minimal impact. Around the proposed Alcatraz disposal site, SF-11, recreational opportunities are extremely limited.

4.13. Socioeconomic Factors.

Land use near the channel is industrial and commercial. There are expensive homes nearby in the City of San Rafael. Project dredging will have a positive socioeconomic impact because of protection of capital invested in harbor facilities, continuation of harbor-related jobs and businesses, and commitment of monetary resources.

4.14. Short-Term Impacts.

4.14.1. Short Term Physical Effects.

The physical effect caused by dredging the San Rafael Channel and Across the Flats includes short-term impacts to the channels and any water-based disposal site. The channels are an already turbid environment and are dredged on a regular basis. Dredging will disturb the benthic community on the channel bottom by removal, and by burial in water based disposal sites. These impacts are considered to be insignificant.

When placing dredged material at an aquatic site, one common concern is the potential for increased turbidity (as suspended load) to affect benthic organisms and the migratory patterns of fish species. Experience has shown, however, that turbidity plumes from the placement of dredged material at the historical in-Bay placement sites generally last for less than 20 minutes. Moreover, estuarine fish tend to be adapted to turbid environments, which are commonly associated with estuaries, in that they have the ability to navigate and locate prey by means other than sight.

The Corps Waterways Experiment Station *Technical Report DS-78-5 (Effects of Dredging on Aquatic Organisms)* reports that: “Most organisms tested are very resistant to the effects of sediment suspensions in the water, and aside from natural systems requiring clear water such as coral reefs and some aquatic plant beds, dredging induced turbidity is not a major ecological concern.” The San Francisco Bay is a shallow, naturally turbid estuary. The stress impacts of dredging related turbidity on organisms living in high background levels of turbidity, though difficult to assess, are not considered to significantly exceed background “noise.”

4.14.1.1. Disposal at SF-10 and SF-11.

Effects of the disposal of dredged material at SF-10 or SF-11 include a slight, short-term and temporary increase in water-column turbidity at the disposal site, and the benthic habitat of the site being covered with a slurry of new dredged material. These impacts are considered to be short-term and insignificant. Both sites are highly disturbed because of ongoing use. Dredging may cause short-term impacts to air quality from exhaust emissions and increased noise level during the episode. Any impacts to the air, navigation, or recreation during this activity are minimal to non-existent. There are no known historical or cultural resources within the project area.

4.14.2. Fish Resources.

While the dredge pumps are turned on, fish in the immediate area of the dredge will be exposed to the noise of the pump motors. Both the noise and turbidity caused by dredging are of short duration, temporary, minor, and introduce nothing new to a normally noisy and turbid shipping channel. The direct impact of dredged material on the fish species may be a short-term and localized exposure to a turbidity plume, and may result in temporary blockage of feeding, spawning, and migration areas. Most fish will be able to swim out of the path of the descending plume to avoid suffocation. The long-term effects of disposal have not been documented to date.

4.14.3. Other Short Term Effects.

On-going dredging may cause short-term impacts to air quality from exhaust emissions and increased noise level. Any impacts to the air, navigation, or recreation during this activity are minimal to non-existent. There are no known historical or cultural resources within the project areas.

Environmental impacts, which must be considered for both upland and in-water operations (Tables 3 and 4), are an assessment of the order, magnitude, and impact mechanism for the major physical, biological, and socioeconomic conditions. An impact is defined as an effect causing a change in conditions. This change can be beneficial or adverse.

Table 3: Environmental Effects of Upland Disposal

1. PHYSICAL	BENEFICIAL	ADVERSE	MAGNITUDE	EFFECT MECHANISM
Air Quality		PT	S	Dredging equipment emissions.
Water Quality		N/A		No effect
Noise		PT	S	Vessel & other equipment related.
Wildlife/ Habitat		PT	L	Removal/destruction of benthos at dredge site. Habitat recolonizes between dredging episodes to some extent.
Wetlands		N/A		Placement in landfill.
Threatened & Endangered Species		T/S	S	Temporary slight alteration of migratory path of salmonids in dredge area.
Sustainable Species		T/C	S	Temporary slight alteration of migra-

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in EFH				tory path of palegics in dredge area.
Hydrology (floodplain values)		N/A		No effect.
2.Socio-Economic	Beneficial	Adverse	Magnitude	Impact Mechanism
Growth Inducement	SC		M	Preserve present rate of economic growth.
Transportation	PC		M	Preserve safe navigable channel for vessels.
		PT	S	Presence of dredge equipment has possibility to interfere with navigation.
Recreation	PC		L	Restore safe navigation depths.
Cultural Resources		N/A		No effect anticipated.
Aesthetics		PT	S	Presence of dredge; noise; turbidity
Energy		PT	S	Commitment of energy to dredging.
Economics	PC		L	Protection of capital invested in harbor facilities; continuation of harbor-related jobs and businesses; and commitment of monetary resources.
Health & Safety	PC		L	Provides safe navigation channel.
Key: Effect: Primary: P Temporary: T N/A = not applicable Magnitude: Slight: S Secondary: S Continuing: C Large: L				

Table 4: Environmental Effects of In-Bay Disposal

1. PHYSICAL	BENEFICIAL	ADVERSE	MAGNITUDE	EFFECT MECHANISM
Air Quality		PT	S	Dredging equipment emissions.
Water Quality		PT	S	Temporary increase in turbidity & decrease in dissolved oxygen
Noise		PT	S	Vessel related.
Wildlife/ Habitat		PT	L	Removal/destruction of benthos at dredge site; smothering of benthos at disposal sites. Habitat recolonizes between dredging episodes to some extent.
Wetlands		N/A		No effects anticipated.
Threatened & Endangered Species		T/S	S	Temporary slight alteration of migratory path of salmonids in dredge area.
Sustainable Species in EFH		T/C	S	Temporary slight alteration of migratory path of palegics in dredge area.
Hydrology		N/A		No effect.

4.15.2. Disposal at SF-10.

LTMS policy limits the amount of dredged material disposal at SF-10 to 500,000 CY per month. The proposed project and other approved federal and non-federal maintenance dredging projects cumulatively would not exceed this limit. Thus, no cumulative impact is anticipated.

4.15.3. Unnamed Upland Site.

Some upland sites (mostly landfills) have specific material acceptance criteria established in their WDR that would allow material with slightly elevated levels of contaminants, not normally suitable for unconfined aquatic disposal (NUAD), to be placed there as daily cover material. Chemically challenged material (NUAD) is required to go to landfills.

If a contractor or sponsor proposed an unnamed alternative upland site, the contractor or sponsor would be responsible for all the environmental compliances needed to place the material onto the upland site.

5. Endangered And Threatened Species

The U.S. Fish and Wildlife Service and NOAA Fisheries have provided the Corps with lists of federally endangered or threatened species that may occur in the vicinity of, or be affected by, the proposed project (see Appendix B). Some species identified, but not discussed in this section, do not have habitat in the project area and will not be impacted. The Long Term Management Strategy (LTMS) Biological Opinion (BO) also covers this proposed action.

5.1. Fish.

Many types of fish, including several species of salmon, are anadromous in that they migrate long distances up rivers and streams to spawn. Figure 9 depicts the presence of anadromous fish within the San Rafael Creek watershed.

The Sacramento River winter-run Chinook salmon, *Oncorhynchus tshawytscha*, and the Steelhead trout, *Oncorhynchus mykiss*, migrate upstream through the estuary starting in late August. Juvenile steelhead usually spend one or two years in freshwater before migrating to sea. Downstream migration occurs in late winter and early spring. The threat to the productivity and existence of these species is because of water diversion projects on the Sacramento River, destruction of upstream spawning habitat, fresh-water intake pump entrainment of juvenile and larvae fish, and effluent discharge. It is unlikely that Chinook salmon or their habitat will be impacted by this proposed project, since they should not be in the immediate area at the time of dredging. In addition, the fish are highly mobile and can avoid any of the proposed construction activity; therefore, no impacts are expected to occur.

The Central California Coast coho salmon, *Oncorhynchus kisutch* was listed as a threatened species on October 31, 1996. The decline of coho salmon has been attributed to several human-caused factors such as: habitat degradation (increased water temperatures, pesticides, non-point source runoff, etc.); harvesting of trees; water diversions; and artificial propagation of salmon. These factors exacerbate the adverse effects of the natural environmental variability from drought and poor ocean conditions. Coho salmon spawn in coastal streams in fall or winter, and remain in fresh water for about a year. It is unlikely that coho salmon or their habitat will be impacted by this proposed project, since they should not be in the immediate area at the time of dredging. In addition, the fish are highly mobile and can avoid any of the proposed construction activity; therefore, no impacts are expected to occur.

The planktivorous Delta smelt, *Hypomesus transpacificus*, occurs only in the Bay-Delta Estuary. The species is mainly found on the open surface and shoal waters of marsh channels and in Suisun Bay. The aquatic habitat in Richmond quadrant is designated as critical habitat for this species, however, this species is not commonly found downstream of Suisun Bay. Passing fish will avoid dredging and disposal operations similar to anadromous species. Therefore, the proposed dredging project is not likely to affect this species.

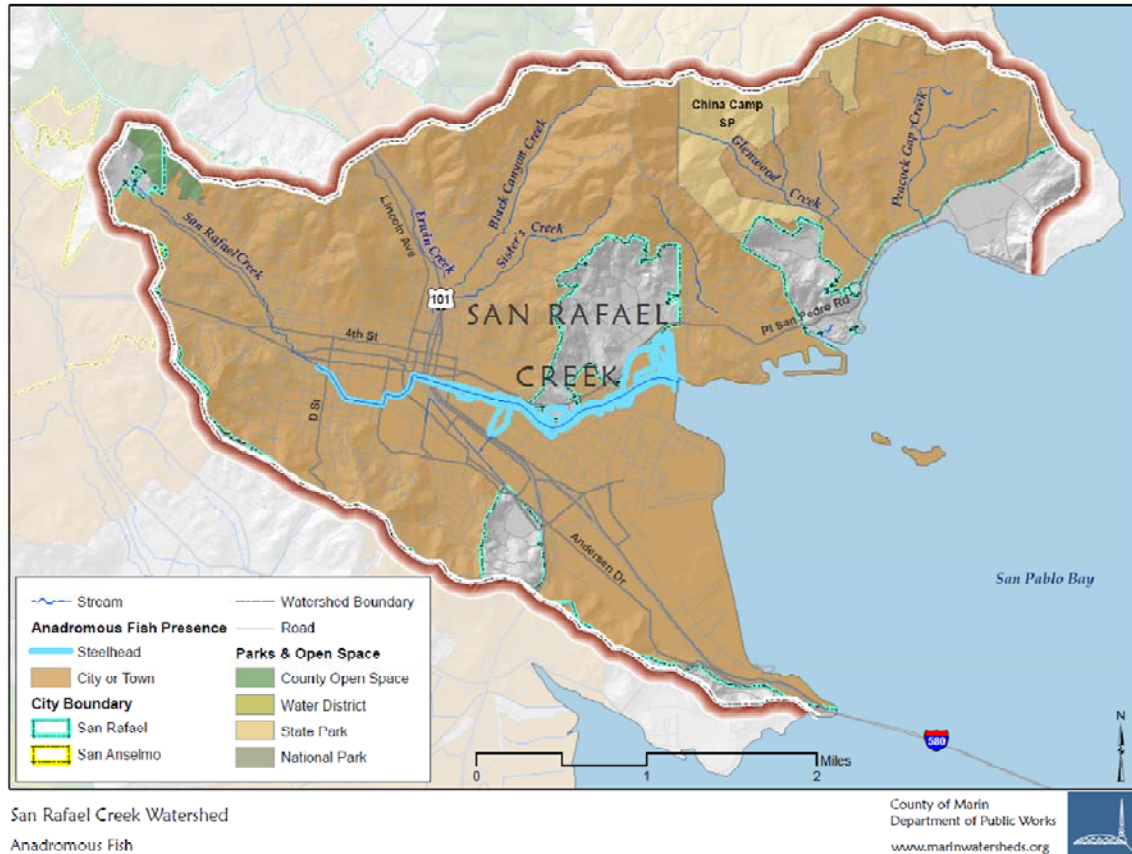


Figure 9: Anadromous Fish Presence.

The green sturgeon *Acipenser medirostris* is listed as threatened. This species migrates throughout the Bay-Delta as a long-lived and late-maturing adult. Green sturgeon utilize both freshwater and saltwater habitat. They spawn in deep pools or "holes" in large, turbulent, freshwater river mainstems (Moyle et al., 1992). Specific spawning habitat preferences are unclear, but eggs likely are broadcast over large cobble substrates, but range from clean sand to bedrock substrates as well (Moyle et al., 1995). It is likely that cold, clean water is important for proper embryonic development. Adults live in oceanic waters, bays, and estuaries when not spawning. They are known to forage in estuaries and bays ranging from San Francisco Bay to British Columbia. The green sturgeon is present in San Francisco

Bay and the Delta. The Corps is consulting with NOAA Fisheries on a programmatic Biological Opinion (BO).

A principal factor in the decline of the Southern DPS is the reduction of the spawning area to a limited section of the Sacramento River. This remains a threat because of increased risk of extirpation because of catastrophic events. Insufficient freshwater flow rates in spawning areas, contaminants (e.g., pesticides), bycatch of green sturgeon in fisheries, potential poaching (e.g., for caviar), entrainment by water projects, influence of exotic species, small population size, impassable barriers, and elevated water temperatures likely pose a threat to this species. A new programmatic LTMS Biological Opinion process is pending.

Tidewater goby, *Eucylogobis newberryi*, occurs coastal lagoons, brackish bays at the mouth of freshwater streams. There is no habitat for this species in the project or disposal area.

The Pacific herring *Clupea pallasii* is not a listed species, but it is ecologically and commercially important. Dredging will be conducted during the late spring and summer when the herring are not expected to be present.

5.2. Reptiles and Amphibians.

The Giant garter snake, *Thamnopsis couchi gigas*, is found in fresh water marshes, riparian areas, and canals in Sacramento, Solano, and San Joaquin Counties. Dredging and aquatic disposal will have no affect on this species or its habitat.

The threatened Alameda whipsnake *Masticophis lateralis euryxanthus*, and the threatened California red-legged frog *Rana aurora draytonii*, and all listed reptile and amphibian species of concern reported in the project area USGS quadrangles do not inhabit the marine environment and will not be affected by this marine open water project. If disposal is land based (landfill), the area where the beneficial dredged material will be placed is a sterile area scraped clean of all growth and possible habitat, thus these species will not be affected by placement of dredged material at that site.

Based on available distribution data, seas turtles are unlikely to occur in the project area because their preferred foraging and nesting habitat are generally located in ocean waters south of Baja California through Costa Rica and in the

western Atlantic Ocean (except *Chelonia agazzi*) surrounding the southern states. Therefore, this project is unlikely to impact the listed sea turtles.

5.3. Birds.

The endangered California brown pelican *Pelecanus occidentalis californicus* has a roost site at Brooks Island near the dredging area. However, the island is more than 300 ft. from the project area, so roosting pelicans are not likely to be disturbed or adversely affected by this project. Pelicans flying over the project area are highly mobile and can avoid the open water project activity, and are therefore not likely to be adversely affected by project activity.

In the San Francisco Bay, the endangered California Least Tern *Sterna antillarum browni* primarily roosts at the Alameda Naval Air Station and does not forage north of the Berkeley Marina. Even if individual California Least Terns forage in the project vicinity it is not likely they would be adversely affected. Dredging might cause temporary increases in turbidity in the eelgrass beds adjacent to portions of the San Rafael Channel, thereby potentially reducing visibility and foraging success, but the affect would be short-term. A study conducted during the deepening and widening of the channel in 1998 could not show that dredging affected the density or coverage of the eelgrass beds. The USFWS has concurred with our determination that this project is not likely to adversely affect the California least tern.

The federal government lists the western snowy plover, *Charadrius alexandrinus nivosus*, as threatened. The western snowy plover breeds primarily on coastal beaches from southern Washington to southern Baja California, Mexico. This species is highly mobile and can avoid the open water project activity. For this species, the project activity has an effect similar to the commercial ships that regularly travel in the same area. Therefore dredging and disposal operations are unlikely to impact the listed species or its habitat.

California clapper rail, *Rallus longirostris obsoletus*, is listed as endangered. It is only found in salt marshes around San Francisco, San Pablo, and Suisun Bays. The California clapper rail inhabits tidal salt marshes, especially where they include tidal channels, which are preferred foraging habitat during low tides. Breeding occurs from March to August. The USFWS has indicated the California clapper rail may be sensitive to loud noise while it is nesting if the noise intensity is unusually high. For this reason, the FWS Biological Opinion (BO) for the Corps' LTMS specifies that dredging shall not occur within 250 feet of potential

habitat for this species from February 1 through August 31. The USFWS considers all potential habitats to actually be occupied by this species unless surveys that year document its absence. The San Rafael Channel does not support significant salt marsh habitat and the channel and SF-11 are over 250 feet from potential clapper rail habitat.

5.4. Invertebrates.

The endangered white abalone *Haliotes sorensi* and the candidate species black abalone *Haliotes cracherodii* are reported in the Farallon Islands USGS quad. Abalone cling to rocks, from wave-swept intertidal ledges down into the twilight zone of deep reefs at 65 meters, wherever they can catch drifting fronds of kelp and other algae. In California, species separate themselves roughly by depth and latitude (Haaker et al. 1986). Green, pink, and white abalones prefer the southern climes, with each species occupying increasingly deeper waters, respectively, from Point Conception into Baja California. Red and Black abalone live in tidal pools from Oregon to the southern tip of Baja California. This project is unlikely to have any impact on these species because they do not inhabit the immediate project area where dredging or disposal takes place.

There are no other listed endangered or threatened invertebrates (Appendix B) that inhabit the immediate project area (marine, open water), so there are no impacts.

The Dungeness crab, *Cancer magister* is not a listed species, but it is ecologically, commercially and recreationally important. No work will be done in shallow berthing areas where Dungeness crabs are typically found, so it is unlikely that this species would be affected.

5.5. Mammals.

There are no known endangered or threatened marine mammals (Appendix B) that inhabit the immediate project area (open water), so the listed mammals would not likely be impacted by this project.

The endangered whales listed in the Farallon Islands USGS quad (sperm whale *Physeter macrocephalus*, sei whale *Balaenoptera borealis*, blue whale *Balaenoptera musculus*, finback whale *Balaenoptera physalus*, and right whale *Eubalaena glacialis*) are infrequent visitors to San Francisco Bay and SF-DODS.

The threatened stellar sea lion *Eumotporias jubatus* and the threatened Guadalupe fur seal *Arctocephalus townsendii* are reported in the Farallon Islands USGS quad. Harbor seals *Phoca vitulina* and California sea lions *Zalophus californianus* may occasionally be found in the dredging and disposal areas of the project. They are highly mobile and can easily avoid dredging equipment. Therefore no impact is expected on these species.

The salt marsh harvest mouse, *Reithrodontomys raviventris*, is a terrestrial species, so aquatic disposal cannot affect it. Disposal of NUAD material would be land based (most likely as daily cover in a landfill), but areas where dredged material would be placed are sterile, having been scraped clean of all growth and possible habitat; so there would be no impact on this species by land-based placement of the dredged material.

5.6. Plants.

None of the listed endangered or threatened plant species (Appendix B) inhabit the immediate project area, and thus would not be affected by this marine, open water project.

Eelgrass *Zostera marina* is not a listed species, but it provides important habitat for a variety of other species. Dredging could cause temporary increases in turbidity in the eelgrass beds adjacent to portions of the San Rafael Canal, thereby potentially reducing visibility and foraging success for species that use this habitat, but the affect would only be short-term. A study conducted during the deepening and widening of the channel in 1998 (Tetra Tech Inc and Merkel & Associates, 1999) showed that dredging and disposal did not affect the density or coverage of eelgrass beds.

A small patch of eelgrass is known to exist between the two Marin Islands. However, it is more than 250 meters from the project site, so the project will have no impact on this eelgrass.

6. Magnuson-Stevens Act Essential Fish Habitat

The Essential Fish Habitat (EFH) mandates of the Magnuson-Stevens Act represent a new effort to integrate fisheries management and habitat management by stressing the ecological relationships between fishery resources and the environments upon which they depend. The EFH consultation process will ensure that federal agencies explicitly consider the effects of their actions on important habitats, with the goal of supporting the sustainable management of marine fisheries. The National Marine Fisheries Service (NOAA Fisheries) administers the EFH (see Appendix B).

The San Rafael Channel is located in a designated EFH for species managed with the Coastal Pelagics, Pacific Coast Salmon, and Pacific Groundfish Fishery Management Plans (FMPs). Five Evolutionary Significant Units (ESU) of salmonids: the endangered Sacramento River winter-run Chinook salmon ESU *Oncorhynchus tshawytscha*, the threatened Central Valley spring-run Chinook salmon ESU *Oncorhynchus tshawytscha*, the threatened Central California Coast steelhead ESU *Oncorhynchus mykiss*, the threatened Central Valley steelhead ESU *Oncorhynchus mykiss*, and the Central Valley fall/late fall-run Chinook salmon ESU *Oncorhynchus tshawytscha* (a candidate species) are reported as possibly occurring in the San Rafael Channel. They also are likely found at SF-DODS. This project could cause a temporary, slight alteration of migratory path of salmonids, other pelagic fish, and ground fish in the dredge area.

The San Rafael Channel project area is designated as EFH for the following fish species managed with the Magnuson-Stevens Act Fishery Management Plan (FMP). These three species are under the Coastal Pelagics and Pacific Coast Salmon FMP: Chinook salmon, *Oncorhynchus tshawytscha*; coho salmon, *O. kisutch*; and Steelhead trout, *O. mykiss*.

Table 5 depicts species and life cycle stages covered under the Groundfish Fish Management Plan (FMP):

Black and yellow rockfish, *Sebastes chrysomelas*,
Blue rockfish, *Sebastes mystinus*,
Cabezon, *Scorpaenichthys marmoratus*,
California scorpionfish, *Scorpaena guttata*,
Kelp Greenling, *Hexagrammos dexagrammus*,
Leopard Shark, *Triakis semifasciata*,
Lingcod, *Ophiodon elongates*,

Olive rockfish, *Sebastesesbastes serranoides*,
 Starry flounder, *Platichthys stellatus*,
 Yellowtail rockfish, *Sebastes flavidus*,

Table 5: Known Species/Life Cycle Stages Covered Under Groundfish FMP

Species	Eggs	Larval	Juvenile	Adult
Abundant at San Rafael Channel/SF-11				
Northern Anchovy, <i>Engraulis mordax</i>	X	X	X	X
English sole, <i>Parphrys vetulus</i>			X	X
Starry flounder, <i>Platichthys stellatus</i>	X	X	X	X
Brown rockfish, <i>Sebastes auriculatus</i>			X	X
Market squid, <i>Loligo opalecscens</i>	X	X	X	
Present at San Rafael Channel/SF-11				
Jack mackerel, <i>Trachurus symmetries</i>	X	X		
Pacific sandab, <i>Cilharichthys sordidus</i>	X	X	X	X
Ling cod, <i>Ophiondon elongates</i>			X	X
Sand sole, <i>Psettichthys melanostictus</i>		X	X	X
Big skate, <i>Raja binocolata</i>			X	X
Pacific whiting (hake), <i>Merluccius Galeorhinus zyopterus</i>			X	X
Curlfin sole, <i>Pleuronichthys decurrens</i>			X	
Rarely Found at San Rafael Channel /SF-11				
Pacific sardine, <i>Sardinops sagax</i>			X	X
Bacaccio, <i>Sebastes paucispins</i>			X	X
Cabazon, <i>Scorpaenichthys marmoratus</i>			X	X

6.1. Impact of Dredging on Essential Fish Habitats.

Bottom fish such as English sole, *Parophrys vetulus*; starry flounder, *Platichys stellatus*; pacific sandab, *Chilharichthys sardidus*; and curlfin sole, which sometime bury themselves in the sandy bottom, have the potential to be entrained with the sediment taken up by the dredge. The hopper into which the fish would be emptied is 80% water and the fish would be released in a short period of time at the Alcatraz Disposal Site. It is possible that some of the entrained fish would survive the entrainment. The mortality to these bottom species, if any, would have no significant effect on their population numbers or species survival.

The dredged material from San Rafael Channel is intended to be disposed at SF-11, which has been regularly used as a disposal site for decades. Because the disposed dredged material is a fine, muddy silt composed of 80% water, fish will not be smothered by it. No additional habit is being affected. Studies (*Evaluation of Turbidity and Turbidity-Related Effects on the Biota of the San Francisco Bay-Delta*

Estuary) show that turbidity caused by dredged material disposal returns to pre-disposal conditions in 10 to 15 minutes. The entire dredge operation, consisting of about 125 dredge hopper loads, will only cause between 11.4 to 17.8 hours of increased turbidity in San Francisco Bay.

The dredged material disposal operation at SF-11 will have no significant impact on the sustainable species within the Essential Fish Habitat of either disposal site. The USACE has requested episodic EFH consultation for this project in addition to the programmatic LTMS EFH consultation. This EA has determined that this project will have no adverse impacts upon the fisheries or their habitats.

7. Coordination

7.1. List of Agencies.

A list of federal, state, and local environmental agencies with whom this project has been coordinated with includes, but is not limited to:

Bay Area Air Quality Management District
Bay Conservation and Development Commission
California Department of Fish and Game
California Regional Water Quality Control Board
California State Historic Preservation Office
California State Lands Commission
California State Resources Agency
National Oceanic and Atmospheric Administration Fisheries
United States Coast Guard
United States Environmental Protection Agency
United States Fish and Wildlife Service
United States Maritime Administration

7.2. Public Notice.

A public notice was issued and transmitted in 2007 to the U.S. Environmental Protection Agency, the San Francisco Bay Regional Water Quality Control Board, the Bay Conservation and Development Commission, and other federal, state, and local agencies. This public notice stated that the Corps complies with requirements for disposal of dredged material into waters of the United States. The availability of supporting information was circulated to the public for fifteen days in accordance with 33 CFR §§ 325.3 and 337.1(a). The notice remains in effect unless changes in the disposal plan warrant reevaluation under Section 404 of the Clean Water Act (CWA) or Section 103 of the Ocean Dumping Act (33 CFR § 337.1(a)).

A copy of this EA will be made available for public inspection upon request to the District Engineer.

8. Conclusion

Mechanical dredging of the San Rafael Creek Inner Canal & Across the Flats (ATF) channels and placement of the resulting dredged material at the Alcatraz Disposal Site (SF-11) has environmental impacts that are similar to those considered in previous EAs for the same project. As before, this project will not jeopardize the continued existence of threatened or endangered species, or adversely affect any critical habitat or the quality of the human environment. Preparation of an Environmental Impact Statement is therefore not recommended.

9. References

- Dredged Material Management Plan (DMMP) for San Rafael Canal Across the Flats. January 2002 USACE SF-District.
- Integrated Alternatives Analysis for San Francisco District Navigation Channels Fiscal Years 2006 – 2009 Operations and Maintenance Dredging, March 2006, USACE SF-District.
- Final Composite Environmental Statement on Maintenance Dredging, Existing Navigation Projects, San Francisco Bay Region, California, December 1975, USACE SF-District.
- Final Environmental Impact Statement for Designation of a Deep Water Ocean Dredged Material Disposal Site off San Francisco, California, August 1993, EPA Region IX.
- Hamilton Army Airfield Wetland Restoration Feasibility Study Novato, Marin County, California, December 1998, Jones & Stokes Associates
- Moyle, P.B., P.J. Foley, and R.M. Yoshiyama. 1992. Status of green sturgeon, *Acipenser medirostris*, in California. Final Report submitted to National Marine Fisheries Service. University of California, Davis, CA 95616.
- Port of Richmond Eelgrass Surveys, Merkel & Associates, January 2, 1997
- Richmond Harbor Navigation Improvement Project Post-Dredging Eelgrass Survey, April 1999, Tetra Tech Inc. and Merkel & Associates, Inc.
- Marin County Watershed Program, Marin County Department of Public Works 2009.http://www.marinwatersheds.org/san_rafael_creek.html

Appendix A: *Corps Overdepth Policy*



DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS
WASHINGTON, D.C. 20314-1000

CECW-P/CECW-0

JAN 17 2006

MEMORANDUM FOR COMMANDERS, MAJOR SUBORDINATE COMMANDS

SUBJECT: Assuring the Adequacy of Environmental Documentation for Construction and Maintenance Dredging of Federal Navigation Projects

1. Purpose. This memorandum provides guidance to assure that environmental compliance activities and environmental documentation associated with U.S. Army Corps of Engineers new Federal navigation project dredging or maintenance dredging adequately considers overdepth dredging. The guidance also has considerations relative to environmental documentation for permitting associated with non-Federal dredging. This guidance contains no new policy and is meant to supplement ER 1130-2-520 and to insure the future compatibility of the dredging description and quantities in environmental compliance documentation with the dredging as actually implemented.

2. Background. Congress specifically authorizes Federal navigation channels by specific depth and width. These authorized channel dimensions are generally based on maximizing net transportation savings considering the characteristics of the vessels using the channel and include consideration of safety, physical conditions, and vessel operating characteristics. In addition, the reliability of the channel is considered and may result in the incorporation of advance maintenance depths into the construction of the channel where such advance maintenance is justified to assure operational reliability and least overall cost. Finally, the construction techniques for the channel are considered. There is inherent imprecision in dredging processes which vary with the physical conditions (tides, currents, and waves); the dredged material characteristics (silt, clay, sand, gravel, rock, etc.); the channel design (depths being dredged, side slopes, etc.); and the type of dredging equipment (mechanical, hydraulic, hopper, etc.). Due to these variables and the resulting imprecision associated with the dredging activity, Corps engineering design, cost estimating and construction contracting documents recognize that dredging below the Congressionally authorized project dimensions will occur and is necessary to assure the required depth and width as well as cost effective operability. To balance project construction requirements against the need to limit dredging and disposal to the minimum required to achieve the designed dimensions, a paid or allowable overdepth (including side slopes) is incorporated into the project-dredging prism. Material removed from this allowable overdepth is paid under the terms of the dredging contract. Material removed beyond the limits of the allowable overdepth is not paid. These dredging zones are illustrated on the enclosed figure and defined and discussed in more detail below.

a. Authorized Dimensions. The authorized dimensions are the depth and width of the channel authorized by Congress to be constructed and maintained by the Corps. These authorized channel dimensions are generally based on maximizing net transportation savings considering the characteristics of the vessels using the channel and include consideration of safety, physical conditions, and vessel operating characteristics. For entrance channels from the ocean into harbors, the authorized dimensions often include an additional allowance of safety for wave action for that portion of the channel crossing the ocean bar. For example, a 45-foot entrance channel may have an authorized 47-foot depth over the ocean bar.

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b. **Advance Maintenance.** Advance maintenance is dredging to a specified depth and/or width beyond the authorized channel dimensions in critical and fast-shoaling areas to avoid frequent redredging and ensure the reliability and least overall cost of operating and maintaining the project authorized dimensions. For maintenance dredging of existing projects, Major Subordinate Commanders (MSC) (Division Commanders) are authorized to approve advance maintenance based on written justification. For new Federal navigation projects, advance maintenance is approved as part of the feasibility report review and approval process based on justification provided in the feasibility report.

c. **Paid Allowable Overdepth.** Paid allowable overdepth dredging (depth and/or width) is a construction design method for dredging that occurs outside the required authorized dimension and advance maintenance (as applicable) prism to compensate for physical conditions and inaccuracies in the dredging process and allow for efficient dredging practices. The term “allowable” must be understood in the contracting context of what dredging quantities are eligible for payment rather than in the regulatory context of what dredging quantities are reflected in environmental compliance documents or permits. As discussed in paragraph 4, environmental documentation must reflect the total quantities likely to be dredged including authorized dimensions, advance maintenance, allowable overdepth, and non-pay dredging. The paid allowable overdepth should reflect a process that seeks to balance considerations of cost, minimizing environmental impact and dredging capability considering physical conditions, equipment and the material to be excavated. ER 1130-2-520 provides that District Commanders may dredge a maximum of two feet of allowable overdepth in coastal regions and in inland navigation channels. Paid allowable overdepth in excess of those allowances or the use of zero paid allowable overdepth requires the prior approval of the MSC Commander. The Corps recognizes that there may be circumstances where there is a need for increased precision in the dredging process, for example in environmental dredging of contaminated material, which dictate trading potential increased costs for reduction in paid allowable overdepth.

d. **Non-Pay Dredging.** Non-pay dredging is dredging outside the paid allowable overdepth that may and does occur due to such factors as unanticipated variations in the substrate, incidental removal of submerged obstructions, or wind or wave conditions. In environmental documentation non-pay dredging is normally recognized as a contingency allowance on dredging quantities and may and does occur in varying magnitude and locations during the construction and maintenance of a project.

e. **Characterization Depth.** Regulatory compliance requires that material to be dredged be characterized and evaluated with regard to its suitability for the proposed placement of the material. Characterization and evaluation of dredged material must consider the entire dredging prism, including paid allowable overdepth and non-pay dredging.

3. **Problem Being Addressed.** The U.S. Environmental Protection Agency has raised questions concerning the dredging of material from outside dimensions characterized and evaluated for dredging and disposal and the potentially unauthorized discharge of that material in the Federally regulated waters of the United States. In some cases, environmental documents and permits primarily associated with compliance with the National Environmental Policy Act, the Clean Water Act and the Marine Protection, Research and Sanctuaries Act may not have adequately described the dredging project and may not have adequately described the application of paid allowable overdepth and non-pay dredging. These documents may have conveyed an inaccurate impression about the precision of the dredging process and may, in some cases, have understated

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dredging quantities. Regulatory compliance requires that the material to be dredged be characterized and evaluated with regard to its suitability for the proposed placement of the material. This characterization and evaluation may or may not require testing depending on applicable requirements. All material likely to be dredged including material in the paid allowable overdepth and non-pay dredging areas must be characterized and evaluated. There is also a need for better communication with agencies and the public about the application of authorized project dimension, advance maintenance, paid allowable overdepth and non-pay dredging, as well as the inherent imprecision of the dredging process and variation from project to project based on project design and survey/measurement considerations, physical conditions, characteristics of the material being dredged, and type of dredging equipment.

4. Guidance for Environmental Compliance Documentation Associated With Federal Navigation Project Dredging and Permitted Dredging.

a. In collaboration with State and Federal resource and regulatory agencies, the Corps will ensure that all applicable environmental compliance actions required for the dredging project have been identified and coordinated with those respective agencies. The Corps will describe in detail the dredging project which will include the total dredging prism including authorized project dimensions, advance maintenance, paid allowable overdepth, and anticipated non-pay dredging. It is understood that the details of the dredging project become more precisely defined as a new construction or maintenance project moves from planning to the design and construction phases. Details will be coordinated with resource and regulatory agencies as they are developed.

b. Characterization and evaluation of dredged material must consider the entire dredging prism including paid allowable overdepth and non-pay dredging. Characterization and evaluation of dredged material should err on the side of considering all material that might be dredged. Determining the depth and width that must be characterized and evaluated in the environmental documentation for a Federal navigation project or a permit should be a collaborative process that involves the Corps, the port, the dredging contractor community, and the Federal and state regulatory and resource agencies. Dredging below the maximum depth and beyond the maximum width characterized and evaluated in the environmental documentation for a Federal navigation project or permit may be subject to environmental compliance enforcement.

c. Environmental documentation must describe the dredging project appropriate to the level of detail available at the stage of the project development process and clearly present the dredging parameters including the advanced maintenance, paid allowable overdepth, and non-pay dredging quantities, and the maximum depth and width that was characterized and evaluated for dredging and placement. The dredging quantities reflected in environmental documentation and permits prescribe the estimated quantities to be dredged and placed. The estimates must be adequate to assure the achievement of the full dimensions of the Congressionally authorized project and advance maintenance needs including estimates of the quantity that may be excavated due to the inherent imprecision of the dredging process while limiting dredging quantities in the interest of environmental protection and preservation of disposal capacity. These estimates must be developed in a collaborative process that involves the Corps, the port, the regulatory and resource agencies, and the dredging contractor community.

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5. Guidance for Contracting and Construction Management.


a. Construction contracts should contain appropriate incentives and disincentives to limit non-pay dredging to satisfy environmental and project design considerations. This is normally achieved by defining a paid allowable overdepth and not providing payment for dredging beyond this limiting depth and/or width. Sloughing or failing of side slopes and dredging in the vicinity of structures (berths, pipelines, bridges, etc.) must be considered during the development of contract documents for construction. The method of measurement must be clearly described and quality assurance and quality control surveys should precisely depict the dredging and placement activities. Contracts should also clearly reflect the maximum depth and width that was characterized and evaluated in the environmental documentation. Non-pay amounts that are dredged should be calculated and reported in the contractor post project evaluations.

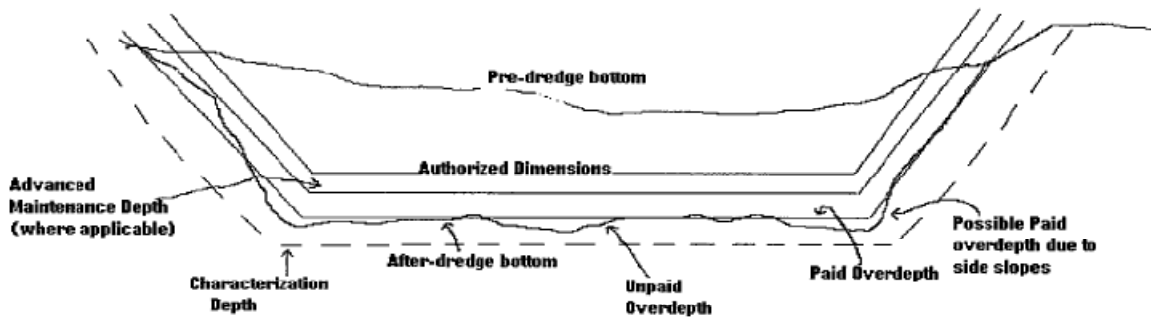
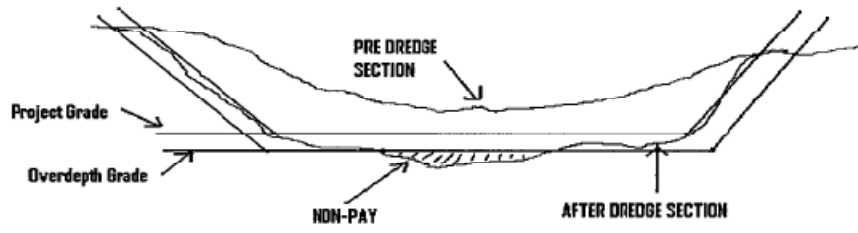
b. Environmental compliance documents and certifications also may describe limitations on the dredging and placement along with quantity limitations and must be clearly described in the contract documents. Appropriate references to the dredging process contained in environmental documentation should also be included.

c. Pre-bid conferences should address and pre-construction conferences must review the dredging processes to be utilized during construction in conjunction with the expectations and limitations contained in the environmental documentation.

FOR THE COMMANDER:

Encl


DON T. RILEY
Major General, USA
Director of Civil Works



**Appendix B: *Threatened & Endangered
Species***

U.S. Fish & Wildlife Service

Sacramento Fish & Wildlife Office

Federal Endangered and Threatened Species that Occur in,
or may be Affected by, Projects in the Counties or
U.S.G.S. 7 1/2 Minute Quads you requested

Document Number: 110222051101

Database Last Updated: April 29, 2010

Invertebrates

- Speyeria callippe callippe
 - callippe silverspot butterfly (E)
- Syncaris pacifica
 - California freshwater shrimp (E)

Fish

- Acipenser medirostris
 - green sturgeon (T) (NMFS)
- Eucyclogobius newberryi
 - tidewater goby (E)
- Hypomesus transpacificus
 - Critical habitat, delta smelt (X)
 - delta smelt (T)
- Oncorhynchus kisutch
 - coho salmon - central CA coast (E) (NMFS)
 - Critical habitat, coho salmon - central CA coast (X) (NMFS)
- Oncorhynchus mykiss
 - Central California Coastal steelhead (T) (NMFS)
 - Central Valley steelhead (T) (NMFS)
 - Critical habitat, Central California coastal steelhead (X) (NMFS)

- Critical habitat, Central Valley steelhead (X) (NMFS)
- *Oncorhynchus tshawytscha*
 - Central Valley spring-run chinook salmon (T) (NMFS)
 - Critical habitat, winter-run chinook salmon (X) (NMFS)
 - winter-run chinook salmon, Sacramento River (E) (NMFS)

Amphibians

- *Rana aurora draytonii*
 - California red-legged frog (T)
 - Critical habitat, California red-legged frog (X)

Reptiles

- *Masticophis lateralis euryxanthus*
 - Alameda whipsnake [=striped racer] (T)
 - Critical habitat, Alameda whipsnake (X)

Birds

- *Charadrius alexandrinus nivosus*
 - western snowy plover (T)
- *Pelecanus occidentalis californicus*
 - California brown pelican (E)
- *Rallus longirostris obsoletus*
 - California clapper rail (E)
- *Sternula antillarum* (=Sterna, =albifrons) browni
 - California least tern (E)
- *Strix occidentalis caurina*
 - northern spotted owl (T)

Mammals

- *Reithrodontomys raviventris*
 - salt marsh harvest mouse (E)

Plants

- *Arctostaphylos pallida*
 - pallid manzanita (=Alameda or Oakland Hills manzanita) (T)
- *Calochortus tiburonensis*
 - Tiburon mariposa lily (T)
- *Castilleja affinis* ssp. *neglecta*
 - Tiburon paintbrush (E)
- *Hesperolinon congestum*
 - Marin dwarf-flax (=western flax) (T)
- *Holocarpha macradenia*
 - Critical habitat, Santa Cruz tarplant (X)
 - Santa Cruz tarplant (T)
- *Streptanthus niger*
 - Tiburon jewelflower (E)
- *Sueda californica*
 - California sea blite (E)

Proposed Species

Amphibians

- *Rana draytonii*
 - Critical habitat, California red-legged frog (PX)

Quads Containing Listed, Proposed or Candidate Species:

RICHMOND (466A)

SAN QUENTIN (466B)

PETALUMA POINT (483C)

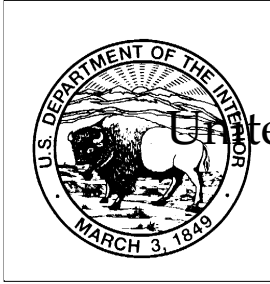
County Lists

No county species lists requested.

Key:

- (E) Endangered - Listed as being in danger of extinction.
- (T) Threatened - Listed as likely to become endangered within the foreseeable future.
- (P) Proposed - Officially proposed in the Federal Register for listing as endangered or threatened.
- (NMFS) Species under the Jurisdiction of the [National Oceanic & Atmospheric Administration Fisheries Service](#). Consult with them directly about these species.
- Critical Habitat - Area essential to the conservation of a species.
- (PX) Proposed Critical Habitat - The species is already listed. Critical habitat is being proposed for it.
- (C) Candidate - Candidate to become a proposed species.
- (V) Vacated by a court order. Not currently in effect. Being reviewed by the Service.
- (X) Critical Habitat designated for this species

Appendix C: *Clapper Rail Survey Protocol*



United States Department of the Interior

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

DRAFT SURVEY PROTOCOL

California Clapper Rail (*Rallus longirostris obsoletus*)

January 21, 2000

Below is a description of the standard methodology used to detect presence or absence of clapper rail breeding activity. Surveys should be conducted once a week for a minimum of four weeks. The optimal time to conduct call count surveys is mid-January through March. Once a survey protocol has been developed, it should be sent to the Service for final approval prior to implementation. After the results are compiled and submitted to us, we will make a final decision on the possibility of doing any work as described.

Methodology

1. Surveys should be conducted from January through mid-April, which encompasses the optimum time period of mid-January through March when the frequency of calls is typically highest. Surveys should not be conducted when tides greater than 4.5 feet NGVD as predicted at the Golden Gate occur at the marsh during the survey period or during full moon periods.
2. Listening stations should be established no more than 150 meters apart along transects in or adjacent to marsh areas. Stations should be established so that the entire marsh is covered by 75 to 100-meter radius circular plots. Listening stations should be placed near marsh features, such as sloughs, but not along slough edges to minimize disturbance to rails. Surveys should be conducted from levee crowns or boardwalks to minimize disturbances to marsh areas where possible. A detailed map depicting sloughs and other marsh landmarks or features should be developed.
3. Surveys should be conducted at sunset or sunrise. Surveys conducted at sunrise should begin 45 minutes before sunrise and continuing until 1 1/4 hours after

sunrise. Surveys conducted at sunset should begin 1 1/4 hours before sunset and continue until 45 minutes after sunset.

4. An observer should be assigned to each listening station for the duration of each survey. Observers should locate key marsh landmarks or features on a map in relation to each listening station location.
5. All rail vocalizations should be recorded, noting the call type, location, and time on a detailed map of the marsh. The call types are coded as C = clapper, D = duet, K = kek, B=kek-burr with a V representing a visual sighting. Other unusual calls also should be noted. The calls of one bird or pair should be marked by circling the calls together. If a rail is moving during the survey, several locations may be noted for the same bird(s). Attention should be focused on accurately mapping the birds that are nearby, especially between observers or towards the edge of the marsh if the station is positioned at the marsh's edge.
6. At the end of each survey, observers should compare maps to determine overlap in detections and to create a master map showing all pairs and individuals located during the survey. Another master map should be developed once all surveys are completed, showing the dates and locations of detections.
7. Weather information, including wind velocities and direction, should be recorded. Call count surveys should not be conducted when wind velocities exceed 10 mph or wind gusts exceed 12 mph, or during moderate to heavy rains. Information on disturbances (e.g., dogs or cats in marsh and aircraft flyovers) occurring during the surveys should be recorded.
8. If a survey of a marsh is conducted over more than one night, observers should be assigned to stations adjacent to their previous night's station if at all possible.
9. New observers should be trained by an experienced observer. Trainees should familiarize themselves with various calls and with estimating distances to calls before training in the field. In-field training should include ways to minimize disturbance to rails and marsh vegetation. Trainees should be stationed with an experienced observer during a call count for a minimum of 2 nights to assess the trainee's ability to accurately detect and map calls in the field. The Palo Alto Baylands is a marsh with many rails typically calling in the evening and easy access via a boardwalk, thus providing an excellent training opportunity for new observers and their instructors. A recording of clapper rail calls is available for training purposes at the U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office, 2800 Cottage Way, Suite W2605, Sacramento, California 95825.

Appendix D: *Project Specific EFH Letter*



DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, U.S. ARMY CORPS OF ENGINEERS
1455 MARKET ST.
SAN FRANCISCO, CALIFORNIA 94103-1398

SEP 22 2010

REPLY TO
ATTENTION OF

Executive Office

Mr. Robert S. Hoffman
Assistant Regional Manager
For Habitat Conservation
Attn: Ms. Korie Schaeffer
U.S. 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

Dear Mr. Hoffman:

This letter is in regards to compliance with the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) for the 2010 Operations and Maintenance (O&M) dredging episode of the federal San Rafael Across the Flats and the San Rafael Canal Channels. Pursuant to section 305 of the MSFCMA, the U. S. Army Corps of Engineers, San Francisco District (USACE) and the U. S. Environmental Protection Agency, Region 9 (USEPA) are currently conducting programmatic consultation with your agency regarding potential effects of the San Francisco Bay Long Term Management Strategy (LTMS) on Essential Fish Habitat (EFH). Per the discussion between your agency staff and the USACE, during a conference call held on Wednesday September 15, 2010, all parties agreed that the USACE would provide your agency with an official letter that discusses the measures that will be taken to avoid, minimize, or mitigate potential adverse effects on EFH for dredging projects that occur prior to the finalization of the Programmatic EFH Conservation Recommendations. As such, this letter serves as compliance with the MSFCMA for dredging of the federal channels.

The San Rafael Across the Flats and the San Rafael Canal Channels are located north of San Francisco Bay in Marin County (37° 57.930' N, 122° 29.172' W; Figure 1-2, enclosed). The shallow-draft channel with two named reaches, predominately serve light commercial and recreational vessels. The O&M dredging schedule provides for seven- and four-year dredging cycles for the San Rafael Across the Flats and the San Rafael Canal Channels, respectively. Project depths are 8 feet Mean Lower Low Water (MLLW) from San Francisco Bay to the mouth of San Rafael Creek; thence 6 feet MLLW to the head of navigation at the Grand Street Bridge in the City of San Rafael.

The USACE plans to begin dredging the San Rafael Channels on October 17, 2010 with a contract mechanical dredge, and dredging will take approximately 30 days. Currently,

the San Rafael Across the Flats Channel from Station 0+00 to Station 86+00 is 6 feet or greater depth, and the USACE will not dredge any part of that reach. The Channel from Station 86+00 to 119+00 will be dredged to a depth of 5 feet MLLW plus 1 foot of paid overdepth. The San Rafael Canal Channel from 119+00 to 175+00 will be dredged to a depth of 5 feet MLLW plus 1 foot of paid overdepth. The dredged material will be placed at either the Alcatraz Disposal Site (SF-11), south of Alcatraz Island, or the San Pablo Bay Disposal Site (SF-10) or both, as previously authorized.

Sediment sampling and testing in the San Rafael Canal Channel from Station 175+00 to Station 200+87 found material that was unsuitable for aquatic placement. The contractor will dredge this reach to a depth of 4 feet MLLW plus 1 foot of paid overdepth. That material will be placed at an upland location to be determined by the contractor. The upland site will meet all regulatory requirements.

The USACE has concluded that the 2010 dredging episode of the San Rafael Channels may adversely, but not substantially, affect the EFH for the following reasons:

- 1) The Channels are primarily composed of silt and clay with some sand and organic material. The last three dredging episodes were six years apart (1991, 1997, and 2002-3). Consequently, there has been adequate time for benthic organisms to recolonize the bottom except that the bottom is continually disturbed by light commercial and recreational vessels, which further disturbs the benthic habitat. Therefore, benthic habitat used as EFH is considered to be marginal.
- 2) There are no known mapped eelgrass beds located within or adjacent to either Channel or the in-Bay placement sites. Therefore, no direct or indirect impacts to eelgrass beds are expected to occur.
- 3) Sediment testing of the San Rafael Across the Flats and Canal Channels from Station 0+00 to Station 175+00 has consistently resulted in clean material that is suitable for in-Bay placement. Therefore, constituents of concern are not expected to be exposed during dredging or dredged-material placement.
- 4) Sampling and testing of the San Rafael Canal Channel from Station 175+00 to Station 200+87 has found unsuitable material for aquatic placement. The contractor will dredge this reach and the sediment will be placed at an approved upland location that meets all regulatory requirements. A copy of the Sampling and Testing Report will be sent both electronically and in printed form with this letter to you.

If you have any questions, our point of contact for this matter, Laurie H. Suda, 415-503-6840, Laurie.H.Suda@usace.army.mil. Copies of this letter were furnished to Brenda Goeden, San Francisco Bay Conservation and Development Commission; Elizabeth Christian, San Francisco Regional Water Control Board, Brian Ross, USEPA; and Vicki Frey, California Department of Fish & Game, Marine Region.

Sincerely,

A handwritten signature in black ink, appearing to read 'Torrey A. DiCiro', written over a horizontal line.

Torrey A. DiCiro
Lieutenant Colonel, U. S. Army
Commanding

Enclosure:

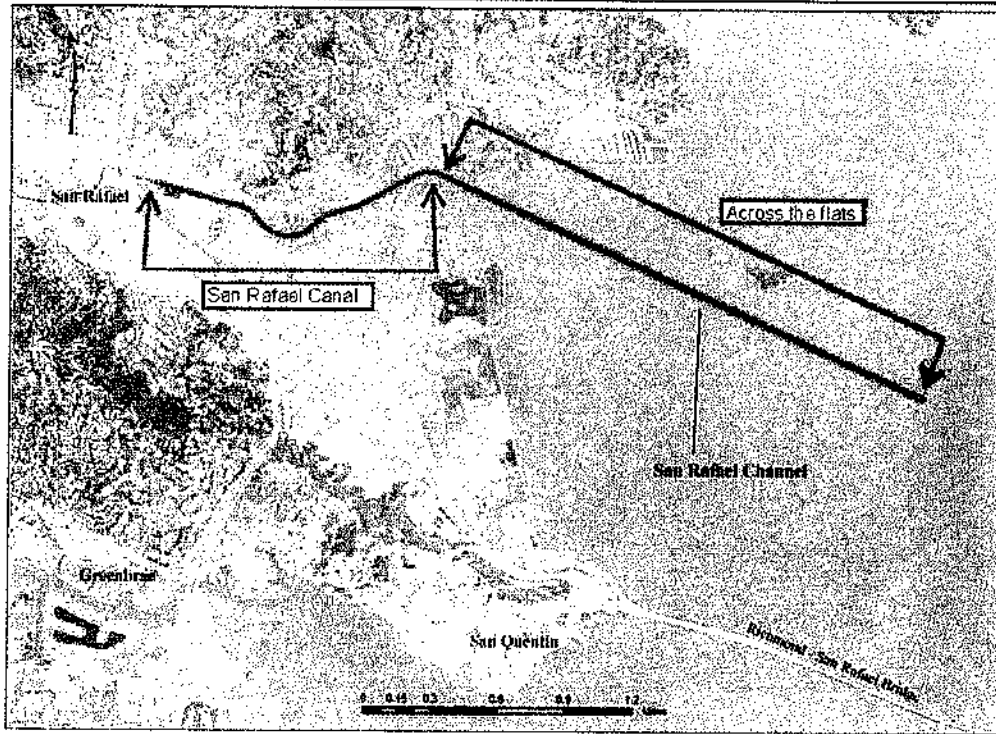


Figure 1-2. Vicinity Map: San Rafael Channel