Environmental Assessment/ Environmental Impact Report

Draft

Prepared for:

US Army Corps of Engineers ®
San Francisco District

CALIFORNIA WATER BOARDS
San Francisco Bay

Prepared by:

SCOUT | Stantec
A MENTOR-PROTÉGÉ JOINT VENTURE

Project Name:

San Francisco Bay Federal Channels Operation and Maintenance Dredging and Sediment Placement Activities, Dredging Years 2025-2034
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San Francisco Bay Federal Channels Operation and Maintenance Dredging and Sediment Placement Activities, Dredging Years 2025 – 2034

Prepared for

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ABBREVIATIONS

µg/m^3	micrograms per cubic meter
°F	degrees Fahrenheit
AAQS	ambient air quality standards
AB	Assembly Bill
APE	area of potential effects
Alt	alternative
AWOIS	Automated Wreck and Obstruction Information System
B	beneficial
BAAQMD	Bay Area Air Quality Management District
BART	Bay Area Rapid Transit
Basin Plan	Water Quality Control Plan for the San Francisco Basin
Bay Plan	San Francisco Bay Plan
BCDC	San Francisco Bay Conservation and Development Commission
BiOp	Biological Opinion
BRRIT	Bay Restoration Regulatory Integration Team
BUDM	beneficial use of dredged material
C.F.R.	Code of Federal Regulations
CAA	Clean Air Act
Cal/OSHA	California Division of Occupational Health and Safety
CARB	California Air Resources Board

CCA	California Coast Act
CCC	California Coastal Commission
CCMP	California Coastal Management Program
CCR	California Code of Regulations
CDFG	California Department of Fish and Game
CDFW	California Department of Fish and Wildlife
CEC	contaminant of emerging concern
CEJST	Climate and Economic Justic Screening Tool
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CH_4	methane
CMA	Critical Maneuvering Area
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CRHR	California Register of Historical Resources
CSLC	California State Lands Commission
CSWO	Office of Coastal Survey Wrecks and Obstructions Database
Cullinan Ranch	Cullinan Ranch Restoration Project
CUPA	Certified Unified Program Agency
CWA	Clean Water Act
CY	cubic yard
CY/day	cubic yards per day
CY/year	cubic yards per year
CZMA	Coastal Zone Management Act
dB	decibel
dBA	A-weighted decibels
DDT	dichloro-diphenyl-trichloroethane

Delta	Sacramento-San Joaquin River Delta
DGL	dredging guidance letter
DMMO	Dredged Material Management Office
DPS	Distinct Population Segment
DTSC	Department of Toxic Substances Control
EA	Environmental Assessment
EA/EIR	Joint Environmental Assessment/Environmental Impact Report
eDNA	environmental DNA
EFH	Essential Fish Habitat
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
ENC	electronic navigational charts
EO	Executive Order
ESA	Endangered Species Act (federal)
Estuary	San Francisco Bay/Sacramento-San Joaquin Delta Estuary
ER	Engineering Regulation
ESU	evolutionarily significant unit
FMP	fisheries management plan
FMWT	Fall Midwater Trawl
FR	Federal Register
FTA	Federal Transit Administration
FY	fiscal year
GHG	greenhouse gas
gpm	gallons per minute
GWP	global warming potential
HAP	hazardous air pollutant
HMBP	hazardous materials business plan
ID	indefinite deferral
ITM	Inland Testing Manual

lbs/day	pounds per day
LTMS	Long Term Management Strategy for the Placement of Dredged Material in San Francisco Bay
LTS	less than significant
MARAD	US Department of Transportation Maritime Administration
MARPOL	International Convention for the Prevention of Pollution from Ships
Master SAP	Master Sampling and Analysis Plan
MET	Modified Elutriate Test
MLD	Most Likely Descendant
MLLW	mean lower low water
mm	millimeter
MMPA	Marine Mammal Protection Act
MPRSA	Marine Protection, Research, and Sanctuaries Act
MSC	San Francisco Harbor Main Ship Channel
MSL	mean sea level
MWRP	Montezuma Wetlands Restoration Project
N_2O	nitrous oxide
N/A	not applicable
NA	No Action Alternative
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NSCI	no significant cumulative impacts
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NI	no impact
NMFS	National Marine Fisheries Service
NOx	nitrogen oxide
NO_2	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NOP	Notice of Preparation

NP	No Project Alternative
NPDES	National Pollutant Discharge Elimination System
NSCI	no significant cumulative impacts
NUAD	not suitable for unconfined aquatic disposal
O_3	ozone
O&M	operations and maintenance
OPA	Oil Pollution Act
OSHA	(federal) Occupational Safety and Health Administration
OTM	Ocean Testing Manual
PAH	polycyclic aromatic hydrocarbons
Pb	lead
PCB	polychlorinated biphenyl
PFMC	Pacific Fisheries Management Council
PM_{10}	particulate matter with a diameter of 10 micrometers or less
$PM_{2.5}$	particulate matter with a diameter of 2.5 micrometers or less
Porter-Cologne Act	Porter-Cologne Water Quality Control Act of 1969
ppb	parts per billion
ppm	parts per million
ppt	parts per thousand
PQS	professional qualifications standards
PRC	California Public Resources Code
RCRA	Resource Conservation and Recovery Act
RDMMP	Regional Dredged Material Management Plan
Regional Water Board	San Francisco Bay Regional Water Quality Control Board
RMP	Regional Monitoring Program
RMS	root mean square
ROG	reactive organic gas
ROI	region of influence
SCC	California State Coastal Conservancy

SF-8	San Francisco Bar Channel Placement Site
SF-9	Carquinez Strait placement site
SF-10	San Pablo Bay placement site
SF-11	Alcatraz Island placement site
SF-16	Suisun Bay placement site
SF-17	Ocean Beach Demonstration Site
SF Bay	San Francisco Bay
SFBAAB	San Francisco Bay Area Air Basin
SF-DODS	San Francisco Deep Ocean Disposal Site
SFEI	San Francisco Estuary Institute
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SLR	sea level rise
SO_2	sulfur dioxide
SPL	sound pressure level
State Water Board	State Water Resources Control Board
TBD	to be determined
TEU	Twenty-Foot Equivalent Unit
TMDL	Total Maximum Daily Loads
tpy	tons per year
UIHC	Upper Inner Harbor Channel
U.S.C.	United States Code
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
Unified Program	Unified Hazardous Waste and Hazardous Materials Management Regulatory Program

UTM	Upland Testing Manual
Valley Water	Santa Clara Valley Water
VOC	volatile organic compounds
WDR	waste discharge requirements
WETA	San Francisco Bay Area Water Emergency Transportation Authority
WQC	water quality certification
WRDA	Water Resources Development Act

Executive Summary

The United States Army Corps of Engineers (USACE), San Francisco District proposes to continue maintenance dredging of the federal navigation channels in San Francisco Bay (SF Bay) to maintain their navigability. The San Francisco Bay Regional Water Quality Control Board (Regional Water Board) will consider issuing a Clean Water Act (CWA) Section 401 Water Quality Certification (WQC) and Waste Discharge Requirements (WDR) pursuant to the State of California's Porter-Cologne Water Quality Control Act (Porter-Cologne Act) for USACE's continued maintenance dredging operations in SF Bay. This authorization is referenced throughout this document as WQC/WDR. Dredging involves the excavation of accumulated sediment from the channel, as well as the transportation and placement of the sediment at a permitted location, consistent with permit conditions established by applicable regulatory agencies. Sediment must be tested for suitability for placement at any site.

USACE and the Regional Water Board prepared this joint Draft Environmental Assessment and Environmental Impact Report (EA/EIR) to address the environmental effects of implementing and permitting maintenance dredging of federal navigation channels in SF Bay and the associated placement of dredged material. See Figure ES-1 for the location of federally authorized dredging projects and placement sites in the study area; Table ES-1 lists placement location categories and examples.

This document is intended to fulfill USACE's National Environmental Policy Act (NEPA) compliance requirements for continuation of maintenance dredging in SF Bay over a roughly ten-year period beginning in dredging year 2025 and continuing through 2034, with the potential for projects to extend into early 2035[1]. It is also intended to fulfill the Regional Water Board's California Environmental Quality Act (CEQA) compliance requirements for issuance of a multiyear WQC/WDR to USACE governing dredge and fill activities. Additionally, for maintenance dredging projects involving the discharge of dredged or fill material into waters of the United States, this document provides the Section 404(b)(1) analysis for maintenance dredging in compliance with the CWA. Although USACE does not issue permits to itself, USACE must demonstrate compliance with Section 404 of the CWA.

This Draft EA/EIR is prepared in accordance with NEPA and Council on Environmental Quality (CEQ) regulations, Section 404 of the CWA, and CEQA Guidelines and regulations. USACE is the NEPA lead agency, and the Regional Water Board is the CEQA lead agency.

The environmental impacts of maintenance dredging of the federal navigation channels for the previous ten-year dredging period, 2015 to 2024, were analyzed in the 2015 EA/EIR for maintenance dredging of the federal navigation channels in SF Bay (USACE and Regional Water Board 2015). This Draft EA/EIR is an update of the 2015 EA/EIR, which is relied upon for background information and cited where relevant.

[1] Dredging year refers to the calendar year in which dredging is planned to begin. In some cases, dredging episodes associated with a dredging year can extend past the end of the calendar year.

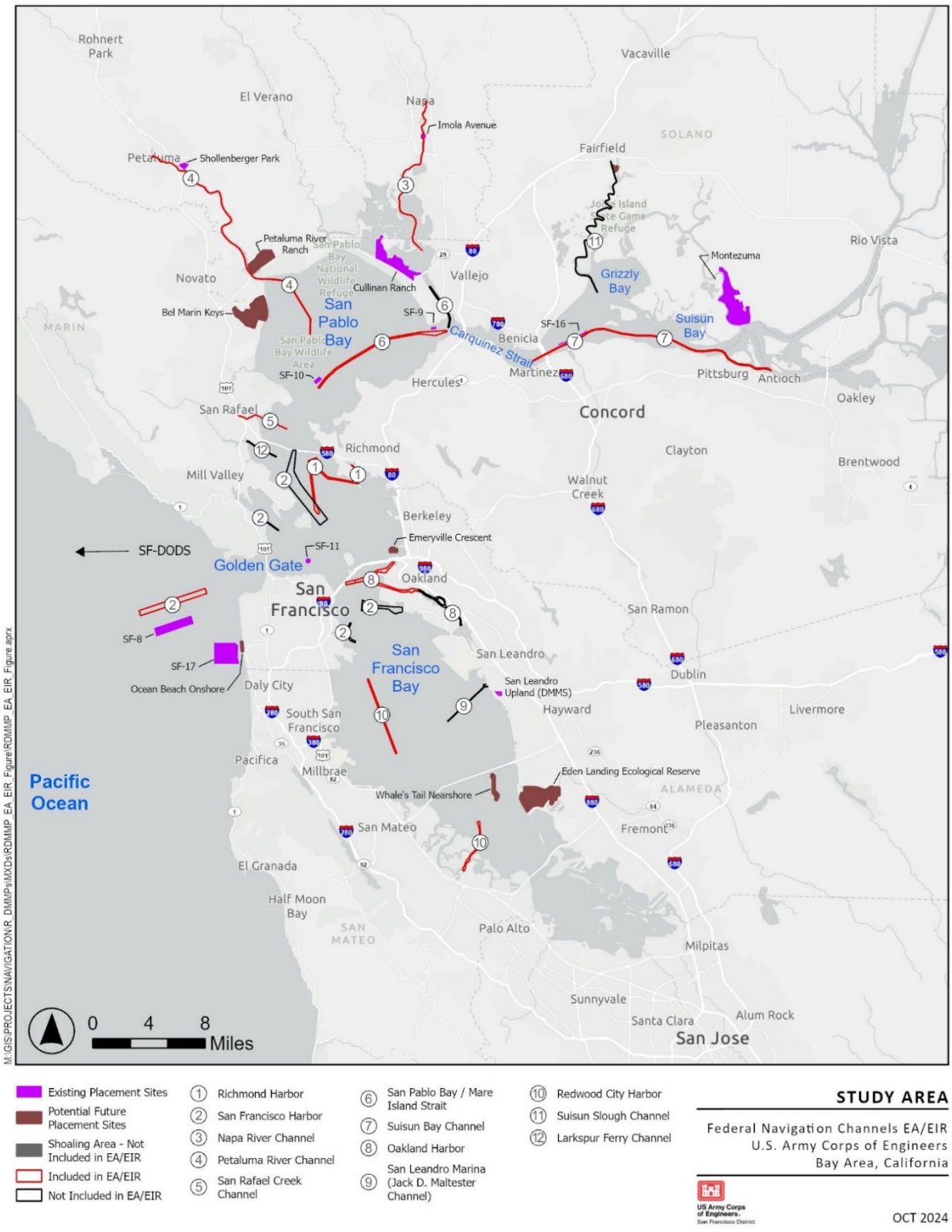


Figure ES-1. Authorized Dredging Projects and Placement Sites in the Study Area

Table ES-1. Placement Type Categories

Placement Type Category	Example Placement Location
Existing Beneficial Use Sites:	
Upland Direct Placement Site	Cullinan Ranch Restoration Project, Montezuma Wetlands Restoration Project
Nearshore Strategic Placement Site	SF-17 (Ocean Beach Nearshore Placement Site)
Transitional Placement Site	
Bar Channel Placement Site	SF-8 (San Francisco Bar Channel Placement Site)
In-Bay Placement Site	SF-9 (Carquinez Strait Placement Site), SF-10 (San Pablo Bay Placement Site), SF-11 (Alcatraz Placement Site), SF-16 (Suisun Bay Placement Site)
Upland (Sponsor-Provided) Site	Shollenberger Park, Imola Avenue
Deep Ocean Disposal	SF-DODS
Possible Future Beneficial Use Placement Site	
Upland Direct Placement Site	Bel Marin Keys, Skaggs Island (Haire Ranch), Southern Eden Landing Ecological Reserve, Alviso Ponds (A8 Complex), Ocean Beach Onshore, Surfers Beach, Stinson Beach Onshore
Nearshore Strategic Placement Site	Bel Marin Keys Nearshore (proximal to Petaluma River and Across the Flats Channel), Cogswell Marsh Nearshore (proximal to Oakland Inner and Outer Harbor and Redwood City Harbor Channels), Emeryville Crescent Nearshore (proximal to Oakland Outer Harbor Channel), Faber Tract (proximal to Redwood City Harbor Channel), Giant Marsh Nearshore (proximal to San Pablo Bay Pinole Shoal Channel), Ryer Island Nearshore (proximal to Suisun Bay Channel), Stege Marsh Nearshore (proximal to Richmond Inner Harbor Channel), Stinson Beach Nearshore (proximal to Main Ship Channel), Surfers Beach Nearshore (proximal to Main Ship Channel), Whale's Tail Nearshore (proximal to Redwood City Harbor Channels)
Elevation Augmentation/Marsh Spraying Site	Bothin Marsh, Sears Point
Water Column Seeding Site	Arrowhead Marsh, Corte Madera Marsh, Faber Tract, Pond A6 (Knapp Tract), Ravenswood

Key: SF-8 = San Francisco Bar Channel Placement Site
SF-9 = Carquinez Strait placement site
SF-10 = San Pablo Bay placement site
SF-11 = Alcatraz Island placement site
SF-16 = Suisun Bay placement site
SF-17 = Ocean Beach Demonstration Site
SF-DODS = San Francisco Deep Ocean Disposal Site

Project Purpose, Need, and Objectives

USACE is mandated by Congress to maintain navigability of federal navigation channels. Accumulation of sediment that settles in these channels can impede navigability and present navigation safety hazards. Maintenance dredging removes this sediment and returns the channels to authorized depths. Accordingly, USACE's overall project purpose is to provide safe, reliable, and efficient waterborne transportation systems (channels, harbors, and waterways) for the movement of commerce, national security needs, and recreation, which is achieved through continuing to dredge federal navigation channels in the SF Bay Area. This basic project purpose is to provide safe, reliable, and efficient waterborne transportation systems. The basic purpose is water dependent as defined by 40 C.F.R. Part 230 since it cannot be fulfilled outside of an aquatic environment. Dredging will be consistent with navigation project authorizations and, to the maximum extent possible, the 20-Year Regional Dredged Material Management Plan (RDMMP), which is a companion document to this Draft EA/EIR (USACE 2024a). The purpose of the RDMMP is to develop a comprehensive 20-year strategy that identifies the Federal Standard Base Plan[2] for the dredging of federal navigation projects and the placement of dredged material in the SF Bay Area. Where applicable, the project would be aligned with the goals of the Long Term Management Strategy for the Placement of Dredged Material in the San Francisco Bay Region (LTMS) program, as described in the 1998 LTMS Final Environmental Impact Statement/EIR (USACE et al. 1998) and the 2001 Long Term Management Strategy for the Placement of Dredged Material in San Francisco Bay (LTMS) Management Plan (USACE et al. 2001).

The Regional Water Board has authority under CWA Section 401 and the Porter-Cologne Act to issue permits that regulate dredge and fill activities. The Regional Water Board will review USACE's application for a WQC/WDR for continued maintenance dredging and placement of dredged material in the SF Bay Area. To issue a WQC/WDR to USACE, the Regional Water Board must analyze and disclose water quality conditions and other environmental impacts of the project; consider alternatives that would avoid or substantially reduce potentially significant impacts of the project as approved; adopt, or make a condition of approval, all feasible mitigation measures for potentially significant impacts within its authority; and demonstrate compliance with all applicable state water quality requirements.

[2] The Federal Standard is the least costly dredged material disposal or placement alternative(s) that is consistent with sound engineering practices and meets all federal environmental requirements, including those established under Section 404 of the Clean Water Act and Section 103 of the Marine Protection, Research, and Sanctuaries Act. For dredged material placement, USACE fully considers all practicable and reasonable alternatives on an equal basis, including the use of dredged material beneficially, to identify the Federal Standard (33 CFR Parts 335-338). "Base Plan" is an operational manifestation of the Federal Standard because it defines the disposal or placement costs that are assigned to the "navigational purpose" of the project (Source: USACE's ER 1105-2-103).

The following objectives are detailed in accordance with CEQA requirements. Specific project objectives include:

- Provide safe, reliable, and efficient navigation through federal channels in SF Bay in a feasible manner.
- Align, where applicable, with the goals of the LTMS program as described in the 1998 LTMS Final Environmental Impact Statement (EIS)/EIR and the 2001 LTMS Management Plan, within the constraints of the Federal Standard Base Plan.
- Increase the minimum amount of dredged material beneficially used[3] by USACE for wetland restoration and conservation within the constraints of the Federal Standard Base Plan.
- Conduct dredging in a manner that adequately protects the environment, including protection of listed species, essential fish habitat (EFH), and beneficial use of waters.[4]

Alternatives

This Draft EA/EIR includes six alternatives for detailed evaluation: the NEPA No Action Alternative, the CEQA No Project Alternative, and four action alternatives. The Proposed Action (NEPA)/Proposed Project (CEQA) Alternative is combination of multiple alternatives and is not described separately as a standalone alternative. Measures common to all alternatives, along with descriptions of each of the alternatives evaluated in this Draft EA/EIR are described below. Table ES-2 provides a detailed comparison of the dredging and dredged material placement differences across the navigation channels for each alternative. Figure ES-2 provides an overview of the differing dredged material disposal/placement details across alternatives.

[3] Beneficial use or reuse is the reuse of dredged sediment for construction, levees, tidal wetland restoration or other projects.

[4] Beneficial uses of waters of the state “that may be protected against degradation include, but are not limited to, domestic, municipal, agricultural and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves.” Wat. Code, sec. 13050, subd. (e). The Water Quality Control Plan for the San Francisco Bay Region designates beneficial uses of waters in the region.

Table ES-2. Alternative Comparison by Federal Channel*

Dredging Channel	Placement Site[1]	Likely Dredge Method	Alternate Dredge Method	Dredging Recurrence (years)	Dredging Episodes over 10-Year Cycle	Average Volume per Episode (CY)	Maximum Volume per Episode (CY)	Average Annual volume over 10-year Cycle (CY)
Oakland: Inner and Outer Harbor								
No Action	SF-DODS[2]	Clamshell	N/A	1	10	750,000	1,225,000	750,000
No Project	SF-DODS[2]	Clamshell	N/A	1	10	750,000	1,225,000	750,000
1	SF-DODS[2]	Clamshell	N/A	1	10	750,000	1,225,000	750,000
2	Upland BU site SF-11[2]	Clamshell Hopper	Cutterhead Clamshell	1	10	540,000 210,000	880,00 345,000	540,000 210,000
3	Upland BU Site	Clamshell	Cutterhead	1	10	750,000	1,225,000	750,000
4	Upland BU site Strategic Placement Site	Clamshell Clamshell	Cutterhead Cutterhead	1	10	650,000 100,000	1,060,000 165,000	650,000 100,000
Redwood City Harbor: Channels								
No Action	SF-11[2]	Clamshell	N/A	1	10	180,000	650,000	180,000
No Project	SF-11[2]	Clamshell	N/A	1	10	180,000	650,000	180,000
1	SF-11[2]	Clamshell	N/A	1	10	180,000	650,000	180,000
2	SF-11[2]	Clamshell	N/A	1	10	180,000	650,000	180,000
3	SF-11[2] Upland BU Site	Clamshell Clamshell	N/A Cutterhead	1	10	100,000 80,000	360,000 290,000	100,000 80,000
4	Upland BU Site Strategic Placement Site	Clamshell Clamshell	Cutterhead Cutterhead	1	10	80,000 100,000	290,000 360,000	80,000 100,000
Redwood City Harbor: San Bruno Shoal								
No Action	SF-DODS[2]	Hopper	Clamshell	Infrequent	1	30,000	30,000	5,000
No Project	SF-DODS[2]	Hopper	Clamshell	Infrequent	1	30,000	30,000	5,000
1	SF-DODS[2]	Hopper	Clamshell	Infrequent	1	30,000	30,000	5,000
2	SF-11[2]	Hopper	Clamshell	Infrequent	1	30,000	30,000	5,000
3	SF-11[2]	Hopper	Clamshell	Infrequent	1	30,000	30,000	5,000
4	Upland BU Site	Hopper	Clamshell	Infrequent	1	30,000	30,000	5,000
Richmond Inner Harbor								
No Action[3]	SF-DODS[2]	Clamshell	N/A	1	10	300,000	630,000	300,000
No Project[3]	SF-DODS[2]	Clamshell	N/A	1	10	300,000	630,000	300,000
1	SF-11[2] Upland BU Site	Clamshell Clamshell	Hopper Cutterhead	1	10	160,000 140,000	335,000 295,000	160,000 140,000
2	SF-11[2]	Hopper	Clamshell	1	10	300,000	630,000	300,000
3	SF-11[2] Upland BU Site	Hopper Clamshell	Clamshell Cutterhead	1	10	265,000 35,000	555,000 75,000	265,000 35,000
4	Upland BU site	Clamshell	Cutterhead	1	10	300,000	630,000	300,000

Dredging Channel	Placement Site[1]	Likely Dredge Method	Alternate Dredge Method	Dredging Recurrence (years)	Dredging Episodes over 10-Year Cycle	Average Volume per Episode (CY)	Maximum Volume per Episode (CY)	Average Annual volume over 10-year Cycle (CY)
Richmond Outer Harbor								
No Action	SF-10 (SF-11 alternate)	Hopper	Clamshell	1	10	210,000	730,000	210,000
No Project	SF-10 (SF-11 alternate)	Hopper	Clamshell	2	5	250,000	730,000	125,000
1	SF-11[2]	Hopper	Clamshell	1	10	210,000	730,000	210,000
2	SF-10[2]	Hopper	Clamshell	1	10	210,000	730,000	210,000
3	SF-10[2] Upland BU Site	Hopper Clamshell	Clamshell Cutterhead	1	10	195,000 15,000	680,000 50,000	195,000 15,000
4	Upland BU site	Clamshell	Cutterhead	1	10	210,000	730,000	210,000
San Francisco Main Ship Channel								
No Action	SF-17 SF-8	Hopper	N/A	1	10	255,000 90,000	455,000 160,000	255,000 90,000
No Project	SF-17 SF-8	Hopper	N/A	1	10	255,000 90,000	455,000 160,000	255,000 90,000
1	SF-17 SF-8	Hopper	N/A	1	10	255,000 90,000	455,000 160,000	255,000 90,000
2	SF-17 SF-8	Hopper	N/A	1	10	255,000 90,000	455,000 160,000	255,000 90,000
3	SF-17 SF-8	Hopper	N/A	1	10	255,000 90,000	455,000 160,000	255,000 90,000
4	SF-17 Onshore BU Site	Hopper	N/A	1	10	260,000 85,000	465,000 150,000	260,000 85,000
San Pablo Bay (Pinole Shoal)								
No Action	SF-10[2]	Hopper	Clamshell	1	10	150,000	560,000	150,000
No Project	SF-10[2]	Hopper	Clamshell	2	5	190,000	560,000	95,000
1	SF-10[2]	Hopper	Clamshell	1[5]	10	150,000	560,000	150,000
2	SF-9[2]	Hopper	Clamshell	1[5]	10	150,000	560,000	150,000
3	SF-9[2] Upland BU Site	Hopper Clamshell	Clamshell N/A	1[5]	10	140,000 10,000	520,000 40,000	140,000 10,000
4	Upland BU Site	Clamshell	N/A	1[5]	10	150,000	560,000	150,000
Suisun Bay Channel and New York Slough								
No Action	SF-16[2]	Clamshell	N/A	1[6]	10	165,000	425,000	165,000
No Project	SF-16[2]	Clamshell	N/A	1[6]	10	165,000	425,000	165,000
1	SF-16[2]	Clamshell	N/A	1[6]	10	165,000	425,000	165,000
2	SF-16[2] Upland BU site	Clamshell	N/A	1[6]	10	130,000 35,000	335,000 90,000	130,000 35,000
3	SF-16[2] Upland BU site	Clamshell	N/A	1[6]	10	130,000 35,000	335,000 90,000	130,000 35,000
4	SF-16[2] Upland BU site	Clamshell	N/A	1[6]	10	130,000 35,000	335,000 90,000	130,000 35,000

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Dredging Channel	Placement Site[1]	Likely Dredge Method	Alternate Dredge Method	Dredging Recurrence (years)	Dredging Episodes over 10-Year Cycle	Average Volume per Episode (CY)	Maximum Volume per Episode (CY)	Average Annual volume over 10-year Cycle (CY)
Napa River								
No Action[4]	Upland (sponsor-provided) Site	Cutterhead	Clamshell	6–11	2	110,000	165,000	20,000
No Project[4]	Upland (sponsor-provided) Site	Cutterhead	Clamshell	6–11	2	110,000	165,000	20,000
1	Upland (sponsor-provided) Site, Upland BU Site	Cutterhead	Clamshell	6–11	2	110,000	165,000	20,000
2	Upland (sponsor-provided) Site, Upland BU Site	Cutterhead	Clamshell	6–11	2	110,000	165,000	20,000
3	Upland (sponsor-provided) Site, Upland BU Site	Cutterhead	Clamshell	6–11	2	110,000	165,000	20,000
4	Upland (sponsor-provided) Site, Upland BU Site	Cutterhead	Clamshell	6–11	2	110,000	165,000	20,000
Petaluma River: Across the Flats								
No Action	SF-10[2]	Clamshell	N/A	3	3	70,000	70,000	20,000
No Project	SF-10[2]	Clamshell	N/A	3	3	70,000	70,000	20,000
1	SF-10[2]	Clamshell	Cutterhead	3	3	70,000	70,000	20,000
2	SF-10[2]	Clamshell	Cutterhead	3	3	70,000	70,000	20,000
3	SF-10[2]	Clamshell	Cutterhead	3	3	70,000	70,000	20,000
4	SF-10[2], Upland BU Site	Clamshell	Cutterhead	3	3	70,000	70,000	20,000
Petaluma River Channel: River Channel								
No Action	Upland (sponsor-provided) Site	Cutterhead	Clamshell	4–7	2	150,000	210,000	30,000
No Project	Upland (sponsor-provided) Site	Cutterhead	Clamshell	4–7	2	150,000	210,000	30,000
1	Upland (sponsor-provided) Site, Upland BU Site	Cutterhead	Clamshell	4–7	2	150,000	210,000	30,000
2	Upland (sponsor-provided) Site, Upland BU Site	Cutterhead	Clamshell	4–7	2	150,000	210,000	30,000
3	Upland (sponsor-provided) Site, Upland BU Site	Cutterhead	Clamshell	4–7	2	150,000	210,000	30,000
4	Upland (sponsor-provided) Site, Upland BU Site	Cutterhead	Clamshell	4–7	2	150,000	210,000	30,000

Executive Summary

Dredging Channel	Placement Site[1]	Likely Dredge Method	Alternate Dredge Method	Dredging Recurrence (years)	Dredging Episodes over 10-Year Cycle	Average Volume per Episode (CY)	Maximum Volume per Episode (CY)	Average Annual volume over 10-year Cycle (CY)
San Rafael Creek								
No Action	SF-11[2]	Clamshell	N/A	4–6	3	110,000	280,000	35,000
No Project	SF-11[2]	Clamshell	N/A	4–6	3	110,000	280,000	35,000
1	SF-11[2]	Clamshell	N/A	4–6	3	110,000	280,000	35,000
2	SF-9[2]	Clamshell	N/A	4–6	3	110,000	280,000	35,000
3	SF-9[2] Upland BU Site	Clamshell Clamshell	N/A Cutterhead	4–6	3	65,000 45,000	165,000 115,000	20,000 15,000
4	Upland BU Site	Clamshell	Cutterhead	4–6	3	110,000	280,000	35,000

* The Proposed Action/Proposed Project is anticipated to be the No Project Alternative in the first year or two of implementation. This is expected to transition to Alternatives 1 and 2 in later years. Rows that are components of the Proposed Action/Proposed Alternative are highlighted in gray.
[1] Placement sites can vary over the 10-year dredging cycle and are provided as one example of how this alternative can be executed.
[2] If work is performed outside the National Marine Fisheries Service work window, placement will occur at a BU site to mitigate impacts.
[3] For the No Project Alternative, Richmond Inner Harbor would continue to be dredged to depth of -38 feet MLLW. Richmond Inner Harbor is authorized to be dredged to -41 feet MLLW (No Action assumption); however, due to lack of federal interest, USACE consistently maintains the depth of the channel at -38 feet MLLW.
[4] Under the No Project Alternative, Lower Napa River Channel and Upper Napa River Channel would be dredged to -9 feet MLLW, rather than the authorized depths of -15 feet and -10 feet, respectively (No Action assumptions).
[5] Includes as-needed advance maintenance dredging.
[6] Includes as-needed emergency dredging episodes of no more than three emergency dredging episodes consisting of less than 30,000 CY each per year.

Key: BU = beneficial use
CY = cubic yard
SF-8 San Francisco Bar Channel Placement Site
SF-9 Carquinez Strait placement site
SF-10 San Pablo Bay placement site
SF-11 Alcatraz Island placement site
SF-16 Suisun Bay placement site
SF-17 Ocean Beach Demonstration Site

Measures Common to All Alternatives

Maintenance dredging typically involves the following steps: 1) surveying a site to identify sediment accumulated (shoaled) above authorized project depth, then sampling and testing for sediment quality; 2) excavating shoaled sediment from the dredging site; 3) transporting dredged sediment via scows, hopper dredges, or pipeline to the designated placement site(s); and 4) placing and managing the dredged material at the designated site, or transfer to another permitted location for placement or use.

All alternatives evaluated in this Draft EA/EIR include two categories of dredging methods performed by USACE for maintenance dredging in SF Bay: hydraulic and mechanical dredging. In hydraulic dredging, hopper or cutterhead ships are typically used to remove sediment via suction through hydraulic pipelines. Hopper dredges store suctioned sediment on board for later placement. USACE mainly uses two federally owned hopper dredges for hopper dredging in the SF Bay Area: the *Essayons* and the *Yaquina*. Cutterhead-pipeline dredges use a pipeline to deposit suctioned sediment directly at placement sites. USACE mechanical dredging in SF Bay is typically conducted with clamshell dredgers. Clamshell dredgers use buckets, which are opened, dropped vertically to the dredging locations, and closed around sediment, which is then lifted and deposited on a scow or barge. Placement can occur via bottom-dumping from split-hull scows or hopper dredges, via a slurry (i.e., mixed water and sediment for mobilization) that is pumped off via a pipe offloader from scows or hopper dredges, or via direct delivery from cutterhead dredges to pipelines and transported by booster pumps, if necessary, to placement sites.

Existing placement sites include Beneficial Use Sites—Upland Direct Placement Sites and Nearshore Strategic Placement Sites; Transitional Placement Sites—San Francisco Bar Channel Placement Site (SF-8), in-Bay Placement Sites, and Non-Federal Sponsor-Provided Upland Sites; and the San Francisco Deep Ocean Disposal Site (SF-DODS). Potential future beneficial use placement sites that may be authorized within the 10--year planning horizon for this document are described in the RDMMP. Use of these sites by USACE would require completion of supplemental environmental review under NEPA and/or CEQA, and environmental approvals from resource and regulatory agencies. Types of possible future beneficial use placement sites include upland direct placement sites, nearshore strategic placement sites, elevation augmentation/marsh spraying sites, and water column seeding sites.

Under all alternatives, dredging and placement would be conducted in accordance with the following measures:

- Dredging at each project location would be limited to the authorized depth.
- Knockdowns (i.e., knocking down high spots or isolated shoals) may be performed in all locations except the San Francisco Harbor Main Ship Channel (MSC). The volume of material above project design depth to be knocked down is not anticipated to exceed 15,000 cubic yards (CY) per year in each deep-draft channel. Knockdowns are subject to the same sediment testing requirements and approvals as full dredging episodes.
- No overflow would be discharged from any barge during transportation, except for spillage incidental to clamshell dredge operations.

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- Overflow from hopper-type suction dredges would be limited to no longer than 15 minutes at the dredge site during any one excavation action (cut). Overflow would be unrestricted when dredging material is greater than 80 percent sand.
- Dredging would be conducted during the following time periods:
  - Between June 1 and November 30, to the extent feasible, at Oakland Inner and Outer Harbor, Redwood City Harbor (Channels and San Bruno Shoal), Richmond Inner and Outer Harbor, MSC, San Pablo Bay (Pinole Shoal), Petaluma (River Channel and Across the Flats), and San Rafael Creek
  - Only between August 1 and November 30 at Suisun Bay Channel/New York Slough, and Napa River
  - Due to the priority hopper dredging in the Columbia River, hopper dredging would only occur in June at Richmond Outer Harbor and Pinole Shoal; hopper dredging would occur between December and February for Oakland Harbor and Richmond Inner Harbor.
- Dredging and placement activities would be consistent with the work window requirements set out by National Marine Fisheries Service (NMFS) and the US Fish and Wildlife Service (USFWS) in their Biological Opinions (BiOp) on the LTMS (USFWS 2004a; NMFS 2015).
- Dredging would stop immediately following any fuel or hazardous waste leaks or spills, and cleanup actions would be implemented.
- During dredging and placement activities, notes to mariners and navigational warning markers would be used as needed to prevent navigational hazards.
- Avoidance and minimization measures, as identified in current and future LTMS BiOps (NMFS 1998, 2015; USFWS 1999, 2004a, 2004b, 2024) and EFH consultation (USACE and USEPA 2011) would be employed to reduce impacts to species and habitat.
- The following measures would be implemented for hydraulic dredging to protect longfin smelt and delta smelt:
  - No dredging would occur in water ranging from 0 to 5 parts per thousand salinity between December 1 and June 30.
  - At the beginning and end of each hopper load, pump priming, drag head clearing, and suction of water would be conducted within 3 feet of the seafloor.
  - Hopper drag head suction pumps would be turned off when raising and lowering the drag arms from the seafloor when turning the dredge vessel.
  - USACE would implement a worker education program for listed fish species that could be adversely impacted by dredging. The program would include a presentation to all workers on biology, general behavior, distribution, and habitat needs, sensitivity to human activities, legal protection status, and project-specific protective measures. Workers would also be provided with written materials containing this information.
  - The drag head, cutterheads, and pipeline intakes will remain in contact with the sea floor during suction dredging.
  - The drag head water intake doors will be kept closed to the maximum extent practicable in locations most vulnerable to entraining smelt. In circumstances when the doors need to be opened to alleviate clogging, the doors will be opened incrementally (i.e., the doors will be opened in small increments and tested to see if the clog is removed) to ensure that doors are not fully opened unnecessarily.

- USACE will set up a pilot study to assess the potential for directing fish away from the hopper dredge during operations to reduce entrainment. To start, USACE will work with the *Essayons* crew (and/or the future federal hopper dredging vessel) to install and operate fish deterrent equipment such as lights, sound speakers, and/or air jets that would trigger an avoidance response in fish and thus push them from the area of exposure and substantially reduce the risk of entrainment. Light and sound have been shown to trigger avoidance behavior in some fish species, though they may attract others (HDR 2015). There is no data on avoidance or attraction for longfin smelt. Should light and/or sound attract listed species it will immediately be discontinued. Accordingly, installing fish deterrent equipment that emits light and/or sound prior to initiating priming the hopper dredge and prior to retracting the hopper from the sediment may will reduce impacts to longfin smelt and other fish species by triggering avoidance behavior. This is a new technology that was not available in 2015 when fish entrainment impacts and mitigation were last analyzed. This pilot study will be implemented for two years to determine its effectiveness. If the methods as set up are shown not to be successful, the pilot study will be refined, and tools adjusted and retested.
- USACE has been testing both environmental DNA (eDNA) sampling and the use of an echosounder in conjunction with hopper dredging activities. From July 21 through July 31, 2023, during hopper dredging by the *Essayons* at Pinole Shoal Channel, six eDNA sampling events with three replicates per sample occurred. These samples later were assessed for the presence of longfin smelt. Despite being repeatedly observed during the physical entrainment monitoring aboard the *Essayons*, no longfin smelt were detected in the eDNA samples (ICF 2023). However, USACE also funded a study of new eDNA collection methodologies in wetlands, which found good detection probabilities of longfin smelt when sampling a large volume of water with a tow net and concentrating the eDNA (Bowen et al. 2024). Prior to dredging, eDNA samples could be collected from two potential dredging locations (likely Pinole Shoal Channel and Richmond Outer Harbor), tested the same day for the presence of longfin smelt, and then used to prioritize the order of dredging based on the presence or absence of longfin smelt. Similarly, echosounder data could be collected to assess the fish community in potential dredging locations, and prioritization for dredging could be based on those results. Results of data collected will be evaluated and will inform measures for avoidance and minimization measures to fish species from dredging operations.

- Under all alternatives, USACE would meet all federal environmental compliance requirements (e.g., CWA Section 404, Endangered Species Act), including those federal requirements implemented by state agencies as applicable (e.g., CWA Section 401, Coastal Zone Management Act).

No Action Alternative and No Project Alternative

Under NEPA, in cases where the project involves modification of an existing program or management plan, the No Action Alternative may be defined as no change from the current authorized program, or no change in management direction or intensity (43 CRF Part 46.30[1]). The No Action Alternative includes activities that may not be necessarily implemented in the current program, but are authorized to occur, such as more frequent dredging.

Section 15126.6 (e)(3)(A) of the CEQA Guidelines states that “when the project is the revision of an existing land use or regulatory plan, policy or ongoing operation, the No Project Alternative will be the continuation of the existing plan, policy or operation into the future.” Therefore, under CEQA, the No Project Alternative is a continuation of existing dredging activities. USACE would continue current maintenance dredging practices for the projects it maintains in SF Bay, and the Regional Water Board would consider issuing a WQC/WDR based on USACE’s current dredging practices.

The No Action Alternative and No Project Alternative differ in that the No Action Alternative represents the current authorized dredging program, regardless of current implementation, given that past implementation is different than current implementation due to recent restrictions (Regional Water Board 2020) placed on hydraulic dredging in SF Bay. The No Project Alternative, in contrast, represents the current, ongoing dredging operation as implemented over the last permit period per CEQA Guidelines Section 15126.6(e)(3)(A). The No Action Alternative is used as the baseline alternative for NEPA. The No Project Alternative is the baseline under CEQA because it is the same as the existing physical setting (CEQA Guidelines Section 15126.6(e) (1)).

The No Action Alternative and No Project Alternative assumptions are the same in all aspects, except that the No Action Alternative includes all authorized activities, even if they were not implemented at the time this document was prepared. Alternatively, the No Project Alternative includes only dredging activities that were carried out during the previously authorized ten-year program. Specifically, the difference between the No Action Alternative and the No Project Alternative is the dredging frequency at Richmond Outer Harbor and the Pinole Shoal Channel portion of San Pablo Bay. Under the No Action Alternative, dredging is assumed to occur every year via hopper at these locations; under the No Project Alternative, dredging occurs every other year via hopper. In addition, there are a few project depths that are authorized but not currently maintained by USACE at those depths, namely, Richmond Inner Harbor, Richmond Outer Harbor, and Napa River.

The No Action Alternative would continue to execute the navigation dredging program in the same way as it has been done in the past, as authorized. This alternative would place approximately 0 percent of dredged sediment at upland beneficial use sites, approximately 45 to 55 percent at deep ocean disposal sites, approximately 30 to 40 percent at in-Bay sites, approximately 5 to 15 percent at ocean beneficial use sites, approximately 0 to 10 percent at ocean sites, and approximately 0 to 10 percent at upland (sponsor-provided) sites. This baseline condition was constructed based on the current navigation program, replicating how each channel would be dredged, how frequently each channel would be dredged, and where the sediment from each channel would be placed. A summary of the No Action Alternative/No Project Alternative and the other evaluated alternatives is provided in Table ES-2.

Action Alternatives

Four action alternatives were developed and evaluated by USACE through the RDMMP process and are described below.

Alternative 1, Beneficial Use: Diversion from Deep Ocean Disposal

This alternative proposes to implement the No Action Alternative, except that a federal project otherwise slated for ocean disposal at SF-DODS may be split between placement in-Bay and at an upland beneficial use site to achieve additional beneficial use of dredged material (BUDM) while maintaining the same cost. In taking this approach, at the Bay-wide programmatic level, this alternative proposes to increase placement of dredged sediment at upland beneficial use sites from approximately 0 percent (No Action Alternative/No Project Alternative) to 5 to 20 percent; to decrease deep ocean disposal from approximately 45 to 55 percent (No Action Alternative/No Project Alternative) to 10 to 40 percent; and to increase in-Bay placement from approximately 30 to 40 percent to 35 to 55 percent at in-Bay sites annually. The remaining placement category percentage ranges would remain the same as for the No Action Alternative/No Project Alternative. The percentages of material going to each category vary depending on the level of maintenance dredging required and the project being diverted from SF-DODS.

This alternative was constructed by identifying the opportunities to divert material from deep ocean disposal, i.e., which channels' previous Federal Standard Base Plan sites were SF-DODS under the No Action Alternative/No Project Alternative, including Oakland Inner and Outer Harbor and Richmond Inner Harbor. Based on the cost estimates developed through the RDMMP's cost engineering process, the optimal split for each channel between in-Bay placement and upland beneficial use placement was determined by matching the combined cost of the two placements with the cost of disposal at SF-DODS. Based on the volume to be placed at in-Bay and upland beneficial use sites from each channel, it was then determined which channel would be the more efficient split to pursue based on the current economic conditions, or whether pursuing both would be a viable option. The current cost estimates suggest that it is more effective to use Richmond Inner Harbor, which produces a higher percentage of beneficial use placement than Oakland (55 percent in-Bay to 45 percent upland beneficial use split for Richmond Inner Harbor, rather than 65 percent in-Bay to 35 percent beneficial use split for Oakland Inner and Outer Harbor). However, it is feasible that a different federal channel, such as Oakland, may be the source of the diversion in the future due to different economic and market conditions, equipment availability, technical feasibility, or environmental acceptability. Therefore, for the purposes of this Draft EA/EIR, different potential scenarios for meeting the Federal Standard Base Plan may occur under Alternative 1 by using hopper dredging to increase placement at in-Bay/upland sites and to provide flexibility in achieving the split. To mitigate for entrainment impacts to longfin smelt from the increase in hydraulic dredging, this alternative includes BUDM as a minimization measure to reduce the impacts to longfin smelt from hopper dredging. Alternative 1 has more BUDM than the No Action Alternative/No Project Alternative.

Alternative 2, Beneficial Use: Regional Optimization, Leverage Hopper Dredging

This alternative proposes to increase hopper dredging in the Bay to offset the increased cost of BUDM to achieve more beneficial use than Alternative 1 and the No Action Alternative/No Project Alternative. Hopper dredging can be increased to include Richmond Inner Harbor or Oakland Harbor or a mixture of both projects. Placement with a hopper dredge is usually limited to in-Bay as the government dredge, the *Essayons*, is unable to place material upland. Therefore, BUDM volume from another project using a clamshell or hydraulic dredge with pumpoff capability would be required. Ultimately, this alternative proposes to increase BUDM placement from approximately 0 percent (No Action Alternative/No Project Alternative) to 20 to 30 percent; to decrease deep ocean disposal from approximately 45 to 55 percent (No Action Alternative/No Project Alternative) to 0 to 10 percent; and to increase in-Bay placement from approximately 30 to 40 percent (No Action Alternative/No Project Alternative) to 50 to 60 percent. The other category percentage ranges remain the same as No Action Alternative/No Project Alternative. These percentages at the Bay-wide, programmatic level may vary depending on the level of maintenance dredging required and which channels are dredged hydraulically to be placed in-Bay. This alternative in the RDMMP identifies that Richmond Inner Harbor would be dredged hydraulically to allow most of Oakland Harbor to be placed at an upland beneficial use site. This is one example of how to execute the navigation program in line with the theme of this alternative. However, it is possible that hydraulic dredging could occur in other channels (e.g., Oakland Inner and Outer Harbor) in exchange for mechanical dredging in others for upland beneficial use (e.g., Richmond Inner and/or Outer Harbor) to execute the program differently than above in the future due to different economic and market conditions, technical feasibility, or environmental acceptability.

This alternative was constructed by first identifying the least-cost dredging method and placement site combination for each channel. In most cases, the least-cost options were in-Bay sites, and the least-cost dredging methods were hydraulic dredging where technically feasible. However, since this would result in nearly all dredged sediment being placed at in-Bay sites, a cost effectiveness analysis was done to determine which channels should be diverted from in-Bay placement to upland beneficial use placement. This approach used the cost difference between each channel's beneficial use placement and least-cost placement site option and resulted in the selection of the most cost-effective channels to be diverted to upland beneficial use. BUDM placement was prioritized over ocean disposal as the diversion destination to maximize beneficial use and avoid ocean disposal. Importantly, this alternative also sought to achieve cost parity with the No Action Alternative/No Project Alternative, like Alternative 1, but at the regional scale. As such, the maximum volume of sediment was diverted to upland beneficial use that would keep the regional cost the same as the No Action Alternative/No Project Alternative. Doing so represents the regionally optimal approach (i.e., maximum BUDM, minimum ocean disposal, and equal cost to the No Action Alternative/No Project Alternative).

This breakdown is one example of how to execute this alternative at the regional scale. While some channels can achieve cost savings by placing dredged material at a different in-Bay site than its placement site under the No Action Alternative/No Project Alternative (e.g., San Pablo Bay [Pinole Shoal]), the bulk of the cost savings comes from Richmond Inner Harbor and a portion of Oakland Harbor, which would use hydraulic (hopper) dredging and would place dredged material at an in-Bay site. This contrasts with the No Action Alternative/No Project Alternative, in which both channels would be

mechanically dredged and transported to SF-DODS for ocean disposal. This cost savings is then applied to other channels and reaches to cover the additional cost of taking dredged material to beneficial use sites (i.e., the most expensive option). The cost savings is applied to the majority (approximately 70 percent) of Oakland Harbor and a portion (approximately 20 percent) of Suisun Bay Channel. Suisun Bay Channel, while clean, can only send about 20 percent to beneficial use due to suitability concerns resulting from the historical Port Chicago explosion at the nearby Military Ocean Terminal Concord, and the possibility of unexploded ordnances in the sediment.

This Draft EA/EIR evaluates hydraulic dredging in channels other than those listed in the example above in exchange for mechanical dredging in others for upland beneficial use, to provide flexibility to execute the program differently than above due to technical feasibility or environmental acceptability, or if the economic conditions change and other combinations become more cost-effective. This alternative includes BUDM, which will minimize potential longfin smelt population impacts from entrainment through habitat creation.

Alternative 3, Beneficial Use: Cost Share Opportunity

This alternative proposes building on Alternative 2 (above) and taking more sediment to upland beneficial use sites within the Water Resources Development Act (WRDA) 2020 Section 125a threshold to more easily justify the cost share of the BUDM incremental cost for operations and maintenance (O&M) budgets. At the Bay-wide programmatic level, this alternative proposes to increase BUDM placement from approximately 0 percent (No Action Alternative/No Project Alternative) to 35 to 45 percent; to decrease deep ocean disposal from approximately 45 to 55 percent (No Action Alternative/No Project Alternative) to 0-10 percent; and to increase in-Bay placement from approximately 30 to 40 percent (No Action Alternative/No Project Alternative) to 35 to 45 percent. The other category percentage ranges remain the same as the No Action Alternative/No Project Alternative. This alternative is not a candidate to be the Federal Standard Base Plan given it is not the least-cost alternative, but it is feasible with non-federal funding for 35 percent of the incremental cost above the Federal Standard Base Plan given that the benefits are qualitatively justified.

This alternative was built upon the regional optimization Alternative 2, with the level of increased BUDM calculated as the 25 percent threshold identified in WRDA 2020 Section 125a, which is described as the point at which the federal share of the incremental cost share (i.e., 65 percent of the incremental cost) is 25 percent above the Federal Standard Base Plan cost (see above for definition and description of the Federal Standard Base Plan). This authority delineates between simpler, qualitative articulation of benefits below the threshold, and more comprehensive, quantitative articulation of benefits above the threshold to justify the federal investment from the O&M budget on the incremental cost of beneficial use. The alternative, therefore, uses this 25 percent federal share of the incremental cost above the Federal Standard Base Plan to determine what level of BUDM can be justified using the simpler qualitative approach described above. This amount provides information on the approximate amount of additional BUDM volume that can be achieved in a relatively straightforward fashion. For more information, see the WRDA 2020 section of the RDMMP document (USACE 2024a). This alternative includes BUDM, which will minimize potential longfin smelt population impacts from entrainment through habitat creation.

Alternative 4, Beneficial Use: Maximized

This alternative proposes placing all suitable material at upland beneficial use sites, including a portion of sediment being placed at nearshore strategic placement beneficial use sites designed to leverage tidal and wave energy to transport sediment from shallow subtidal placement areas to existing intertidal mudflats and marshes. This alternative can also be executed with the volume of sediment placed at the nearshore strategic placement beneficial use sites being placed at upland beneficial use sites instead. At the Bay-wide programmatic level, this alternative proposes to increase BUDM placement from approximately 0 percent (No Action Alternative/No Project Alternative) to 65 to 75 percent; to increase beneficial use nearshore strategic placement from approximately 0 percent (No Action Alternative/No Project Alternative) to 5 to 15 percent; to decrease deep ocean disposal from approximately 45 to 55 percent (No Action Alternative/No Project Alternative) to 0 to 10 percent; and to decrease in-Bay placement from approximately 30 to 40 percent (No Action Alternative/No Project Alternative) to 0 to 10 percent. The other category percentage ranges remain the same as the No Action Alternative/No Project Alternative. This alternative is not a candidate to be the Federal Standard Base Plan given it is not the least-cost alternative and would require non-federal funding for the full incremental cost above the Base Plan, or for 35 percent of the incremental cost given the benefits justify and quantitatively exceed the incremental cost under the WRDA 2020 Section 125a cost-sharing authority. Currently, no non-federal entity has expressed interest in such a programmatic-wide scale partnership. However, USACE remains open to the possibility should any non-federal entity express such interest or for any partnerships on a project-by-project or year-by-year basis.

This alternative was constructed based on maximizing the amount of suitable material for upland beneficial use and nearshore strategic placement beneficial use. All channels capable of supplying dredged material for beneficial use do so under this alternative, including placement of MSC sand directly on Ocean Beach for beach nourishment (see the Ocean Beach Onshore section of the RDMMP for more details). The alternative outlines the amount of beneficial use that would be achievable given the more comprehensive, quantitative articulation of benefits above the threshold to justify federal investment from the O&M budget on the incremental cost of BUDM placement. Additionally, should the federal investment not be deemed justified, it is still possible to execute this alternative if non-federal partners are willing to fund the full 100 percent of the incremental cost for BUDM placement above the Federal Standard Base Plan. For more information, see the WRDA 2020 section of the RDMMP.

Proposed Action/Proposed Project Alternative

The requirement for review under NEPA is triggered by a "federal action." (40 C.F.R. pt. 1508.1[w]). The Proposed (federal) Action described in this section would meet the purpose and need described in Chapter 1, which is to allow maintenance dredging of the federal navigation channels in SF Bay consistent with the goals and adopted plans of the LTMS, while adequately protecting the environment, including listed species.

Under CEQA, a detailed and stable project description is fundamental to the purpose of the study, which is to identify and analyze impacts from the Proposed Project. The CEQA Guidelines define the types of information that must be included in an EIR project description. The project description must include the specifics of the Proposed Project, the project site, and its surroundings, but does not need to include extensive detail beyond what is needed to evaluate environmental impacts (CEQA Guidelines Section 15124).

The Proposed Action/Proposed Project is the phased implementation of the USACE Federal Standard Base Plan alternatives – the No Project Alternative, Alternative 1, and Alternative 2. The No Project Alternative, Alternative 1 (diversion from ocean disposal), and Alternative 2 (regional optimization) are all least cost, while Alternative 3 (cost-share opportunity) and Alternative 4 (maximum BUDM) are progressively more expensive. Of the three least cost options that are candidates to be the Federal Standard Base Plan, the No Project Alternative results in the most ocean disposal and least BUDM, and Alternative 2 results in the most BUDM and the least ocean disposal. As described previously, Alternative 3 and Alternative 4 are not least cost and, therefore, they do not currently qualify to be the Federal Standard Base Plan. However, if non-federal funding become available or incremental cost-sharing opportunities present themselves, USACE will seek to implement Alternatives 3 or 4, when practicable. Figure ES-2 provides an overview of the differing dredged material disposal/placement details across alternatives, with hatched bars indicating the potential maximum range of sediment placement options for each alternative. Figure ES-3 provides more detail on cost share scenarios for the percentage range of combined BUDM for each alternative; the red line indicates the least Federal Standard Base Plan threshold.

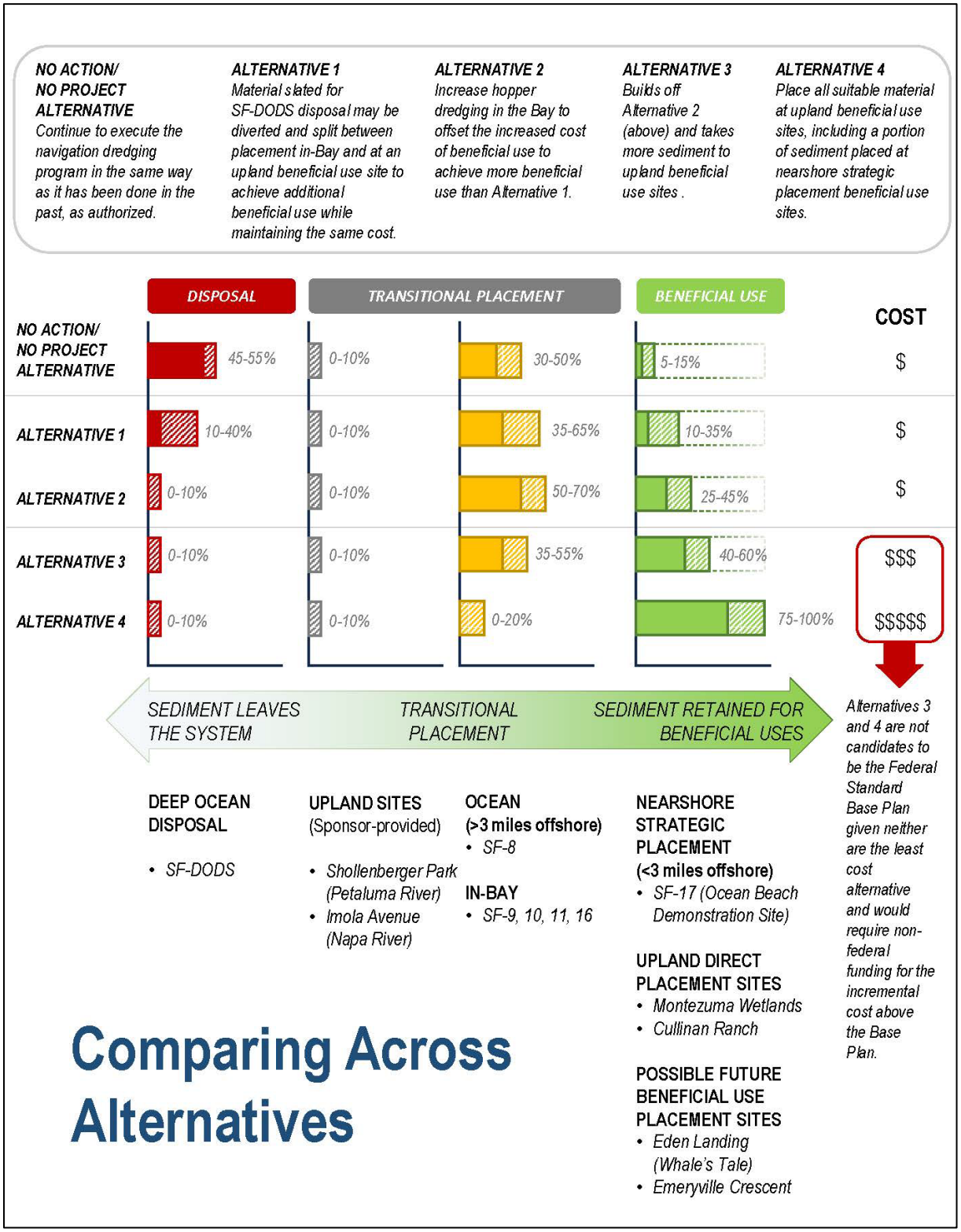


Figure ES-2. Comparison of Dredged Material Disposal and Placement Across Alternatives

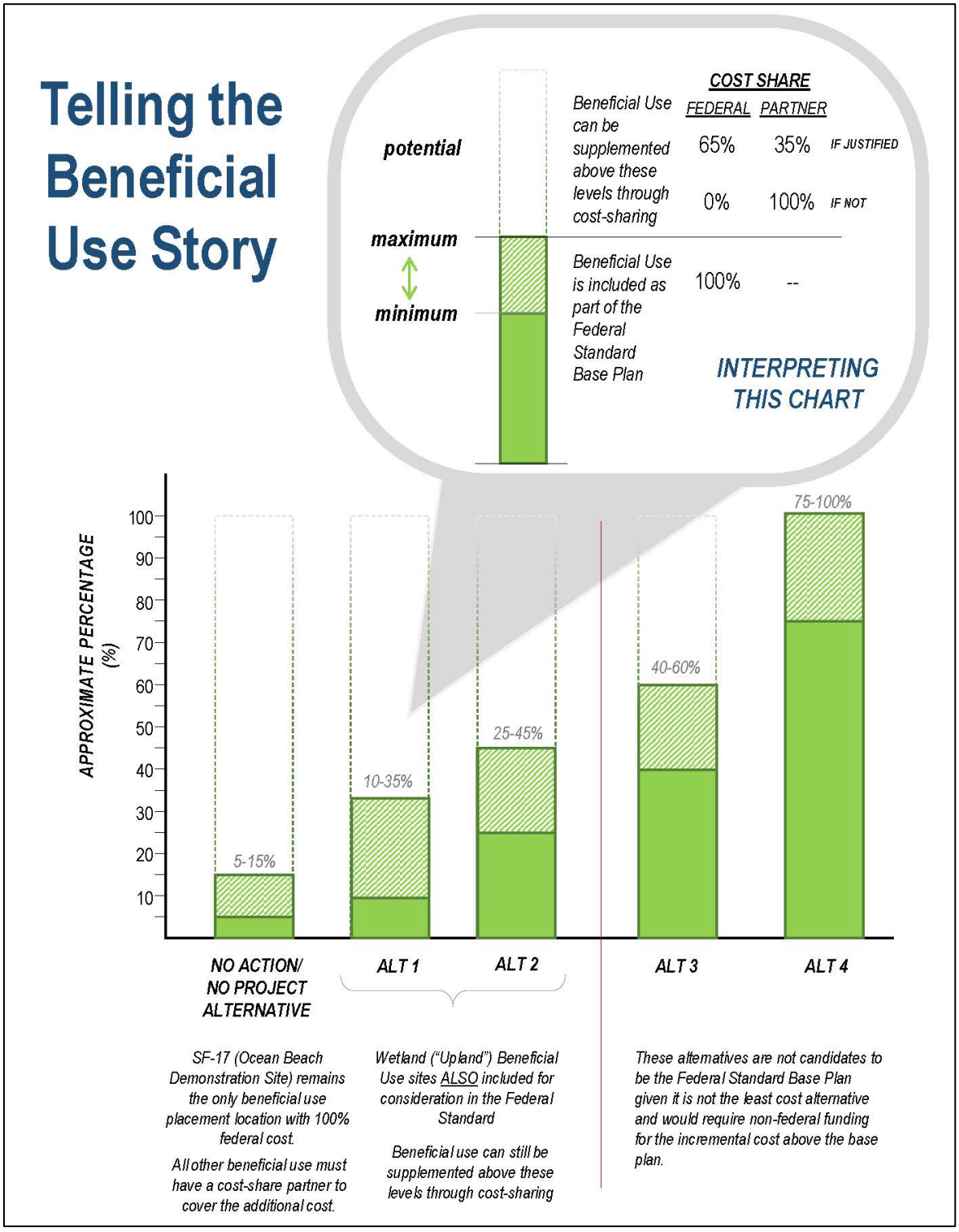


Figure ES-3. Summary of Alternatives and Example of Cost-sharing Mechanism Described in All Alternatives.

The proposed phased implementation of the Proposed Action/Proposed Project is:

- 2025, No Project Alternative: Continuing the No Project Alternative allows USACE the time necessary to appropriately plan for and implement the changes required for Alternatives 1 and eventually 2.
- 2026–2027, Alternative 1: The earliest USACE would be able to implement Alternative 1 would be in 2026.
- 2027–2034, Alternative 2: The earliest USACE would be able to implement Alternative 2 would be in 2027. This time is necessary to allow USACE to work to expand the capacity of its hopper dredges, including utilizing the West Coast Hopper Dredging contract.

The potential environmental impacts associated with each of the alternatives that compose the Proposed Action/Proposed Project are analyzed in Chapter 3 of this Draft EA/EIR. The impacts of the phased Proposed Action/Proposed Project as a whole are also addressed in Chapter 3.

The implementation schedule and associated mitigation measures for the Proposed Action/Proposed Project must be approved by the Regional Water Board through the issuance of the WQC/WDR.

Environmental Effects

Table ES-3 at the end of the Executive Summary outlines the potential environmental impact pathways analyzed (Potential Impact Pathway column); proposed avoidance, minimization, and mitigation measures (Mitigation Measure column); and the federal and state (NEPA and CEQA) effect determinations for each proposed alternative, taking into account proposed mitigation. Detailed effects analyses and assessment of environmental impacts are provided in Chapter 3.

Evaluation of Alternatives

The type and degree of environmental impacts among all the alternatives are similar. Differences in impacts are related to 1) the proportion and location of hopper dredge use versus mechanical dredge use under each alternative, and 2) the extent of BUDM, and 3) the amount of dredged sediment placed at sites and retained within the SF Bay region which may facilitate the creation and/or restoration wetland habitats along and around SF Bay by providing suitable soil material.

Per CEQA Guidelines [Section 15126.6(e)(2)], if the environmentally superior alternative is the No Project Alternative, then the EIR must also identify an environmentally superior alternative among the other alternatives. The action alternatives presented in this document would have less adverse environmental impacts than the No Action Alternative and No Project Alternative and more environmentally beneficial effects through increased BUDM for restoration of habitat for listed species. For these reasons, the environmentally superior alternative is not the No Project Alternative. Alternative 4, Beneficial Use — Maximized, proposes placing all suitable material at upland beneficial use sites. Therefore, Alternative 4, Beneficial Use—Maximized is considered to be the environmentally superior alternative under CEQA. However, as described above, Alternative 4 is not a Federal Standard Base Plan alternative. Of the Federal Standard Base Plan alternatives evaluated in the Draft EA/EIR, Alternative 2, Beneficial Use – Regional Optimization, Leverage Hopper Dredging, is considered the environmentally superior alternative

due to the extent of BUDM placement and amount of dredged sediment placed at sites and retained within the SF Bay region which may facilitate the creation and/or restoration wetland habitats along and around SF Bay by providing suitable soil material.

Coordination and Consultation

Public and agency participation has occurred as a part of the environmental review process, pursuant to the requirements of NEPA and CEQA. Tribal outreach has also occurred in accordance with federal and state requirements.

Consistent with CEQA for preparation of an EIR, the Regional Water Board submitted an NOP to the California State Clearinghouse on February 13, 2024, to alert potentially interested parties of the project, and to invite participation in the environmental review process. The NOP was also posted to the USACE and Regional Water Board websites and distributed through the LTMS, RDMMP, and the Regional Water Board's CEQA email listservs. The NOP included the project description and a figure of the study area. The NOP also announced the scoping period and public scoping meeting.

The scoping period ran from February 13, 2024, through March 14, 2024, and a hybrid (in-person/virtual) scoping meeting was held on March 5, 2024. The purpose of the scoping meeting was to solicit public comments on the scope of the EA/EIR and provide a brief overview of the proposed alternatives to the public. There were 21 participants at the meeting.

Additional public and agency coordination has occurred through the RDMMP development process. The RDMMP website (San Francisco District > Missions > Projects and Programs > Regional Dredge Material Management Plan (army.mil)) provides a history and overview of the public meetings and outreach that have taken place over the past ten-year dredging cycle that informed the development, refinement, and subsequent analysis of the alternatives analyzed in this document. Activities included nine RDMMP meetings and outreach events between July 2019 to March 2024 (SFEI 2024), numerous presentations at public meetings to solicit feedback, an interagency working group led by USACE, in partnership with the San Francisco Estuary Institute (SFEI), to solicit expert technical advice and decision support to USACE on gap analysis studies.

In compliance with USACE Tribal Consultation Policy and AB 52, in March 2024, USACE and the Regional Water Board reached out to tribes (via email) identified through initiation of a Sacred Lands Files search with Native American Heritage Commission (NAHC) in Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma Counties. and requested their comments on the project. To date, the Regional Water Board has had one meeting with the Federated Indians of Graton Rancheria. The Confederated Villages of Lisjan and the Amah Mutsun Tribal Band also provided comments. Tribal consultation is ongoing.

In accordance with the mandates, codes, and directives presented in this Draft EA/EIR, USACE and the Regional Water Board have developed a communications plan for this project that contains a roadmap for outreach and engagement to stakeholders with environmental justice concerns. In effort to ensure this project does not disproportionately impact communities with environmental justice concerns in the SF Bay region, environmental justice community representatives were invited to participate in a virtual public

meeting prior to the public review period for this Draft EA/EIR to receive information and for USACE and the Regional Water Board to address any specific concerns or questions. The meeting was held October 15, 2024, at 4:00 p.m.

This Draft EA/EIR is available for public review and comment. An electronic copy of the Draft EA/EIR is available at: San Francisco District > Missions > Projects and Programs > Regional Dredge Material Management Plan. During the public review period, written comments should be sent to USACE at SF-Bay-Dredging@usace.army.mil and the Regional Water Board, c/o Jazzy Graham-Davis (Jazzy.Graham-Davis@Waterboards.ca.gov). Commenters should use “SF Bay Dredging EA/EIR” in the subject line for comments on the Draft EA/EIR. Commenting agencies and organizations should include the name of a contact person for the agency or organization.

After considering public and agency comments, USACE and the Regional Water Board will prepare a Final EA/EIR. Comments received from the public and agencies on the alternatives presented in this draft document will be considered in the refinement of alternatives, including the Proposed Action/Proposed Project, and identification of the Preferred Alternative. The Preferred Alternative is the alternative that best fulfills the purpose and need and the agency objectives for the project while balancing impacts on the natural and human environment. The Final EA/EIR will present the Preferred Alternative and address public and agency comments.

Table ES-3. Summary of Net Impacts and Findings for Alternatives

Potential Impact Pathway	Mitigation Measures[1]	No Action	No Project	Proposed Action/ Proposed Project	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Air Quality, Climate Change, and Greenhouse Gas Emissions								
Impact AQ-1: Potential violation of any air quality standard or contribute substantially to an existing or projected air quality violation.	No Mitigation Measures	Less than significant (LTS)	LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS
Impact AQ-2: Potential conflict with or Obstruction of Implementation of an Applicable Air Quality Plan.	No Mitigation Measures	LTS	LTS	NEPA: Beneficial (B) CEQA: No impact (NI)[2]	NEPA: B CEQA: NI[2]	NEPA: B CEQA: NI[2]	NEPA: B CEQA: NI[2]	NEPA: B CEQA: NI[2]
Impact AQ-3: Potential for exposure of Sensitive Receptors to Substantial Pollutant Concentrations.	No Mitigation Measures	LTS	LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS
Impact AQ-4: Potential to Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.	No Mitigation Measures	LTS	LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS
Impact AQ-5: Result in Cumulative Impacts on Regional Air Quality	No Mitigation Measures	No cumulatively considerable impacts (NCCI)	NCCI	NEPA: NCCI CEQA: NCCI	NEPA: NCCI CEQA: NCCI	NEPA: NCCI CEQA: NCCI	NEPA: NCCI CEQA: NCCI	NEPA: NCCI CEQA: NCCI
Biological Resources								
Impact BI-1: Potential Effects on Fish and Benthic Invertebrate Survival Caused by Entrainment	BI1-1: Compensatory Mitigation—*No Project*	LTS	Significant; reduced to LTS with BI-1-1 Mitigation Measure	NEPA: LTS CEQA: Significant; reduced to LTS with BI1-1 Mitigation Measure	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS
Impact BI-2: Potential Adverse Effects of Increased Turbidity Caused by Dredging and Material Placement on Special Status Species, Critical Habitat and Commercially Valuable Marine Species	No Mitigation Measures	LTS	LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS
Impact BI-3: Potential Effects on Fish and Marine Mammals Caused by Noise from Dredging Activities	No Mitigation Measures	LTS	LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS
Impact BI-4: Potential Effects of Maintenance Dredging and Material Placement on Benthic Habitat	No Mitigation Measures	LTS	LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS
Impact BI-5: Potential Effects Caused by Upland Beneficial Use of Dredged Material Placement	No Mitigation Measures	B	LTS	NEPA: B CEQA: LTS	NEPA: B CEQA: LTS	NEPA: B CEQA: LTS	NEPA: B CEQA: LTS	NEPA: B CEQA: LTS
Impact BI-6: Potential Effects Caused by the Resuspension of Contaminated Sediments	No Mitigation Measures	LTS	LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS
Impact B7: Potential Interference of Migratory Passage for fish and marine mammals	No Mitigation Measures	LTS	LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS
Impact BI-8: Potential Effects of Dredging Activities on Roosting, Nesting, and Foraging Avian Species	No Mitigation Measures	LTS	LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS
Impact BI-9: Potential Disturbance of EFH and “Special Aquatic Sites” Including Eelgrass Beds and Mudflats	No Mitigation Measures	LTS	LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS
Impact BI-10: Potential for Dredging, Transport, and Placement Activities to Result in Cumulative Impacts on Biological Resources	No Mitigation Measures	NCCI	NCCI	NEPA: NCCI CEQA: NCCI	NEPA: NCCI CEQA: NCCI	NEPA: NCCI CEQA: NCCI	NEPA: NCCI CEQA: NCCI	NEPA: NCCI CEQA: NCCI

Potential Impact Pathway	Mitigation Measures[1]	No Action	No Project	Proposed Action/ Proposed Project	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Cultural and Tribal Resources								
Impact CT-1: Substantial Adverse Change to a Historical Resource or Disturb Unique Archaeological Resources	CT1.-1: Cultural Resources Monitoring Program—*All Alternatives* CT1-2: Inadvertent Archaeological Discovery—*All Alternatives*	LTS with mitigation	LTS with mitigation	NEPA: LTS with mitigation CEQA: LTS with mitigation	NEPA: LTS with mitigation CEQA: LTS with mitigation	NEPA: LTS with mitigation CEQA: LTS with mitigation	NEPA: LTS with mitigation CEQA: LTS with mitigation	NEPA: LTS with mitigation CEQA: LTS with mitigation
Impact CT-2: Potential to Disturb Human Remains, including those Interred Outside of Formal Cemeteries	CT2-1: Treatment of Human Remains—*All Alternatives*	LTS with mitigation	LTS with mitigation	NEPA: LTS with mitigation CEQA: LTS with mitigation	NEPA: LTS with mitigation CEQA: LTS with mitigation	NEPA: LTS with mitigation CEQA: LTS with mitigation	NEPA: LTS with mitigation CEQA: LTS with mitigation	NEPA: LTS with mitigation CEQA: LTS with mitigation
Impact CT-3: Potential Impacts to Native American Sacred Sites or Religious Ceremonies	No Mitigation Measures	LTS	LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS
Impact CT-4: Potential for Dredging, Transport, and Placement Activities to Result in Cumulative Impacts on Historical Resources	All Alternatives: CT1.-1: Cultural Resources Monitoring Program CT1-2: Inadvertent Archaeological Discovery CT2-1: Treatment of Human Remains	NCCI with mitigation	NCCI with mitigation	NEPA: NCCI with mitigation CEQA: NCCI with mitigation	NEPA: NCCI with mitigation CEQA: NCCI with mitigation	NEPA: NCCI with mitigation CEQA: NCCI with mitigation	NEPA: NCCI with mitigation CEQA: NCCI with mitigation	NEPA: NCCI with mitigation CEQA: NCCI with mitigation
Geology, Soils, and Sediment Quality								
Impact GE-1: Potential for Dredging, Transport, and Placement Activities to Result in Substantial Soil Erosion	No Mitigation Measures	LTS	LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS
Impact GE-2: Potential for Dredging, Transport, and Placement Activities to Substantially Degrade Sediment Quality	No Mitigation Measures	LTS	LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS
Impact GE-3: Potential for Dredging, Transport, and Placement Activities to Result in Substantial in-Bay Sediment Mounding	No Mitigation Measures	LTS	LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS
Impact GE-4: Potential for Dredging, Transport, and Placement Activities to Result in Cumulative Impacts on Soil Erosion, Sediment Quality and Sediment Mounding	No Mitigation Measures	NCCI	NCCI	NEPA: NCCI CEQA: NCCI	NEPA: NCCI CEQA: NCCI	NEPA: NCCI CEQA: NCCI	NEPA: NCCI CEQA: NCCI	NEPA: NCCI CEQA: NCCI
Hazards and Hazardous Materials								
Impact HM-1: Potential Public or Environmental Exposure from the Transport, Use, and Disposal of Hazardous Materials	No Mitigation Measures	LTS	LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS
Impact HM-2: Potential Impacts to Implementation of an Adopted Emergency Response Plan	No Mitigation Measures	B	LTS	NEPA: B CEQA: LTS	NEPA: B CEQA: NI*	NEPA: B CEQA: NI*	NEPA: B CEQA: NI*	NEPA: B CEQA: NI*
Impact HM-3 Potential for Dredging, Transport, and Placement Activities to Result in Cumulative Impacts on Hazards and Hazardous Materials	No Mitigation Measures	NCCI	NCCI	NEPA: NCCI CEQA: NCCI	NEPA: NCCI CEQA: NCCI	NEPA: NCCI CEQA: NCCI	NEPA: NCCI CEQA: NCCI	NEPA: NCCI CEQA: NCCI

Executive Summary

Potential Impact Pathway	Mitigation Measures[1]	No Action	No Project	Proposed Action/ Proposed Project	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Hydrology and Water Quality								
Impact HY-1: Potential to Substantially Degrade Water Quality through Alteration of Water Temperature, Salinity, pH, and Dissolved Oxygen	No Mitigation Measures	LTS	LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS
Impact HY-2: Potential to Substantially Degrade Water Quality Because of Increased Turbidity	No Mitigation Measures	LTS	LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS
Impact HY-3: Potential to Substantially Degrade Water Quality from Mobilization of Contaminated Sediments or Release of Hazardous Materials	No Mitigation Measures	LTS	LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS
Impact HY-4: Potential for Dredging, Transport, and Placement Activities to Result in Cumulative Impacts on Hydrology or Water Quality	No Mitigation Measures	NCCI	NCCI	NEPA: NCCI CEQA: NCCI	NEPA: NCCI CEQA: NCCI	NEPA: NCCI CEQA: NCCI	NEPA: NCCI CEQA: NCCI	NEPA: NCCI CEQA: NCCI
Land Use and Planning								
Impact LU-1: Potential Conflict with Applicable Plans and Policies	No Mitigation Measures	No Impact	No Impact	NEPA: No Impact CEQA: No impact	NEPA: B CEQA: No impact	NEPA: B CEQA: No impact	NEPA: B CEQA: No impact	NEPA: B CEQA: No impact
Impact LU-2: Potential for Dredging, Transport, and Placement Activities to Result in Cumulative Impacts on Land Use	No Mitigation Measures	NCCI	NCCI	NEPA: NCCI CEQA: NCCI	NEPA: NCCI CEQA: NCCI	NEPA: NCCI CEQA: NCCI	NEPA: NCCI CEQA: NCCI	NEPA: NCCI CEQA: NCCI
Transportation and Traffic								
Impact TR-1: Potential to Disrupt or Impede Marine Navigation	No Mitigation Measures	LTS	LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS	NEPA: LTS CEQA: LTS
Impact TR-2: Potential to Create Navigational Safety Risks	No Mitigation Measures	B	NI[2]	NEPA: B CEQA: NI[2]	NEPA: B CEQA: NI[2]	NEPA: B CEQA: NI[2]	NEPA: B CEQA: NI[2]	NEPA: B CEQA: NI[2]
Impact TR-3: Potential for Dredging, Transport, and Placement Activities to Result in Cumulative Impacts on Transportation and Traffic	No Mitigation Measures	NCCI	NCCI	NEPA: NCCI CEQA: NCCI	NEPA: NCCI CEQA: NCCI	NEPA: NCCI CEQA: NCCI	NEPA: NCCI CEQA: NCCI	NEPA: NCCI CEQA: NCCI

[1] Standard practices and avoidance and minimization measures, as identified in LTMS BiOp (NMFS 1998, 2015; USFWS 1999, 2004a, 2004b, 2024) and EFH Consultation (USACE and USEPA 2011) would be employed under all alternative to reduce impacts to species and habitat.
[2] Impacts would be similar under NEPA and CEQA; however, CEQA does not permit beneficial impact determinations.

Key: B = beneficial
CEQA = California Environmental Quality Act
EFH = Essential Fish Habitat
LTS = Less than significant
NEPA = National Environmental Policy Act
NI = No impact
NCCI = No cumulatively considerable impacts

1.0 Introduction

The United States Army Corps of Engineers (USACE) San Francisco District proposes to continue maintenance dredging of the federal navigation channels in San Francisco Bay (SF Bay) to maintain their navigability. The San Francisco Bay Regional Water Quality Control Board (Regional Water Board) will consider issuing a Clean Water Act (CWA) Section 401 Water Quality Certification (WQC) and Waste Discharge Requirements (WDR) pursuant to the State of California's Porter-Cologne Water Quality Control Act (Porter-Cologne Act) for USACE's continued maintenance dredging operations in SF Bay. This authorization is referenced throughout this document as WQC/WDR. Dredging involves the excavation of accumulated sediment from the channel, as well as the transportation and placement of the sediment at a permitted location, consistent with permit conditions established by applicable regulatory agencies. Sediment must be tested for suitability for placement at any site.

USACE and the Regional Water Board prepared this joint Draft Environmental Assessment and Environmental Impact Report (EA/EIR) to address the environmental effects of implementing and permitting maintenance dredging of federal navigation channels in SF Bay and the associated placement of dredged material.

This document is intended to fulfill USACE's National Environmental Policy Act (NEPA) compliance requirements for continuation of maintenance dredging in SF Bay over a roughly ten-year period beginning in dredging year 2025 and continuing through 2034, with the potential for projects to extend into early 2035[5]. It is also intended to fulfill the Regional Water Board's California Environmental Quality Act (CEQA) compliance requirements for issuance of a multiyear WQC/WDR to USACE governing dredge and fill activities. Additionally, for maintenance dredging projects involving the discharge of dredged or fill material into waters of the United States, Appendix A of this document provides the Section 404(b)(1) analysis for maintenance dredging in compliance with the CWA. Although USACE does not issue permits to itself, USACE must demonstrate compliance with Section 404 of the CWA.

This Draft EA/EIR is prepared in accordance with NEPA and Council on Environmental Quality (CEQ) regulations, Section 404 of the CWA, and CEQA law and guidelines. USACE is the NEPA lead agency, and the Regional Water Board is the CEQA lead agency. The Proposed Action/Project and alternatives are described in Chapter 2.

The environmental impacts of maintenance dredging of the federal navigation channels for the previous ten-year dredging period, 2015 to 2024, were analyzed in the 2015 EA/EIR for maintenance dredging of the federal navigation channels in SF Bay (USACE and Regional Water Board 2015). This Draft EA/EIR is an update of the 2015 EA/EIR, which is relied upon for background information and cited where relevant.

[5] Dredging year refers to the calendar year in which dredging is planned to begin. In some cases, dredging episodes associated with a dredging year can extend past the end of the calendar year.

1.1 Basic and Overall Project Purpose, Need, and Objectives

USACE is mandated by Congress to maintain navigability of federal navigation channels. Accumulation of sediment that settles in these channels can impede navigability and present navigation safety hazards. Maintenance dredging removes this sediment and returns the channels to authorized depths. Accordingly, USACE's overall project purpose is to provide safe, reliable, and efficient waterborne transportation systems (channels, harbors, and waterways) for the movement of commerce, national security needs, and recreation, which is achieved through continuing to dredge federal navigation channels in the SF Bay Area. This basic project purpose is to provide safe, reliable, and efficient waterborne transportation systems. The basic purpose is water dependent as defined by 40 C.F.R. Part 230 since it cannot be fulfilled outside of an aquatic environment. Dredging will be consistent with navigation project authorizations and, to the maximum extent possible, the 20-year Regional Dredged Material Management Plan (RDMMP), which is a companion document to this Draft EA/EIR (USACE 2024a). The purpose of the RDMMP is to develop a comprehensive 20-year strategy that identifies the Federal Standard Base Plan[6] for the dredging of federal navigation projects and the placement of dredged material in the SF Bay Area. Where applicable, the project would be aligned with the goals of the Long Term Management Strategy for the Placement of Dredged Material in the San Francisco Bay Region (LTMS) program, as described in the 1998 LTMS Final Environmental Impact Statement/EIR (USACE et al. 1998) and the 2001 Long Term Management Strategy for the Placement of Dredged Material in San Francisco Bay (LTMS) Management Plan (USACE et al. 2001).

The Regional Water Board has authority under the CWA Section 401 and the Porter-Cologne Act to issue permits that regulate dredge and fill activities. The Regional Water Board will review USACE's application for a WQC/WDR for continued maintenance dredging and placement of dredged material in the SF Bay Area. To issue a WQC/WDR to USACE, the Regional Water Board must analyze and disclose water quality conditions and other environmental impacts of the project; consider alternatives that would avoid or substantially reduce potentially significant impacts of the project as approved; adopt, or make a condition of approval, all feasible mitigation measures for potentially significant impacts within its authority; and demonstrate compliance with all applicable state water quality requirements.

The following project objectives are detailed in accordance with CEQA requirements:

- Provide safe, reliable, and efficient navigation through federal channels in SF Bay in a feasible manner.
- Align, where applicable, with the goals of the LTMS program as described in the 1998 LTMS Final EIS/EIR and the 2001 LTMS Management Plan (refer to Section 1.2.1), within the constraints of the Federal Standard Base Plan.

[6] The Federal Standard is the least costly dredged material disposal or placement alternative(s) that is consistent with sound engineering practices and meets all federal environmental requirements, including those established under Section 404 of the Clean Water Act and Section 103 of the Marine Protection, Research, and Sanctuaries Act. For dredged material placement, USACE fully considers all practicable and reasonable alternatives on an equal basis, including the use of dredged material beneficially, to identify the Federal Standard (33 CFR Parts 335-338). "Base Plan" is an operational manifestation of the Federal Standard because it defines the disposal or placement costs that are assigned to the "navigational purpose" of the project (Source: USACE's ER 1105-2-103).

- Increase the minimum amount of dredged material beneficially used[7] by USACE for wetland restoration and conservation within the constraints of the Federal Standard Base Plan.
- Conduct dredging in a manner that adequately protects the environment, including protection of listed species, essential fish habitat (EFH), and beneficial uses of waters.[8]

1.2 Relationship to Other Plans and Policies

USACE's maintenance dredging and dredged material placement must comply with the regulations set forth in 33 C.F.R. Part 335-338, which define the "Federal Standard." The Base Plan, or Federal Standard Base Plan, is the operational manifestation of the Federal Standard. Other plans and policies related to dredged material management in SF Bay are described in the following sections.

1.2.1 LTMS Planning Context

The LTMS program was formed in the 1990s in response to the public's growing concern over the potential direct, indirect, and cumulative effects of dredging and dredged material placement activities on San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Estuary) (USACE 2013a). The LTMS is designed to develop technically feasible, economically prudent, and environmentally acceptable long-term solutions to the placement of dredged material over a fifty-year period. It specifically addresses maintenance dredging and is not intended to address new dredging or sand mining. The primary goals of the LTMS include managing dredging and placement in an economically and environmentally sound manner, maximizing the use of dredged material for beneficial reuse,[9] and developing a coordinated permit application review process for dredging and placement.

The LTMS program has reduced in-Bay placement of dredged sediment, creating a goal of 1.25 million cubic yards (CY) per year maximum (with an additional 250,000 CY contingency volume, as needed), improved Bay water quality, and reduced other adverse impacts of dredged material placement (USACE et al. 2013, 2018). During a 12-year review of the LTMS completed in 2013, LTMS agencies suggested assessing potential program modifications, including changes or flexibility to in-Bay placement volume limits, encouraging more and new kinds of beneficial reuse. More information can be found in the 20-year RDMMP companion document to this Draft EA/EIR (USACE 2024a). The average in-Bay placement of dredged material from 2019-2021 was 802,216 CY.

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7 Beneficial use or reuse is the use or reuse of dredged sediment for construction, levees, tidal wetland restoration or other projects.

8 Beneficial uses of waters of the state "that may be protected against degradation include, but are not limited to, domestic, municipal, agricultural and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves" (Wat. Code, sec. 13050, subd. (e)). The Water Quality Control Plan for the San Francisco Bay region designates beneficial uses of waters in the region.

9 USACE typically uses the terminology "beneficial use;" "beneficial reuse" is applied here to be consistent with LTMS language.

1.2.1.1 LTMS Program Relationship to Regulatory Requirements

The LTMS program relationship with the San Francisco Bay Plan, Water Quality Control Plan for the San Francisco Bay Basin, and the Clean Water Act are discussed in the following sections.

San Francisco Bay Plan

The San Francisco Bay Conservation and Development Commission (BCDC) regulates dredging and dredged material placement in SF Bay under authority of the State of California's McAteer-Petris Act of 1965. BCDC completed and adopted the SF Bay Plan (Bay Plan) in 1968 to comply with the provisions of the McAteer-Petris Act, which mandated its study of the SF Bay (BCDC 2020). The Bay Plan dredging policies were amended to adopt the LTMS findings, including reducing in-Bay disposal[10] and maximizing beneficial use of dredged material (BUDM) with the goal of limiting in-Bay placement volumes to a maximum of one million CY per year. The Bay Plan was amended in 2019 and included a policy for BCDC to continue to participate in the LTMS, the Dredged Material Management Office (DMMO), and other initiatives conducting research on Bay sediment movement, the effects of dredging and disposal/placement on Bay natural resources, alternatives to in-Bay aquatic disposal, and funding additional costs of transporting dredged material to upland and ocean disposal sites (BCDC 2020). BCDC is also the state coastal management agency under the federal Coastal Zone Management Act (CZMA) for the SF Bay segment of the California coastal zone; it is responsible for the implementation of federal consistency provisions of the CZMA (BCDC 2020).

Water Quality Control Plan for the San Francisco Bay Basin

The Water Quality Control Plan for the San Francisco Basin (Basin Plan)[11] is a key document used by the Regional Water Board for the regulation of in-Bay dredging. In 2008, the Basin Plan was amended to identify the LTMS strategy as the key process for addressing dredging operations in SF Bay, and for achieving the LTMS goals (USACE and Regional Water Board 2015). The Regional Water Board periodically updates the Basin Plan by amendment, which must then be approved by the State Water Resources Control Board (State Water Board). The current Basin Plan includes amendments approved by the State Water Board through April 17, 2024.X The Basin Plan generally follows the same policies as the LTMS and has a goal of reducing in-Bay placement[12] volumes to about 1.25 million CY per year (Regional Water Board 2024).

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[10] Note that while the BCDC and its Bay Plan consider in-Bay, unconfined, aquatic placement of dredged material to be "disposal," USACE classifies this as "placement" of dredged material, in accordance with the agency definition of transitional placement: "Transitional placement is keeping sediment in the riverine or coastal system as a part of a management process or in a period of transition. Generally, this material will be managed or dredged again and is considered neither beneficial use nor disposal" (USACE 2023a, page 2).

[11] The Basin Plan can be found at the Regional Water Board's website at >Basin Planning | San Francisco Bay Regional Water Quality Control Board (ca.gov).

[12] See Footnote 8. Similar to BCDC's Bay Plan, the Regional Water Board and its Basin Plan use the terminology "disposal" rather than USACE's use of "placement."

Clean Water Act

USACE, the US Environmental Protection Agency (USEPA) and the Regional Water Board regulate placement of dredged material in SF Bay pursuant to the CWA through the LTMS as described in the 2015 EA/EIR (USACE and Regional Water Board 2015). See Section 1.6.1.3 for additional discussion of CWA. There have been no new developments in the relationship between the LTMS program and the CWA since the publication of the 2015 EA/EIR (USACE and Regional Water Board 2015).

1.2.2 Management of Dredged Material

A variety of federal and state permits regulate and authorize the discharge of dredged material in the open ocean, enclosed coastal waters, upland sites, or for beneficial use. USACE and USEPA jointly regulate the discharge of dredged material into waters of the United States and the transportation of dredged material for the purpose of placement in ocean waters pursuant to Section 404 of the CWA, and the Marine Protection, Research, and Sanctuaries Act (MPRSA). Pursuant to the consistency provisions of the CZMA, BCDC has authority over dredging and disposal of dredged material in the Bay. Pursuant to Section 401 of the CWA and the Porter-Cologne Water Quality Control Act (Porter-Cologne Act), the Regional Water Board has authority over dredging and disposal of dredged material in the Bay.

1.2.2.1 Dredged Material Management Office

The DMMO was formed in 1996 to establish a consolidated and comprehensive approach to eliminate redundancy and delays in the dredged material placement permitting process. The DMMO is a joint program comprised of USACE, USEPA, BCDC, Regional Water Board, and the California State Lands Commission (CSLC). Participating agencies include the California Department of Fish and Wildlife (CDFW), the National Marine Fisheries Service (NMFS), and the United States Fish and Wildlife Service (USFWS) (USACE et al. 2018). The DMMO established a joint agency process for the review and approval of sediment quality sampling and analysis plans, sediment sampling results, dredged material placement suitability determinations, and dredging project permit applications. The DMMO also coordinates the implementation of programmatic requirements such as species consultations, alternative placement site development, record keeping, and production of annual reports (DMMO 2022).

1.2.2.2 Testing Requirements for Placement and Beneficial Use of Dredged Material

USACE conducts sediment testing prior to dredging and placement at ocean, in-Bay or beneficial use sites. Material is tested for physical and chemical attributes to ensure compliance with relevant environmental laws and regulations to minimize environmental degradation. Requirements for the type and extent of testing are generally site specific, varying based on sediment characteristics and the type of placement site. The DMMO oversees testing plans and results.

Sediment testing is conducted in accordance with a tiered sampling framework for projects ranging from low to high potential impacts. Testing requirements increase from Tier I up to Tier IV. The terms Tier I, Tier II, Tier III, and Tier IV are defined in the Ocean Testing Manual (OTM) (USACE and USEPA 1991), Inland Testing Manual (ITM) (USACE and USEPA 1998), and Upland Testing Manual (UTM) (USACE 2003).

Introduction

The term Tier I is an evaluation system used by the DMMO to determine the suitability of sediment for unconfined aquatic placement without additional testing, or minimal confirmatory testing. This determination is granted when the existing sediment data are sufficient for regulatory agencies to determine placement suitability. Criteria that may deem a Tier 1 exclusion appropriate include:

1. The dredged material has been fully characterized to Tier III requirements in the last 3 to 5 years; or
2. The dredged material is composed predominantly of sand, gravel, rock, or any other naturally occurring bottom material with particle sizes larger than silt, and the material is found in areas of high current or wave energy; or
3. The dredged material is for beach nourishment or restoration and is composed predominantly of sand, gravel, or shell with particle sizes compatible with material on the receiving beaches; or
4. When:

    a) The material proposed for dumping is substantially the same as the substrate at the proposed site; and

    b) The proposed dredging site is far removed (by distance or depth) from known existing and historical sources of pollution to provide reasonable assurance that such material has not been contaminated by such pollution.

Tier II testing typically requires physical and chemical analysis such as total solids, total organic carbon, grain size, metals, butyltins, pesticides, polychlorinated biphenyls (PCB), and polycyclic aromatic hydrocarbons. Tier III testing may require biological evaluations, such as water column toxicity, benthic toxicity, and benthic bioaccumulation tests, in addition to physical and chemical analysis. Tier IV testing requires more comprehensive, case-specific evaluations.

Additional testing requirements may include confirmatory grain-size analysis, and the Modified Elutriate Test. Confirmatory grain-size analysis is a physical analysis of sediment grain size, total organic carbon, and total solids. The Modified Elutriate Test is designed to measure and predict the release of contaminants from sediment into the water column and any toxicity associated with decant water that could be discharged from upland placement sites to adjacent surface waters.

Screening level guidelines for beneficial use of sediments for wetland restoration differ for cover material and foundation material. Cover material is a class of material that is not expected to pose a threat to water quality or the aquatic environment, even in places where the material is in direct contact with surface waters or aquatic organisms, and is suitable for unconfined aquatic disposal. Wetland foundation material is not of a quality that constitutes a hazardous or listed waste but has a potential for biological effects if directly exposed to organisms. Wetland foundation material is not expected to be a threat to water quality when an adequate amount of cover material is used to reduce the risk of foundation material coming into contact with the aquatic environment. The amount of cover material needed to adequately reduce this risk depends on site-specific characteristics. Placement of dredged sediment at beneficial use

sites is also often governed by acceptance criteria included in project-specific biological opinions (BiOps) and WDRs.

A detailed description of sediment testing guidelines for BUDM may be found in the Regional Water Board's Beneficial Reuse of Dredged Material: Sediment Screening and Testing Guidelines (Regional Water Board 2019a).

1.2.3 Overdepth and Advance Maintenance Dredging

Congress authorizes maximum depths and widths, or authorized dimensions, to which USACE navigation channels may be constructed and maintained. However, USACE does not always maintain channels to their authorized depth, and often maintains channels at shallower depths. Overdepth dredging is dredging that occurs outside the required authorized dimensions prism, including side slopes to "compensate for physical conditions and inaccuracies in the dredging process and allow for efficient dredging practices" (USACE 2006, page 2). At times, USACE conducts advance maintenance dredging, or dredging to a specified depth and/or width beyond the authorized channel dimensions in critical and fast-shoaling areas to avoid frequent re-dredging and to ensure the reliability and least overall cost of operating and maintaining the project authorized dimensions (Tavolaro et al. 2007).

Overdepth and advance maintenance dredging are part of USACE's maintenance dredging program and are not considered deepening. In both overdepth and advance maintenance dredging, material is fully characterized in pre-dredge sediment testing. Overdepth and advance maintenance dredging differ in that:

- Overdepth dredging typically extends to a maximum of 2 feet beyond the historically maintained depth for the dredged area, per Engineering Regulation [ER] 1130-2-520 (USACE 1996).
- Advance maintenance dredging extends to a specified depth and/or width beyond the previously dredged channel dimensions in critical and fast-shoaling areas to avoid high spots which require frequent dredging. The purpose is to ensure the reliability and least overall cost of operating and maintaining the channel's design dimensions.
- Advance maintenance dredging was analyzed in the previous EA/EIR (USACE and Regional Water Board 2015) and conducted under Regional Water Board authorizations R2-2015-0023 (Regional Water Board 2015) and R2-2020-0011 (Regional Water Board 2020).

1.2.4 Beneficial Use of Dredged Material Guidance

In consideration of dredged material as a resource, BUDM initiatives embrace the concept that dredged material can be used in a manner that will benefit society and the natural environment (USEPA and USACE 2007). There is a long history of BUDM initiatives in SF Bay dating back to the formation of the LTMS program in 1990 to work together to maximize beneficial reuse of dredged sediment and minimize disposal in the Bay and at the San Francisco Deep Ocean Disposal Site (SF-DODS). USACE, the Regional Water Board, and other LTMS agencies recognize that BUDM is a necessary component of the dredged material management process, especially in light of anticipated sea level rise (SLR) expected in SF Bay by 2100 (Regional Water Board 2019b). One of the challenges has historically been paying for

the more expensive option of BUDM, hence new USACE and Regional Water Board policies related to BUDM.

In January 2023, Chief of Engineers and Commanding General of USACE, Lieutenant General Scott A. Spellmon, issued a "Beneficial Use of Dredged Material Command Philosophy Notice," which outlined the USACE-wide goal of beneficially using at least 70 percent of its dredged material by 2030 (70/30 goal). This ambitious goal, directed by USACE's top leader, reflects a shifting landscape where dredged material is recognized as a resource and BUDM is prioritized. The intent of the Command Philosophy Notice was to encourage innovation, planning, and categorization of dredged material for beneficial use. On August 28, 2023, USACE issued a detailed memorandum outlining its program to identify new opportunities for BUDM and expand the BUDM. USACE recognizes the term "beneficial use," but the term "beneficial reuse" has been adopted by many agencies and stakeholders around SF Bay and the terms can be used interchangeably. This memorandum clarified and built upon the earlier "Command Philosophy Notice" issued by Lieutenant General Spellmon. It should be noted that the beneficial uses outlined in the August 28, 2023, memorandum are broader and more innovative than the beneficial uses previously considered in the LTMS program, and include such uses as agricultural, construction, and remediation-related uses (USACE 2023a).

In 2019, the Regional Water Board published findings concerning the BUDM to maximize "nature-based solutions" to protect vulnerable shorelines from SLR. Details of these findings, which will likely be incorporated into the Basin Plan during the ten-year life span of the project, are presented in a project report from the Wetland Policy Climate Change Update Project, Wetlands Fill Policy Challenges and Future Regulatory Options: Findings and Recommendations (Regional Water Board 2019b).

The Water Resources Development Act (WRDA) of 2020 included a new authorization to address challenges associated with paying for potentially more expensive options due to incorporating BUDM in navigation projects. Section 125a of WRDA 2020 (116th Congress 2nd Session H.R. 7575) specifies the incremental cost above the Federal Standard, or Base Plan, for BUDM can be cost-shared at 65 percent federal/35 percent non-federal given the benefits justify the additional cost. This justification is different depending on the cost magnitude. If the federal portion (i.e., the 65 percent of the incremental cost) is less than 25 percent above the Federal Standard Base Plan cost, the benefits simply need to be listed qualitatively to justify spending federal money on the BUDM. If the federal portion (i.e., the 65 percent of the incremental cost) is greater than 25 percent above the Federal Standard Base Plan cost, the benefits must be listed quantitatively and shown to exceed the incremental cost. Please refer to Section 1.1, above, for the definition of the Federal Standard.

1.3 Federal Maintenance Dredging Budget and Economics

The Estuary is one of the nation's critical maritime thoroughfares, supporting international trade, commercial and recreational fishing, and other recreation activities. For over a century, navigational channels were created, deepened, and maintained by dredging to enable ships to navigate safely into and out of ports, harbors, and marinas without running aground. Dredging the region's channels, ports and associated docking, and berthing and other facilities will continue to be necessary to maintain adequate depths for vessels to maneuver in a safe and efficient manner.

Introduction

SF Bay is home to four publicly owned and operated maritime ports: the Port of Oakland, the Port of San Francisco, the Port of Richmond, and the Port of Redwood City, and one privately owned and operated port, the Port of Benicia. The Port of Oakland accounts for 99 percent of the containerized cargo moving through Northern California, with an average annual volume throughput of 2.4 million twenty-foot equivalent units (TEU) of containerized cargo during the period between 2014 to 2022 (Port of Oakland 2024); it was ranked the eighth busiest port in the United States in terms of TEUs (US Department of Transportation [USDOT] 2024a). Navigational dredging facilitated an estimated $80.3 billion dollars of economic output at the Oakland Seaport in 2021 from direct revenue, direct and indirect job growth, and tax revenue (Martin Associates 2021). In addition to containerized cargo and commodities, SF Bay is home to five refineries, which collectively employ 26,686 Bay Area residents and contribute over three billion dollars annually to the state and local tax base of the region (Sedgwick et al. 2019). The federally maintained shipping channels also help support privately operated ferry transportation, cruise terminals, and numerous public and private recreational marinas.

As mandated by Congress, USACE is responsible for providing safe, reliable, and efficient waterborne transportation for the movement of commerce, national security needs, and recreation. This applies to federal navigational channels, harbors, and waterways. Successfully accomplishing this mission, which requires maintaining the federal channels to their authorized depths, is critical to the region's maritime trade and to its regional and national economies.

Policy, guidance, and procedures for development of dredged material plans and the establishment of the Federal Standard Base Plan are provided in Section E-15 of the Planning Guidance Notebook (ER 1105-2-100). Recent USACE guidance requiring annual RDMMP updates with 5-year time horizons has also been promulgated in accordance with Section 125 of the WRDA 2020.

To identify the Federal Standard, USACE considers all practicable and reasonable alternatives on an equal basis, including the BUDM (33 C.F.R. Parts 335-338). "Base Plan" is an operational description of the Federal Standard because it defines the disposal or placement costs that are assigned to the "navigational purpose" of the project, per USACE's ER 1105-2-103. Once the Federal Standard Base Plan has been determined, site-specific factors lead to the identification of potential dredged material management alternatives. As required by USACE ER 1105-2-100, a Base Plan must be identified that represents the least-cost, environmentally acceptable, and technically feasible dredged material management alternative.

USACE has a three-year budget process for its O&M program: Year 1—USACE develops budget; Year 2—Congress reviews and appropriates the budget; Year 3—USACE spends the Year 1 budget appropriated by Congress. For context, in the spring of 2024, USACE was developing its Fiscal Year (FY) 2026 budget, Congress was reviewing the FY 2025 budget, and USACE was spending the FY 2024 budget. Congress has focused appropriation of funding on the highest value projects. Increasing federal fiscal constraints make maintaining the Bay federal navigation channels to their authorized depths more challenging for USACE. To maximize the effectiveness of its reduced budget nationally (i.e., to complete more dredging with appropriated funds), USACE has attempted to increase the use of government-owned hopper dredges in its fleet, as opposed to increasing the use of commercial hopper and clamshell dredges. USACE mainly uses two federally-owned hopper dredges in the SF Bay Area: the *Essayons*

and the *Yaquina*. Whether dredging is needed at a given site is dependent on shoaling; whether dredging is executed is dependent on funding. Shoaling is not constant. Different areas of SF Bay will experience sedimentation at different rates, and sedimentation in any one area will be different from year to year. Similarly, costs and funding for USACE's maintenance dredging program may vary annually.

Every dredging project has different challenges that can affect cost and schedule. Typical issues that can affect cost and schedule for any dredging project include design depth, project volume, dredging equipment type, dredge timing, local constraints (such as the ability to work 24 hours per day), weather, competition issues (including equipment availability), regulatory constraints, distance to disposal or placement sites, and any offloading or placement site costs. A host of other project-specific issues may also be relevant, including, but not limited to, whether sediment rehandling would be involved, any special dredging techniques or equipment that may be needed (e.g., for sediment of concern or when dredging adjacent to sensitive resources), whether or not compensatory mitigation is required (such as when eelgrass is present or take of special-status species would occur), or if contractors demand a premium for last-minute projects (USACE 2013a). Budget availability often affects how early in the dredging window a project can start. Therefore, although USACE's maintenance program includes prescribed dredging cycles for each channel, it is difficult to predict the frequency of dredging for all projects.

1.4 Environmental Setting

In SF Bay, the study area spans the shoreline and marine areas of the following 11 counties: Marin, Sonoma, Napa, Solano, Sacramento, San Joaquin, Contra Costa, Alameda, Santa Clara, San Mateo, and San Francisco (Figure 1-1). The geographic scope of the study area comprises the estuarine waters of the SF Bay region, portions of the Sacramento-San Joaquin River Delta (Delta) west of Sherman Island. Outside the Golden Gate, the study area includes SF-DODS, the San Francisco Bar Channel Placement Site (SF-8), and the nearshore zone off Ocean Beach, as well as the waters used by vessels en route to these sites. Detailed descriptions of the environmental setting are presented in each of the resource area discussions presented in Chapter 3 of this document.

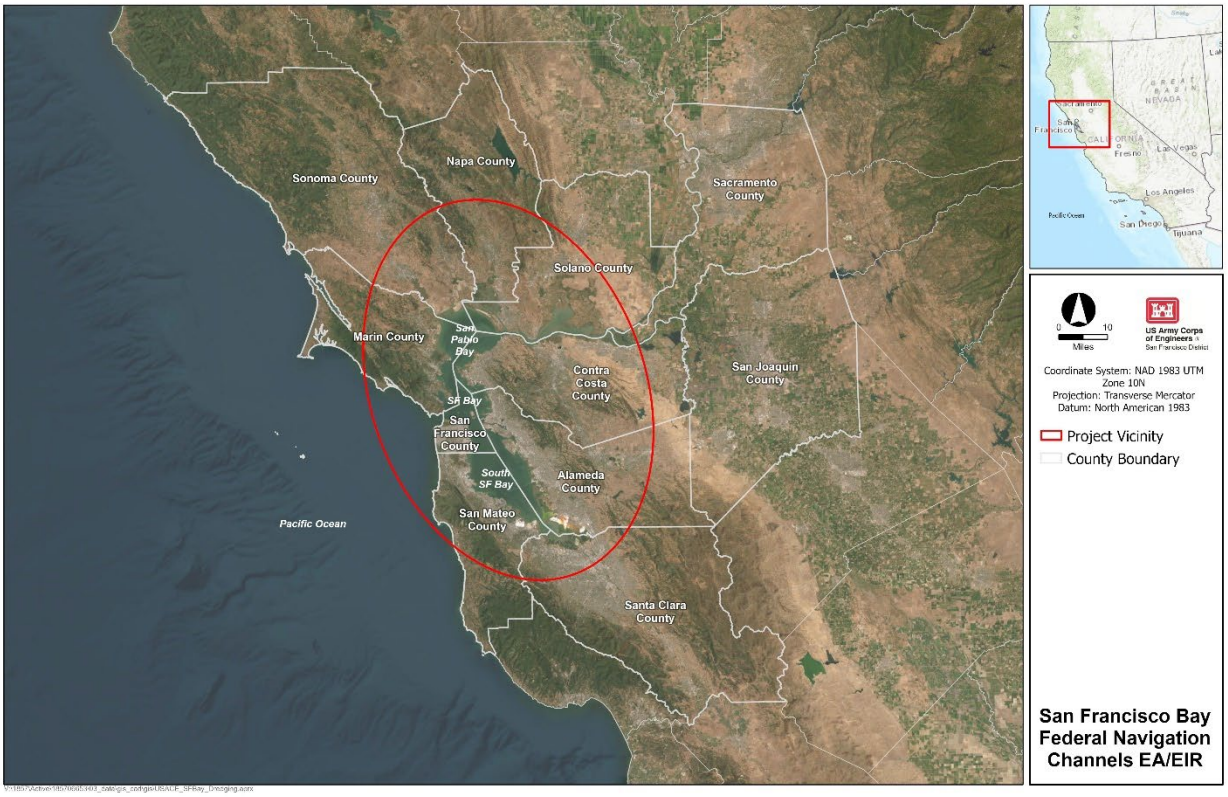


Figure 1-1. Regional Context for San Francisco Bay Federal Channels Operation and Maintenance Dredging and Sediment Placement Activities

1.5 Overview of Federal Navigation Channels Maintenance Dredging

The Proposed Project involves the continuation of historically authorized maintenance dredging of the federal navigation channels in SF Bay to remove sediment and return the channels to authorized (or otherwise appropriate) depths to provide safe, reliable, and efficient waterborne transportation systems (channels, harbors, and waterways) for the movement of commerce, national security needs, and recreation (Figure 1-2). Where practicable, the project would be aligned with the goals of the LTMS in the SF Bay Region program, as described in the 1998 LTMS Final Environmental Impact Statement/EIR (USACE et al. 1998) and the 2001 LTMS Management Plan (USACE et al. 2001).

1.5.1 Regional Dredged Material Management Plan

To the maximum extent possible, dredging will be consistent with navigation project authorizations and the 20-year Regional Dredged Material Management Plan (RDMMP), a companion document to this Draft EA/EIR. In addition to identifying the Federal Standard Base Plan, a main goal of the 20-year RDMMP is to maximize BUDM opportunities, in line with command philosophy and District priorities, which may improve natural infrastructure by restoring critical ecosystem habitat; enhancing flood protection for low-

lying, historically disadvantaged and socially vulnerable communities; and increasing regional resiliency to climate change hazards including SLR (USACE 2024a). Additionally, the RDMMP sets a foundation for a cooperative permitting framework that reduces redundancy and unnecessary delays in permit processing.

1.5.2 Location and Description of Federal Navigation Channels and Placement Sites

USACE maintains 12 federal navigation channels in SF Bay (Figure 1-2). Oakland Harbor, Redwood City Harbor, Richmond Harbor, San Francisco Harbor (MSC only, no in-Bay Sites), San Pablo Bay/Mare Island Strait, and Suisun Bay Channel, are all dredged annually or semi-annually. Napa River Channel, Petaluma River Channel, and San Rafael Creek Channel are dredged on cycles between 4 to 7 years, as necessary. Suisun Slough Channel and San Leandro Marina (Jack D. Maltester Channel) are authorized but dredged much less frequently; these will not be dredged during the planning horizon of this Draft EA/EIR and are not included in the evaluation.

Table 1-1 provides the authorized dimensions, type of dredge equipment commonly used, dredging cycle (i.e., frequency of dredging), last fiscal year the project was dredged, and the historic dredged material placement site for each project. Authorized dimensions are the depth and width of the channel authorized by Congress to be constructed and maintained by USACE, while regulatory dimensions refer to channel dimensions at a project location that would continue to be limited to the design. Detailed descriptions of the proposed dredging actions for each of the federally authorized ship channels are presented below. Table 1-2 lists dredged material placement type categories with example placement locations.

Introduction

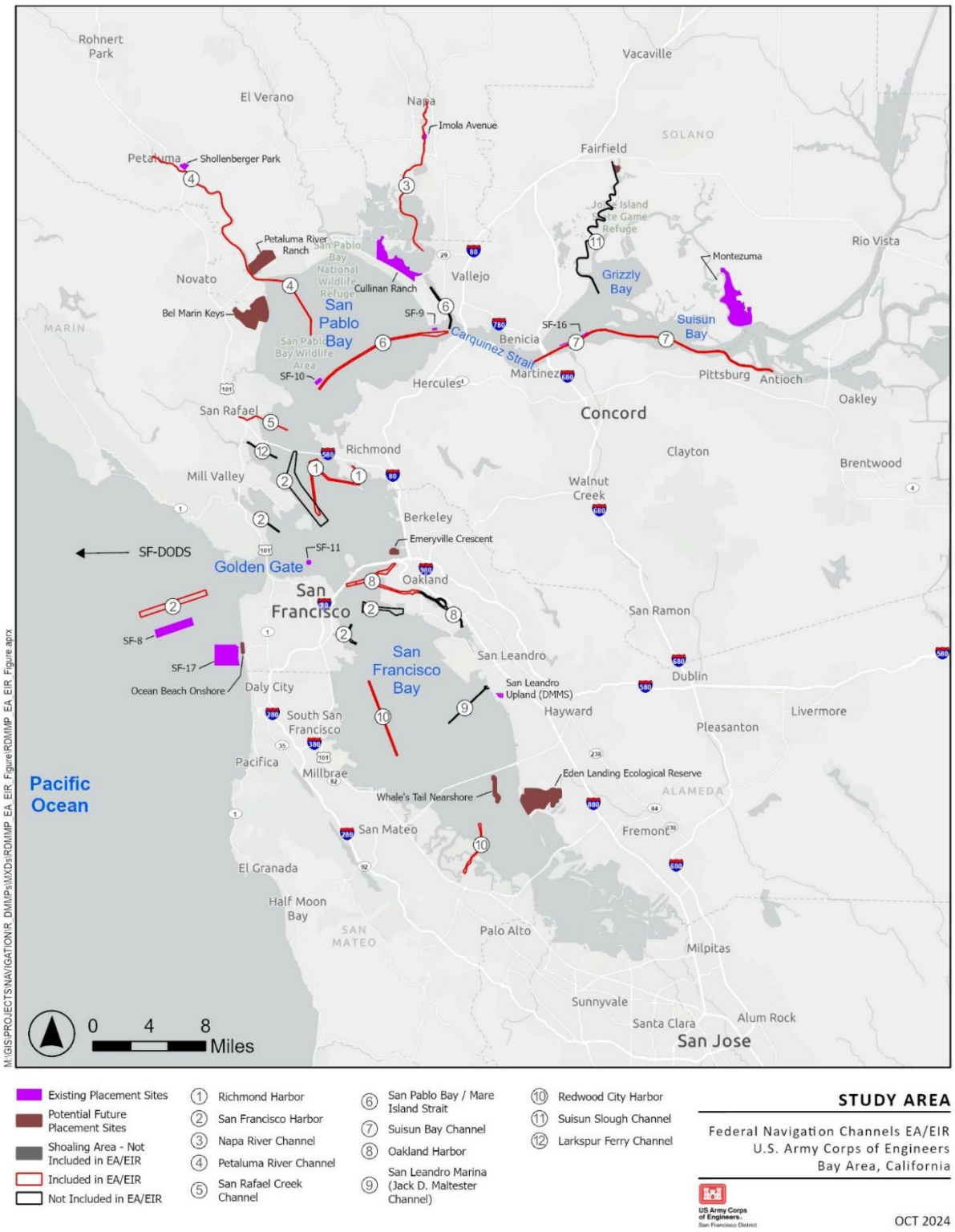


Figure 1-2. Authorized Dredging Projects and Placement Sites in the Study Area

Table 1-1. Current USACE-Maintained Federal Navigation Channels in San Francisco Bay

Dredge Location	Authorized Depth (feet below Mean Lower Low Water)[1]	Length (feet)	Width (feet)	Area (acres)	Dredge Type	Dredging Recurrence (years)	Last Dredged (Fiscal Year)[2]	Historical Placement Site10
Oakland Harbor								
Entrance Channel (Outer Harbor)	50	3,600	1,050	87	Clamshell	1	2024	SF-DODS, SF-11 (prior to 1999), MWRP, Cullinan Ranch, Winter Island, Hamilton Wetlands Restoration Project[3]
Oakland Inner Harbor	50	21,100	600 - 950	402	Clamshell	1	2024	SF-11, SF-DODS, MWRP, Cullinan Ranch
Oakland Outer Harbor	50	16,720	600 - 1000	374	Clamshell	1	2024	SF-11, SF-DODS, MWRP Cullinan Ranch
Brooklyn Basin South Channel	35	14,380	600	187	-	-	-	-
Brooklyn Basin North Channel	25	4,900	450	54	-	-	-	-
Tidal Canal	18	8,760	300	63	-	-	-	-
Redwood City Harbor								
Entrance Channel	30	15,500	300 – 410	132	Clamshell	1	2024	SF-11, MWRP, Cullinan Ranch
Outer Turning Basin	30	2,200	400 - 900	35	Clamshell	1	2024	SF-11, MWRP, Cullinan Ranch
Connecting Channel	30	1,300	400	12	Clamshell	1	2024	SF-11, MWRP
Inner Turning Basin	30	1,849	400-900	30	Clamshell	1	2024	SF-11, MWRP, SF-DODS
Inner Channel	30	7,000	150	24	Clamshell	1	2024	SF-11, MWRP
San Bruno Shoal	30	30,000	500	344	Clamshell//Hopper	1	2005	SF-10/SF-11
Richmond Harbor								
Southampton Shoal	45	17,179	600	277	Hopper	2	2024	SF-11, SF-10
Outer Harbor at Long Wharf	45	4,920	600	341	Hopper	2	2024	SF-11, SF-10
Inner Harbor Entrance Channel	41[4]	20,000	600	459	Clamshell	1	2024	SF-DODS, Cullinan Ranch, MWRP
Inner Harbor Approach Channel	41[4]	8,000	730	101	Clamshell	1	2024	SF-DODS, Cullinan Ranch, MWRP
Santa Fe Channel	30	2,420	200	11	Clamshell	12	1999	SF-DODS
Point San Pablo Channel	20	2,000	150	7	Clamshell	ID	-	SF-DODS

Introduction

Dredge Location	Authorized Depth (feet below Mean Lower Low Water)[1]	Length (feet)	Width (feet)	Area (acres)	Dredge Type	Dredging Recurrence (years)	Last Dredged (Fiscal Year)[2]	Historical Placement Site10
San Francisco Harbor								
MSC (Bar Channel)	55	16,000	2,000	735	Hopper	1	2024	SF-8, Ocean Beach Demonstration Site (SF-17)
Marinship Channel (Richardson Bay)	20	11,120	300	110	-	ID	1982	
Alameda Point Navigation Channel	37	15,430	1,000	588	-	ID	1994	
North Ship Channel	45	31,230	3,900	2,402	-	ID	-	SF-8, SF-11
West Richmond Channel	45	-	-	-	-	ID	-	
Islais Creek Shoal	40	8,890	500	137	-	ID	1977	
Presidio Shoal[5]	40	Varying widths and lengths	Varying widths and lengths	-	-	-	-	
Black Point Shoal[5]	40	Varying widths and lengths	Varying widths and lengths	-	-	-	-	
Alcatraz Shoal[5]	40	Varying widths and lengths	Varying widths and lengths	-	-	-	-	
Point Knox Shoal[5]	35	Varying widths and lengths	Varying widths and lengths	-	-	-	-	
San Pablo Bay/Mare Island Strait								
Pinole Shoal*	35	40,000	600	799	Hopper	2	2023	SF-10, SF-9 SF-8
Mare Island Strait	35	17,750	600		Clamshell/Hopper	ID	1994	
Suisun Bay Channel								
Main Channel (including Bulls Head Reach[6])	35	73,300	350	575	Clamshell	1	2024	SF-16, MWRP, Cullinan Ranch
New York Slough	35	23,170	400	212	Clamshell	1	2024	
South Sea Island Channel	25	5,600	250	32	Hopper	Infrequent	1994	SF-16, SF-9
Napa River Channel								
Lower Napa River Channel (Mare Island Strait Causeway to Asylum Slough)	15[7]	84,480	100	194	Cutterhead-Pipeline/Clamshell	6–11	1999	Imola, or other upland (sponsor-provided) placement site
Upper Napa River Channel (Asylum Slough to Third Street)	9[8]	16,800	75	34	Cutterhead-Pipeline/Clamshell	6–11	2022	Imola, or other upland (sponsor-provided) placement site
Petaluma River Channel								
Across the Flats	8	25,000	200	115	Clamshell	4–7	2020	SF-10
River Channel	8	21,760 (n) 54,370 (s)	100	52 (n) 125 (s)	Clamshell, Cutterhead-Pipeline	4–7	2020	Shollenberger, beneficial use in 2024
San Rafael Creek Channel								
Across the Flats	8	10,000	100	23	Clamshell	7	2022	SF-10, SF-11, SF-DODS
Inner Canal Channel	6	8,900	60	12	Clamshell	4	2022	SF-10, SF-11, SF-DODS, Winter Island
Turning Basin	6	200	100	0.5	Clamshell	4	2022	SF-10, SF-11, SF-DODS
San Leandro Marina (Jack D. Maltester Channel)								
Main Access Channel	8	18,550	200	80	Cutterhead-Pipeline	4–7	2009	Upland
Interior Access Channel	8	1,860	125	6	Cutterhead-Pipeline	4–7	2009	Upland

Introduction

Dredge Location	Authorized Depth (feet below Mean Lower Low Water)[1]	Length (feet)	Width (feet)	Area (acres)	Dredge Type	Dredging Recurrence (years)	Last Dredged (Fiscal Year)[2]	Historical Placement Site10
Suisun Slough Channel								
Suisun Slough Channel	8	80,290	200	257	Clamshell	ID	1991	Upland
Larkspur Ferry Channel								
Larkspur Ferry Channel[9]	13	12,580	230	70	Clamshell	4–7	2022	SF-10, SF-11

Note: Shaded rows are dredge project location that will not be dredged by USACE in the planning horizon of this Draft EA/EIR

[1] Some federally authorized channels are not maintained to their authorized depth. See individual notes
[2] Last dredging period only includes the past 10 years.
[3] Winter Island was a one-time placement site due to unavailability of Montezuma Wetlands Restoration Project.
[4] Richmond Inner Harbor Channel is authorized to -41 feet MLLW, but, maintained to -38 feet MLLW.
[5] Shoal location where rocks were removed.
[6] USACE recently requested authority approval to increase advance maintenance dredging at Bulls Head Reach from -37 to -39 feet starting in fiscal year 25.
[7] Lower Napa River Channel is authorized to -15 feet MLLW, but is maintained at -9 feet MLLW.
[8] Upper Napa River Channel is authorized to -10 feet MLLW, but is maintained at -9 feet MLLW.
[9] USACE last dredged Larkspur Ferry Channel in 2003 pursuant to the Continuing Authorities Program, Section 107 of the Rivers and Harbors Act of 1960, as directed by Congress in WRDA 1986 and 1999. Since that time, the project has been maintained by the non-federal sponsor, Golden Gate Bridge Highway and Transportation District[10] Beneficial use sites have been used for placement in the past to mitigate for work occurring outside of the NMFS work window (see Section 2.3.1.5).

Key: *In addition to O&M dredging, sea trial dredging will occur in some years at Pinole Shoal. Each episode would generate between 10,500 and 12,000 CY of material. See Sea Trial section below for more information.
- Information not available
Cullinan Ranch = Cullinan Ranch Restoration Project
ID = indefinite deferral
MLLW = Mean Lower Low Water
MWRP = Montezuma Wetlands Restoration Project
MSC = Main Ship Channel
SF-8 = San Francisco Bar Channel Placement Site
SF-9 = Carquinez Strait placement site
SF-10 = San Pablo Bay placement site
SF-11 = Alcatraz Island placement site
SF-16 = Suisun Bay placement site
SF-17 = Ocean Beach Demonstration Site

Table 1-2. Dredge Material Placement Type Categories

Placement Type Category	Example Placement Location
Existing Beneficial Use Sites	
Upland Direct Placement Sites	Cullinan Ranch Restoration Project, Montezuma Wetlands Restoration Project
Nearshore Strategic Placement Site	SF-17 (Ocean Beach Nearshore Placement Site)
Transitional Placement Sites	
Bar Channel Placement Site	SF-8 (San Francisco Bar Channel Placement Site)
In-Bay Placement Sites	SF-9 (Carquinez Strait Placement Site), SF-10 (San Pablo Bay Placement Site), SF-11 (Alcatraz Placement Site), SF-16 (Suisun Bay Placement Site)
Upland (Sponsor-Provided) Sites	Shollenberger Park, Imola Avenue
Deep Ocean Disposal	SF-DODS
Possible Future Beneficial Use Placement Site	
Upland Direct Placement Sites	Bel Marin Keys, Skaggs Island (Haire Ranch), Southern Eden Landing Ecological Reserve, Alviso Ponds (A8 Complex), Ocean Beach Onshore, Surfers Beach, Stinson Beach Onshore
Nearshore Strategic Placement Sites	Bel Marin Keys Nearshore (proximal to Petaluma River and Across the Flats Channel), Cogswell Marsh Nearshore (proximal to Oakland Inner and Outer Harbor and Redwood City Harbor Channels), Emeryville Crescent Nearshore (proximal to Oakland Outer Harbor Channel), Faber Tract (proximal to Redwood City Harbor Channel), Giant Marsh Nearshore (proximal to San Pablo Bay Pinole Shoal Channel), Ryer Island Nearshore (proximal to Suisun Bay Channel), Stege Marsh Nearshore (proximal to Richmond Inner Harbor Channel), Stinson Beach Nearshore (proximal to MSC), Surfers Beach Nearshore (proximal to MSC), Whale's Tail Nearshore (proximal to Redwood City Harbor Channels)
Elevation Augmentation/Marsh Spraying Sites	Bothin Marsh, Sears Point
Water Column Seeding Sites	Arrowhead Marsh, Corte Madera Marsh, Faber Tract, Pond A6 (Knapp Tract), Ravenswood

Key: MSC = Main Ship Channel
SF-8 = San Francisco Bar Channel Placement Site
SF-9 = Carquinez Strait placement site
SF-10 = San Pablo Bay placement site
SF-11 = Alcatraz Island placement site
SF-16 = Suisun Bay placement site
SF-17 = Ocean Beach Demonstration Site

1.5.2.1 Description of USACE-Managed Federal Navigation Channels

USACE-maintained federal navigation channels in SF Bay are described in the following sections. See Figure 1-2 for channel locations; channel detail figures are provided in the subsections below. Figures 1-3 to 1-11 depict the locations of the authorized dredging channels included in the study area. These channel detail figures also depict placement sites, which are described in Section 1.5.2.2.

Oakland Harbor

Oakland Harbor includes the Entrance Channel, Outer Harbor Channel, Inner Harbor Channel, Brooklyn Basin South Channel, Brooklyn Basin North Channel, and Tidal Canal. Oakland Harbor (Figure 1-3) is in the City of Oakland, on the eastern shore of Central SF Bay immediately south of the San Francisco-Oakland Bay Bridge. Construction of, improvements to, and maintenance dredging of the federal project were accomplished pursuant to the following authorities: the Rivers and Harbors Act of 1910; Rivers and Harbors Appropriations Act of 1917; Rivers and Harbors Act of 1927; Rivers and Harbors Act of 1930; Rivers and Harbor Acts of 1945; Rivers and Harbors Act of 1962; and the WRDA of 1986. Deepening of the Entrance Channel, Outer Harbor Channel, and Inner Harbor Channel to 50 feet below MLLW was completed early in 2010. The Port of Oakland is the non-federal sponsor for the Oakland Harbor project.

The Entrance Channel, Outer Harbor Channel, and Inner Harbor Channel are typically dredged annually using clamshell-bucket equipment; these areas were last dredged in 2024. Dredged material from Oakland Harbor has typically been less than 80 percent sand. Prior to 1999, all dredged material from Oakland Harbor was placed at SF-11; since 1999, it has been placed at SF-DODS and SF-11, with BUDM site placement occurring to mitigate for impacts to salmonids when work must occur outside the NMFS work window (see Section 2.3.1.5). Dredge material from Oakland Harbor was also recently placed at upland direct placement sites, Cullinan Ranch Restoration Project (Cullinan Ranch) and MWRP Montezuma Wetlands Restoration Project (MWRP), for tidal wetland restoration. Some material has also been taken to Winter Island and Hamilton Wetlands Restoration Project for work not related to USACE O&M dredging or mitigation; these sites are no longer being used.

The Brooklyn Basin and Tidal Canal portion of this authorized project is not anticipated to be dredged within the planning horizon, and therefore is not a part of the Proposed Project and is not addressed in this Draft EA/EIR.

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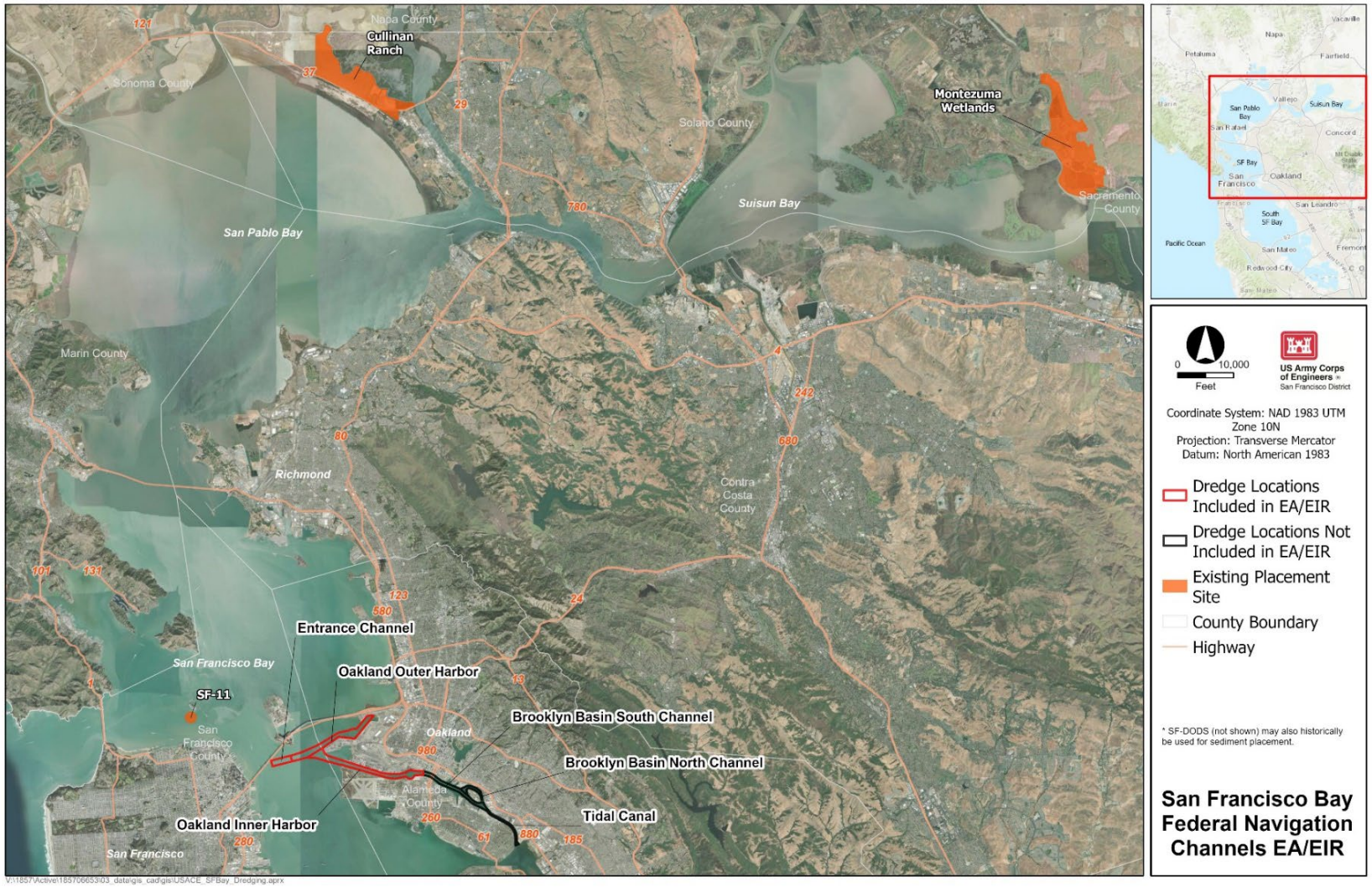


Figure 1-3. Dredge Locations and Material Placement Areas for Oakland Harbor

Redwood City Harbor

The Port of Redwood City (Figure 1-4) is approximately 18 nautical miles south of San Francisco on the western side of South SF Bay. It provides deep-draft access to the mid-Peninsula and San Jose metropolitan areas. Redwood City Harbor is situated within the confines of Redwood Creek, and consists of the harbor Entrance Channel, the Outer Turning Basin, Connecting Channel, the Inner Turning Basin, and Inner Channel, along with San Bruno Shoal. The Inner Channel mainly supports recreational craft, and is currently not maintained by the federal government. The federal channels were authorized the Rivers and Harbors Acts of 1884, 1902, 1910, 1930, 1945, and 1950. The Port of Redwood City is the non-federal project sponsor.

Redwood City Harbor was last deepened in 1962. Project maintenance provides for dredging of the channels and turning basins, which range in width from 300 feet to 900 feet, to 30 feet below MLLW. The Entrance Channel, Outer Turning Basin, Connecting Channel, and Inner Turning Basin were historically dredged every one to two years using clamshell-bucket equipment. As of 2024, they are dredged annually; these areas were last dredged in 2024. San Bruno Shoal is dredged using a hopper dredge at 10-year intervals or greater and was last dredged in 2005. Dredged material from Redwood City Harbor channels has typically been less than 80 percent sand and has primarily been placed at SF-11 and SF-10. Though it has not been recently used, the Federal Standard Base Plan for San Bruno Shoal material is identified as SF-DODS. When work must occur outside the NMFS work window, Redwood City Harbor Channel sediment is placed at beneficial use sites to mitigate for impacts to salmonids (see Section 2.3.1.5).

Introduction

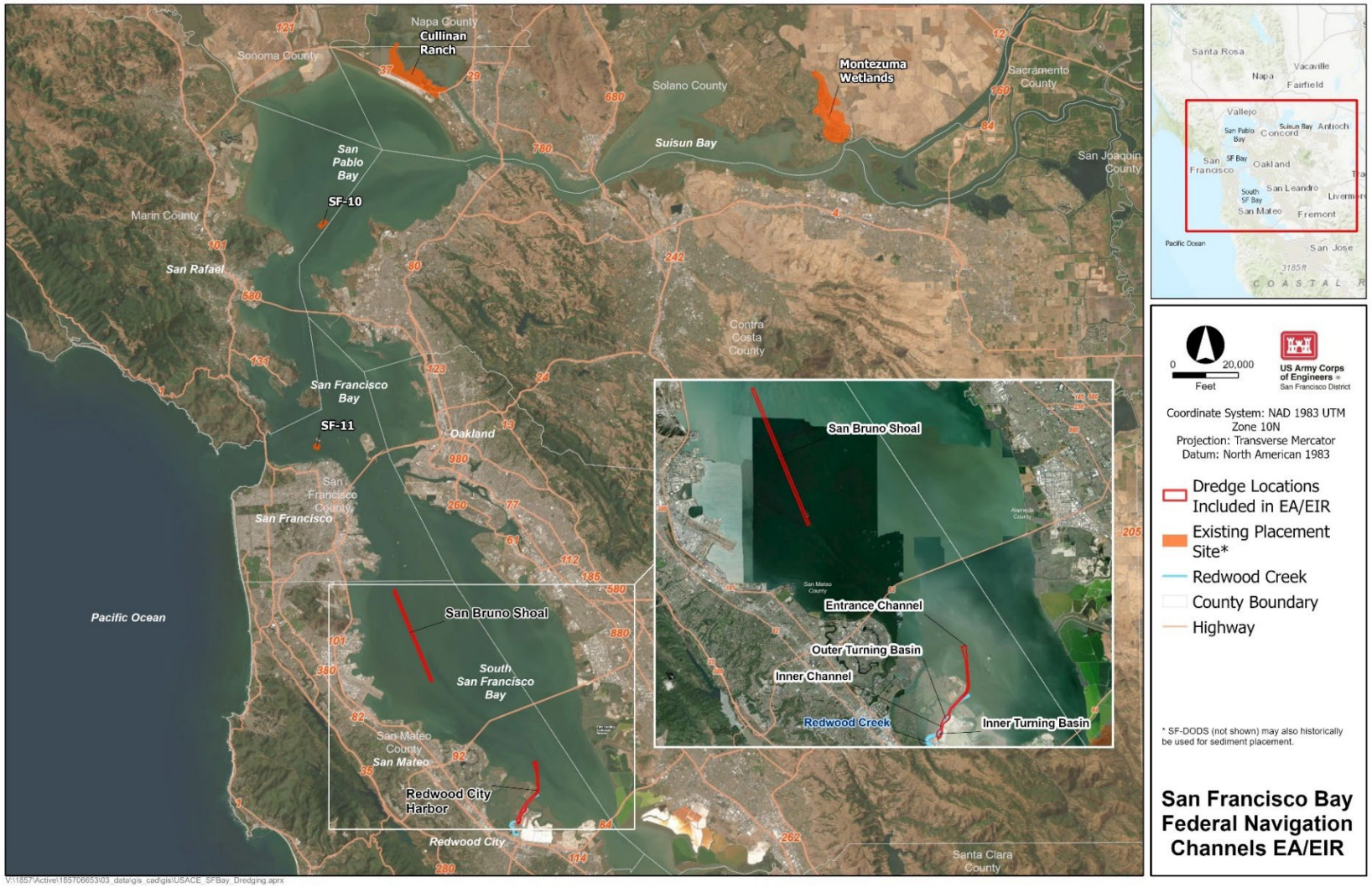


Figure 1-4. Dredge Locations and Material Placement Areas for Redwood City Harbor

Richmond Harbor

Richmond Harbor (Figure 1-5) consists of the Inner Harbor and Outer Harbor. Construction of the federal channel in Richmond Inner Harbor was authorized by the Rivers and Harbors Act of 1917, as amended. Construction of the Outer Harbor was authorized under the Rivers and Harbors Act of 1935, as amended. The Port of Richmond is the non-federal sponsor for the Richmond Harbor Project.

Richmond Outer Harbor is on the eastern side of Central SF Bay within the boundaries of Contra Costa County, with the exception of the Southampton Shoal Channel, which is predominately in San Francisco County (Figure 1-5). Project maintenance provides for annual dredging of the Outer Harbor Channel 600 feet wide to a depth of 45 feet below mean lower low water (MLLW), from Southampton Shoal in Central SF Bay to the Richmond Long Wharf, including the maneuvering area. Richmond Outer Harbor was last deepened in 1965 to 45 feet below MLLW. Richmond Outer Harbor provides deep-draft navigation access to the Richmond Long Wharf and Port of Richmond marine terminals. Deep-draft tankers use the harbor for loading and offloading petroleum products at the Chevron Long Wharf facility. Last dredged in 2024, Richmond Outer Harbor is typically dredged with a hopper dredge, although bucket-clamshell equipment has been used on occasion. Dredged material from the Outer Harbor has typically been less than 80 percent sand and placed at SF-10, with the Alcatraz Island placement site (SF-11) being used as an alternate placement location.

The Richmond Inner Harbor (Figure 1-5) is on the eastern side of Central SF Bay within the boundaries of Contra Costa County. The Inner Harbor consists of the Inner Harbor Entrance Channel, Inner Harbor Approach Channel, and the Santa Fe Channel. Project maintenance provides for annual dredging of the Inner Harbor Entrance Channel 600 feet wide to 38 feet below MLLW to Point Richmond; the Inner Harbor Approach Channel 500 feet wide to 38 feet below MLLW to a 1,260-foot-diameter turning basin at Point Potrero, and then 850 feet wide to 38 feet below MLLW to the Santa Fe Channel; and the Santa Fe Channel, which is 200 feet wide and 30 feet below MLLW. Richmond Inner Harbor was last deepened to 38 feet below MLLW in 1998. The current depth of the entire Inner Harbor is 38 feet below MLLW, with an allowable overdepth of 2 feet; the Inner Harbor has not previously been dredged to—nor is it maintained at—its federally authorized depth of 41 feet below MLLW. The Inner Harbor Channel provides commercial navigation access to privately owned and City of Richmond-owned marine terminals, including the Point Potrero Marine Terminal. Richmond Inner Harbor, except for the Santa Fe Channel, is typically dredged annually using clamshell-bucket equipment. Richmond Inner Harbor was last dredged in 2024, except for the Santa Fe Channel, which has not been dredged since 1999. Since 2014, dredged material from the Inner Harbor has typically been less than 80 percent sand and placed at SF-DODS, MWRP, and Cullinan Ranch (USACE 2024b).

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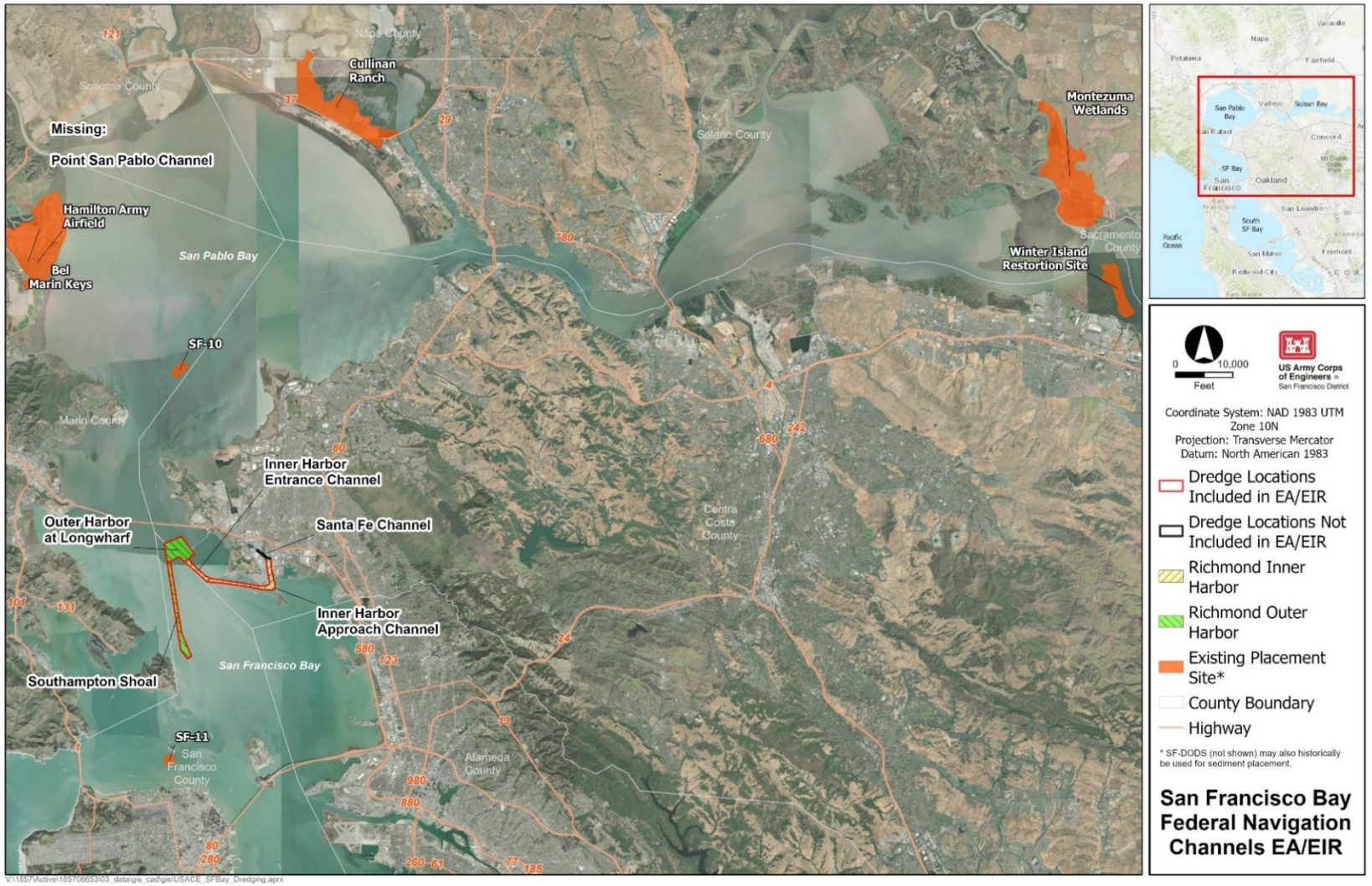


Figure 1-5. Dredge Locations and Material Placement Areas for Richmond Harbor

Introduction

Material from some parts of the Upper Inner Harbor Channel (UIHC), which includes the Santa Fe Channel, may exceed the screening criteria for in-Bay placement and upland use due to elevated levels of pesticides, metals, polycyclic aromatic hydrocarbons (PAH), dioxins, and furans. These contaminants are related to the adjacent United Heckathorn Superfund Site and other legacy industrial activities along the shoreline. USACE currently dredges only to Station 217+02, which stops just short of the Santa Fe Channel. Based on the results of sediment chemistry, bioassay and bioaccumulation testing performed in 2018, material from the UIHC and the Santa Fe Channel did not meet the screening criteria for placement in unconfined aquatic in-Bay sites, including SF-11. Material from some portions of the UIHC could be used as foundation material for the MWRP. All the material from the UIHC met the sediment chemistry, bioassay, and bioaccumulation screening criteria for disposal at SF-DODS (USACE 2018).

San Francisco Harbor

San Francisco Harbor (Figure 1-6) consists of a deep-draft navigation channel (MSC or Bar Channel) immediately offshore SF Bay on the San Francisco Bar; and in-Bay components. Construction of a federal channel on the San Francisco Bar was authorized by the Rivers and Harbors Act of 1935, as amended, Pub. L. No. 74-409, 49 Stat. 1028 (August 30, 1935). The Main Ship Channel (MSC) was last deepened in 1974. Current project depth is 55 feet below MLLW, with an allowable overdepth of 2 feet. As a regional multi-user channel, the MSC does not have a non-federal sponsor.

The MSC (Figure 1-6) is approximately 5 miles west of the Golden Gate Bridge and extends across the arc-shaped, submerged San Francisco Bar in the Gulf of the Farallones. It is approximately 16,000 feet long and 2,000 feet wide. The MSC is the only deep-draft ocean entrance to SF Bay and is used by all ocean-going shippers to SF Bay and inland ports. It is typically dredged annually and was last dredged in May and June 2024. The MSC must be dredged with a hopper dredge because it is the only type of dredge that can safely operate at this channel due to the combination of depth and open-sea wave conditions. Even with the hopper dredge, weather conditions can present safety concerns and preempt dredging of the MSC. Dredged material from the MSC is greater than 80 percent sand and has been placed at SF-8 and at the Ocean Beach Nearshore Placement site (SF-17), also known as the Ocean Beach Demonstration Site.

In-Bay components of San Francisco Harbor include Marinship Channel in Richardson Bay, Alameda Point Navigation Channel, Berkeley Marina Channel, Northship Channel, West Richmond Channel, and several shoal areas (Figure 1-6). These areas are not anticipated to be dredged within the planning horizon, and therefore are not addressed in this Draft EA/EIR.

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Figure 1-6. Dredge Locations and Material Placement Areas for San Francisco Harbor

San Pablo Bay (Pinole Shoal)/Mare Island Strait

The San Pablo Bay and Mare Island Strait project consists of the Pinole Shoal Channel and Mare Island Strait. The Pinole Shoal Channel (Figure 1-7) is in Contra Costa County, in southern San Pablo Bay. The federal Pinole Shoal Channel was authorized by the Rivers and Harbors Act of 1917, as amended. As a regional multi-user channel, the Pinole Shoal project does not have a non-federal sponsor.

Pinole Shoal Channel provides deep-draft navigation in and through San Pablo Bay. Shipping operations out of the Port of Stockton, Port of Sacramento, Suisun Bay, San Pablo Bay, and Carquinez Strait make the channel a significant waterway. In addition to being a major link in the navigation system to the inland ports of Sacramento and Stockton, the Pinole Shoal Channel allows deep-draft access to several oil refineries adjacent in the vicinity of Carquinez Strait. Pinole Shoal Channel is used for commercial traffic, including deep-draft, merchant, and oil tanker vessels. It also provides navigational access for recreational boaters to many marinas and small individual docks.

The San Pablo Bay project provides for maintenance dredging of both Pinole Shoal and Mare Island Strait. The Pinole Shoal portion is a 600-foot-wide channel to a depth of 35 feet below MLLW, which is approximately 11 miles long, in San Pablo Bay across Pinole Shoal with a maneuvering area adjacent to Oleum Pier at the mouth of Carquinez Strait (i.e., the Pinole Shoal Channel). The Mare Island Strait portion in composed of a 600-foot-wide channel to 30 feet below MLLW through Mare Island Strait, flaring to a turning basin generally 1,000 feet wide, from former Dike Number 6 to within 75 feet south of the causeway between Mare Island and Vallejo; and a channel to 30 feet below MLLW up the Napa River, except at the northerly end, at the City of Vallejo Marina, where the project depth is 26 feet below MLLW. The Mare Island Strait portion of this authorized project is not anticipated to be dredged within the planning horizon, and therefore is not a part of the Proposed Project, and not addressed in this Draft EA/EIR.

The Pinole Shoal Channel is typically dredged with a hopper dredge; however, bucket-clamshell equipment has occasionally been used to dredge the channel. Pinole Shoal Channel was last dredged in 2023. The sediment composition of dredged material from Pinole Shoal Channel varies along the channel, with the eastern and western ends of the channel typically being sandy. Dredged material from Pinole Shoal Channel is typically placed at SF-10, and also has been placed in small amounts at SF-8 and SF-9. When work must occur outside the NMFS work window, sediment is placed at beneficial use site to mitigate for impacts to salmonids (see Section 2.3.1.5).

The channel is authorized for a depth of 45 feet below MLLW but is only maintained to a depth of 35 feet below MLLW plus 2 feet of allowable overdepth (i.e., total maintained depth of 37 feet below MLLW). In 2009 and 2010, USACE conducted 2 feet of advance maintenance in areas that tended to aggressively shoal. This included the southern edge of the channel, between buoy markers 10 and 12; and further east along the northern edge of the channel, starting at buoy marker 11 to just east of buoy 13. The extent of the advance maintenance dredging in these two areas was 200 feet wide and 2 feet deep.

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Figure 1-7. Dredge Locations and Material Placement Areas for San Pablo Bay and Mare Island Strait

Introduction

Beginning in 2011, the lower end of Pinole Shoal Channel was slightly realigned to the north. The realigned channel experiences substantially less shoaling than the old alignment, and thus requires less dredging. Since the realignment of the channel, advance maintenance dredging has not been required.

Suisun Bay

Suisun Bay Channel consists of Bulls Head Reach, Suisun Bay Main Channel, New York Slough, and the South Seal Island Channel. The Suisun Bay Channel (Figure 1-8) is in Suisun Bay, 30 miles northeast of San Francisco, in the counties of Contra Costa and Solano. The Rivers and Harbors Act of 1919 authorized the construction of a federal channel in Suisun Bay. Construction of the New York Slough Channel was authorized by the Rivers and Harbors Act of 1927, as amended. Suisun Bay Channel was deepened to 35 feet below MLLW in 1960; Bulls Head Reach and New York Slough were deepened to 35 feet below MLLW in 1968. Contra Costa County is the non-federal project sponsor.

This channel is an integral part of the SF Bay to Stockton project, providing deep-draft access to the Pacific Ocean from the inland ports of Stockton and Sacramento. The 300-foot-wide Main Channel runs 25,000 feet along the southern shore of Suisun Bay through Point Edith and Middle Ground Shoals to the mouth of New York Slough at Pittsburg. It includes Bulls Head Reach, which extends from the Benicia Bridge to the Avon Pier. New York Slough stretches from Pittsburg to Antioch, approximately 4 miles. The Suisun Bay Channel and New York Slough are maintained to a depth of 35 feet below MLLW. The Main Channel and New York Slough are typically dredged annually using clamshell-bucket equipment and were last dredged in 2024. Dredged material from Suisun Bay Channel has typically been greater than 80 percent sand and has been placed at the Suisun Bay placement site (SF-16) and occasionally the Carquinez Strait placement site (SF-9).

At Bulls Head Reach, past maintenance has included dredging up to 4 feet of advance maintenance material to accommodate rapid shoaling. Because of the variable shoaling rate at this location, this practice is reviewed annually to determine if it remains effective. In the case of Bulls Head Reach Shoal, USACE typically elects to perform advance maintenance every year because that area shoals faster than the annual dredging cycle, and it is essential for USACE to maintain the utility of the channel as long as possible before needing to address any shoaling issues outside of the work window. In recent years, advance maintenance at Bulls Head Reach has reduced USACE’s critical dredging episodes outside of the work window. When work must occur outside the NMFS work window, sediment is placed at beneficial use site to mitigate for impacts to salmonids (see Section 2.3.1.5)

As of 2023, USACE Suisun Bay Main Channel material upstream of Station 200+00 must be disposed at Suisun Bay placement site (SF-16). This material must stay within proximity of the channel because of the non-zero chance of containing remnants from the Port Chicago explosion on July 17, 1944.

The South Seal Island portion of this project is not anticipated to be dredged within the planning horizon; it therefore is not a part of the Proposed Project, and is not addressed in this Draft EA/EIR.

Introduction

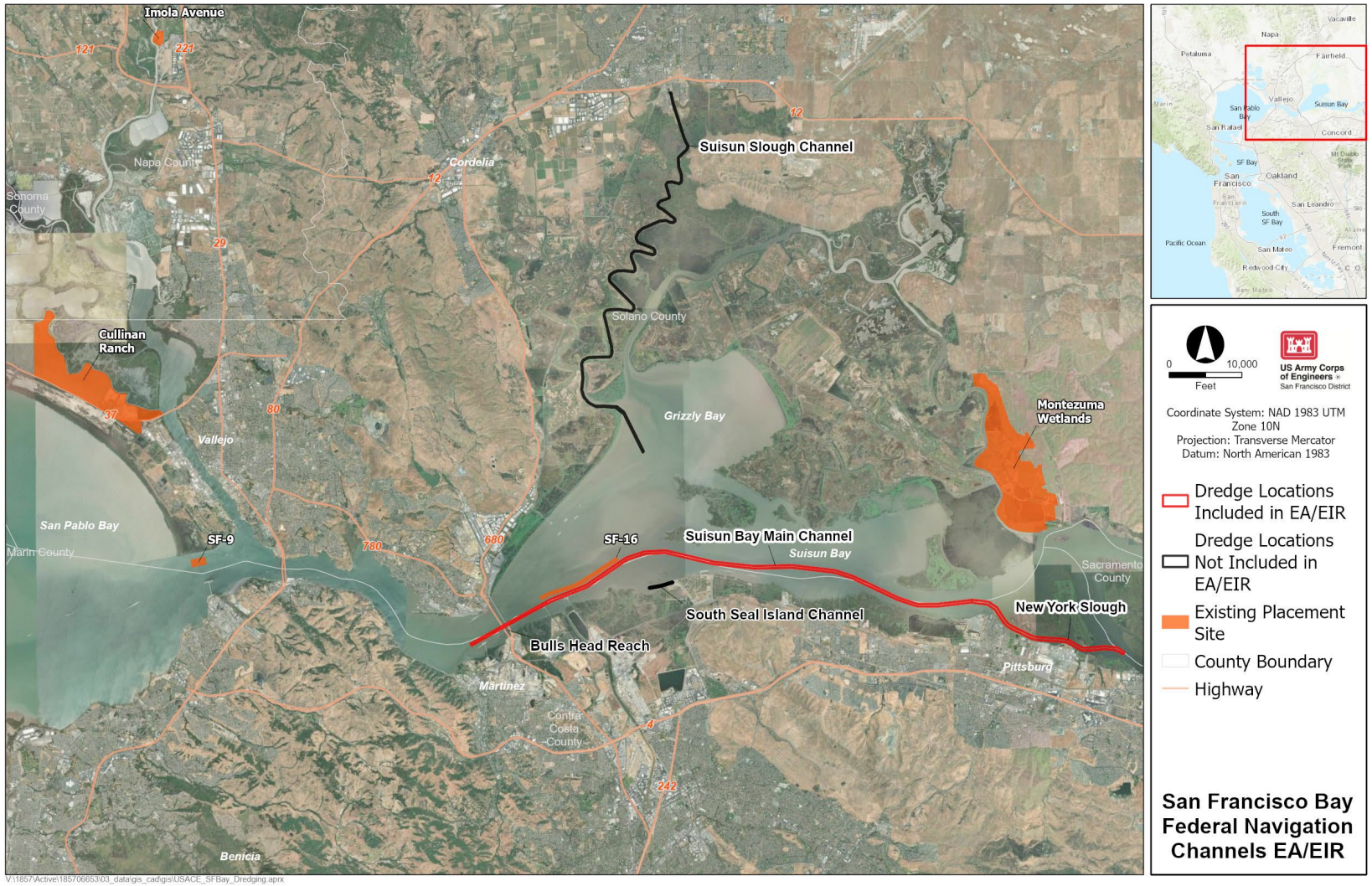


Figure 1-8. Dredge Locations and Material Placement Areas for Suisun Bay Channel

Napa River

The Napa River Channel consists of a downstream reach from Mare Island Strait Causeway to Asylum Slough, and an upstream reach from Asylum Slough to Third Street (Figure 1-9). The channel is a shallow-draft, predominately light commercial and recreational channel. The Rivers and Harbors Acts of August 30, 1935, and July 24, 1946, authorized construction and maintenance of the navigation channel in the Napa River. The Napa County Flood Control and Water Conservation District is the non-federal sponsor for the Napa River project.

Project maintenance provides for dredging of the Napa River Channel to a depth of 15 feet below MLLW from Mare Island Strait Causeway to Asylum Slough, and to a depth of 10 feet below MLLW to the head of navigation at the Third Street Bridge in the City of Napa; the channels were deepened to these depths in 1952. The project is approximately 100 feet wide and 16 miles long. Dredging has historically been conducted using a hydraulic cutterhead dredge or clamshell. Dredged material from the Napa River has typically been less than 80 percent sand and placed at the upland (sponsor-provided) sites. The Napa River is on a six-year dredging cycle. The Upper Napa River was last dredged in 2022 and the Lower Napa river in 1999.

Petaluma River

The Petaluma River Channel (Figure 1-10) consists of two segments: one known as Across the Flats starting in San Pablo Bay and going up to the mouth of the river; and another in the River Channel. The Petaluma River Channel was authorized by the Rivers and Harbors Act of 1930, as amended. The Petaluma River (Figure 1-10) is in Sonoma and Marin counties, California, on San Pablo Bay. The City of Petaluma is the non-federal sponsor for the Petaluma River project.

Project maintenance provides for dredging the channel 200 feet wide to a depth of 8 feet below MLLW for the Across the Flats segment, and 100 feet wide to 8 feet below MLLW thereafter to Western Avenue in Petaluma (River Channel), including a turning basin 300 to 400 feet wide to 8 feet below MLLW. Both segments were initially dredged to a depth of 8 feet below MLLW in 1933. Dredging has been conducted using clamshell-bucket equipment for Across the Flats, and a hydraulic cutterhead or clamshell-bucket dredge for the upriver channel. Dredged material from Across the Flats has typically been less than 80 percent sand and placed at the San Pablo Bay placement site (SF-10). When work must occur outside the NMFS work window at Across the Flats, sediment is placed at beneficial use site to mitigate for impacts to salmonids (see Section 2.3.1.5). Dredged material from the River Channel has typically been less than 80 percent sand, and has been placed at upland (sponsor-provided) sites. The Across the Flats Channel is on a three-year dredging cycle, and the River Channel is on a four-year dredging cycle. The Petaluma River Channel, and Across the Flats have not been dredged since 2020.

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Figure 1-9. Dredge Locations and Material Placement Areas for Napa River Channel

Introduction



Figure 1-10. Dredge Locations and Material Placement Areas for Petaluma River Channel

San Rafael Creek

San Rafael Creek Channel (Figure 1-11) consists of the Across the Flats Channel, Inner Canal Channel, and a 200-foot-wide turning basin near the western terminus of the Inner Canal Channel. San Rafael Creek is north of SF Bay in Marin County. This project is a shallow-draft, predominately light commercial and recreational channel. 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 Rivers and Harbors Act of March 2, 1919. The channels were deepened in 1925. The City of San Rafael is the non-federal project sponsor.

Project maintenance provides for dredging the Across the Flats Channel in SF Bay to the mouth of San Rafael Creek to a depth of 8 feet below MLLW (plus 2 feet of allowable overdepth); and 6 feet below MLLW (plus 2 feet of allowable overdepth) for the Inner Canal Channel to the head of navigation at the Grand Street Bridge in the City of San Rafael. On average, Across the Flats is dredged every seven years, and the Inner Canal Channel and turning basin are dredged every four years. Across the Flats was last dredged in 2020 to a depth of 5 feet below MLLW. The Inner Canal Channel was last dredged in 2022; the turning basin was last dredged in 2022. Dredging has historically been conducted using clamshell-bucket equipment or a hydraulic cutterhead dredge. Dredged material has typically been less than 80 percent sand and placed at SF-11. In 2002 and 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; this material was placed at Winter Island in 2002. Downstream of Station 175+00, the shoaling is relatively “clean,” and is deemed suitable for in-Bay placement. Follow-up analysis in June 2011 confirmed that there has been no downstream migration of the contaminated sediment beyond Station 175+00 since the 2010 sampling and testing event. SF-10 and SF-DODS also may be used for San Rafael Creek material placement. When work must occur outside the NMFS work window, sediment is placed at beneficial use site to mitigate for impacts to salmonids (see Section 2.3.1.5)

Recent confirmation sediment testing in the Inner Canal Channel 2022 indicates no significant migration of contaminated material from upstream locations. The data results for metals, PCBs, PAHs, organotoxins, total DDT and dioxins/furans all indicate no significant changes in channel sediment chemistry and no migration of material from higher concentration areas. The consistent shoaled volumes and consistent, or lower, concentrations of constituents indicate that the channel is stable and unchanged since the April 2021 sampling effort (USACE 2022a).

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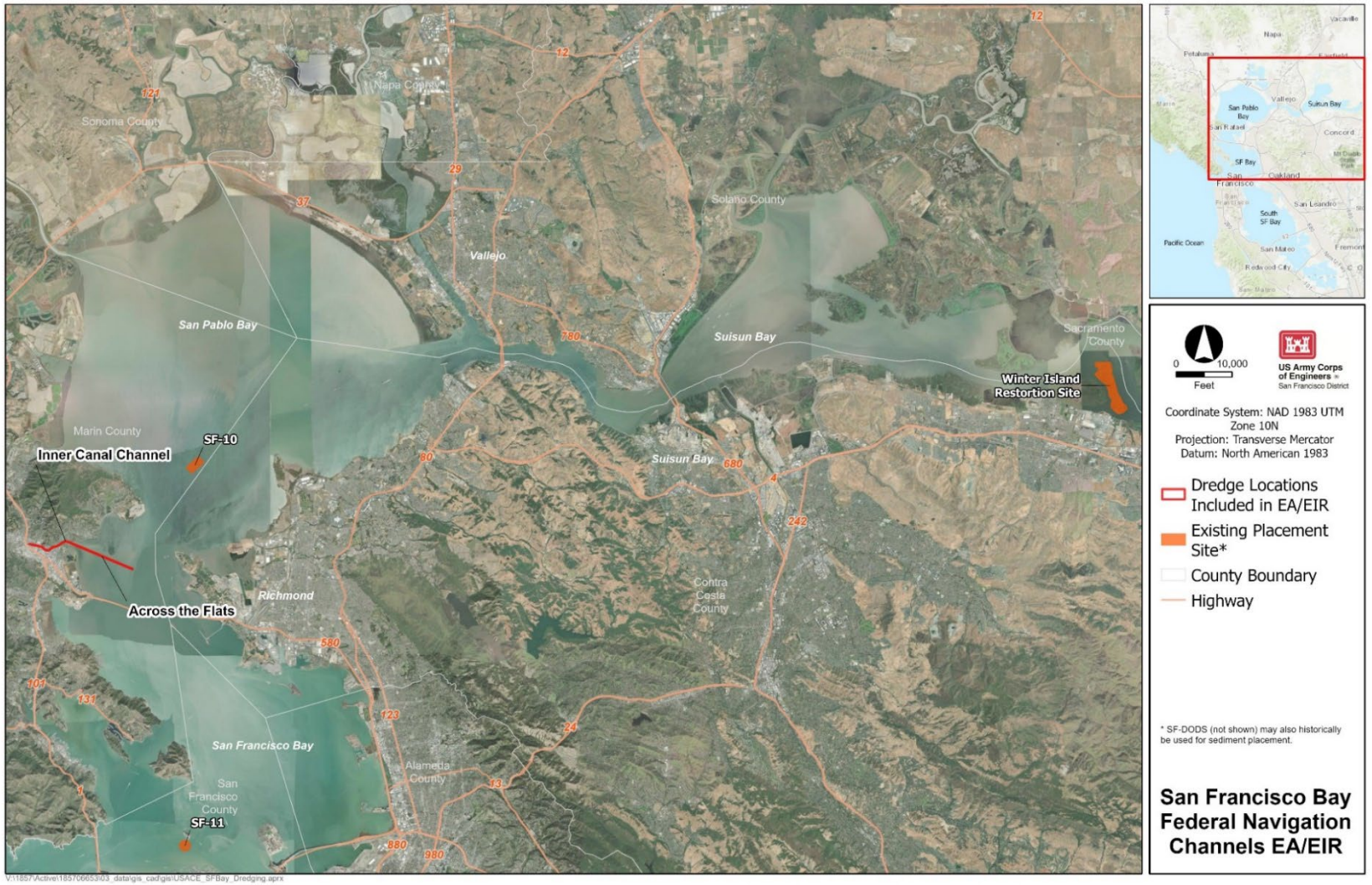


Figure 1-11. Dredge Locations and Material Placement Areas for San Rafael Creek Channel

Sea Trials

In addition to the dredging of the federal navigation channels described above, USACE may perform "sea trials," which involves dredging that is a necessary component of the maintenance and repair of its hopper dredges, the *Essayons* and/or *Yaquina*. Sea trials occurred in 2016 for the *Essayons* and 2019 for the *Yaquina*. Following the completion of dry dock work, the dredges must undergo standard calibration and testing of all the systems. The Proposed Project includes an estimate of three sea trials over the 10-year project horizon. Sea trials are usually conducted at Pinole Shoal for about three to five days between mid-January to late March, depending on when the ship emerges from dry dock. Each episode would generate between 10,500 and 12,000 CY of mostly sandy material, and the material would be placed at SF-11. SF-8 serves as a backup if time and weather conditions allow. Any material placed outside the window will have an equivalent amount placed at a suitable beneficial use upland site per the conditions of the LTMS BiOp (NMFS 2015).

1.5.2.2 Description of Placement Sites

After sediment is dredged from navigation channels, the dredged material is transported to either disposal or placement sites. Use of term "disposal" in this Draft EA/EIR is consistent with definition provided in USACE's memorandum on *Expanding Beneficial Use of Dredged Material in the USACE* (2023a). "Disposal" is defined as the placement of material in an area where the material is anticipated to remain in place and have no measurable benefit. In open-water placement sites, nondispersive sites are considered disposal; in confined placement sites, disposal applies if the material is not intended to be offloaded for another beneficial use. Transitional placement is defined as keeping sediment in the riverine or coastal system as a part of a management process or in a period of transition. USACE and the Regional Water Board acknowledge that application of "placement" terminology for in-Bay sites differs from terminology used for these sites by most LTMS agencies, including the terminology used by the Regional Water Board in its Basin Plan.

The regional geographic location of in-Bay and ocean placement and ocean disposal sites currently in use or expected to be used during the 10-year planning horizon is presented in Figure 1-2 and Table 1-2. BUDM placement sites are presented in Figure 1-2 and discussed below. The Proposed Project's use of placement and disposal sites is described under the description of the alternatives in Chapter 2.

There are costs associated with use of all sites; these costs vary depending on the dredge equipment used, proximity of the navigation channel to the placement or disposal site, and any applicable tipping fees,[13] among other factors. Typically, the Federal Standard Base Plan placement site is used; however, dredging contractors may propose other permitted upland locations as an alternative to the placement or disposal site or sites identified in a given solicitation for maintenance dredging contracts, so long as the cost to the federal government of the site is comparable to the cost of the Federal Standard Base Plan. All necessary environmental documentation, including regulatory and resource agency review and

[13] A tipping fee is the cost/price per cubic yard dredgers would pay to compensate the contractor's (or other entity's) work to install and operate equipment (pipeline, barges, etc.), prepare the site to receive dredged material, and manage the site during dredged material placement operations.

approvals, must be completed for a site prior to receiving any dredged material from the federal channels maintained by USACE.

Existing Beneficial Use Sites

BUDM is the reuse of dredged sediment for construction, levees, tidal wetland restoration or other projects. Existing upland and nearshore placement sites for BUDM are described below; locations are depicted on channel figures in Section 1.5.2.1 where applicable. Not all beneficial use sites will provide the same benefits. For example, sites that restore or supplement tidal wetlands provide benefits to native and endangered species, water quality, and shoreline infrastructure, while levee maintenance primarily provides benefits to shoreline infrastructure.

Upland Direct Placement Sites

Upland direct placement beneficial use sites[14] are those where sediment is transported and placed at desired locations for the purposes of wetland restoration or beach nourishment. These placements occur at or above the water level (Bay or ocean depending on type of placement) between the intertidal and supratidal zones.

Cullinan Ranch Restoration Project

Cullinan Ranch is part of the San Pablo Bay National Wildlife Refuge (Figure 1-2). The USFWS operates the site for the purpose of increasing habitat for salt marsh harvest mouse and Ridgway's rail by restoring diked baylands to historic tidal marsh conditions. The southern property boundary is a naturally formed levee that is the base for State Highway 37. Cullinan Ranch is permitted to restore approximately 290 acres of tidal marsh habitat through the importation of approximately 2.8 million CY of dredged material via an offloading facility temporarily located in the Napa River near its confluence with Dutchman Slough, which accommodates deep-draft barges. Cullinan Ranch is still an active placement site as of 2024, permitted by the Regional Water Board R2-2010-0108.

Montezuma Wetlands Restoration Project

MWRP is a privately owned and operated site of approximately 1,800 acres adjacent to Montezuma Slough in Solano County (Figure 1-2); the owner/operator is Montezuma Wetlands LLC. MWRP has indicated there are two phases of the project remaining, which could accommodate up to 30 million CY of sediment. Imported material is being used to create wetlands. The site can accept both cover and foundation quality material. MWRP is still an active placement site as of 2024, permitted by the Regional Water Board R2-2012-0087.

[14] Upland direct placement BU sites may include upland habitat, which is not typically inundated, as well as wetland habitat that is periodically or permanently inundated, such as tidal freshwater and saltwater marshes. Existing upland direct placement sites considered in this document are wetland restoration sites.

Nearshore Strategic Placement Site, SF-17 (Ocean Beach Nearshore Placement Site)

The Ocean Beach Nearshore Placement Site, SF-17, which includes the Ocean Beach Demonstration Site, is in waters of the Pacific Ocean adjacent to the south-of-Sloat-Boulevard stretch of Ocean Beach, and outside of the southern section of the San Francisco Bar (Figure 1-2). SF-17's eastern boundary is approximately 0.35 mile offshore from the back-beach bluff; its center is 4 miles southwest of SF-8; and the site's area is 3.3 square miles. Water depths along the shoreward boundary range from approximately 25 to 35 feet below MLLW, and depths along the seaward boundary ranges from approximately 37 to greater than 50 feet below MLLW. Although SF-8 (see subsequent section) was established to disperse sandy material dredged from the San Francisco Bar Channel within the littoral cell[15], sufficient material has not reached the southern reach of Ocean Beach to protect infrastructure from storm damage. The Ocean Beach Demonstration Site was chosen as a demonstration site because it is in a location where waves can potentially feed sediment toward that reach of Ocean Beach, which may ultimately help mitigate ongoing shoreline erosion in the area that threatens expensive municipal infrastructure, including segments of the Great Highway.

Transitional Placement Sites

In transitional placement, sediment is placed in a riverine or coastal system as a part of a management process or for a temporary period. This material will generally be re-dredged or managed for some other purpose (USACE 2023a). Transitionally placed sediment is expected to disperse throughout the system.

SF-8, San Francisco Bar Channel Placement Site

The SF-8 placement site is a 15,000- by 3,000-foot-wide rectangle 7,500 feet south of the San Francisco Bar Channel in the Pacific Ocean (Figure 1-2). Depths at SF-8 range from approximately 30 to 45 feet below MLLW. Disposal is limited to sandy material dredged by USACE from the San Francisco Bar Channel. However, the easternmost portion of SF-8 is within the 3-mile limit, and sand from non-USACE SF Bay Area dredging projects can be permitted there as BUDM for beach nourishment. The trapezoidal portion of SF-8 that is within the 3-mile limit is approximately 3,000 feet long by 430 feet at its northern end; and 1,000 feet wide at its southern end. There is no set limit on disposal at SF-8.

It was expected that sand placed at SF-8 would eventually move shoreward to the surf zone and beach; however, surveys indicate that spreading occurs at a much slower rate than expected. Operation reports from the captain of USACE's hopper dredge *Essayons* state that vessel maneuverability is impaired during times of rough seas because sand is being placed faster than it disperses. Instead of dispersing, sand has mounded and remained on site to the point that safe operation of the *Essayons* (and other large hopper dredges) in much of the SF-8 footprint is often restricted or precluded during the rough seas that commonly occur on the San Francisco Bar. Shoaling at SF-8 was unexpected because pre-site-designation studies concluded that the area would be dispersive, meaning that waves would spread the

[15] Littoral cells are self-contained beach compartments with distinct sediment movement characteristics that are geographically separated from other cells (Patsch and Griggs 2006).

sand at such a rate that accumulation would be minimal. SF-8 remains a placement site option; however, because of this shoaling, USACE limits the use of SF-8 to the extent feasible.

In-Bay Placement Sites

The four in-Bay placement sites include:

- **SF-9, Carquinez Strait Placement Site**: A 1,000-foot by 2,000-foot rectangle, approximately 10 to 55 feet deep, 0.9 mile west of the entrance to Mare Island Strait in eastern San Pablo Bay in Solano County (Figure 1-2). Placement is limited to 1.0 million CY of dredged material per month and a maximum of 3.0 million CY per year during wet or above-normal water flow years, and 2.0 million CY per year during all other years.
- **SF-10, San Pablo Bay Placement Site**: A 1,500-foot by 3,000-foot rectangle, approximately 30 to 45 feet deep, 3.0 miles northeast of Point San Pedro in southern San Pablo Bay in Marin County (Figure 1-2). Placement is limited to 500,000 CY of dredged material per year.
- **SF-11, Alcatraz Placement Site**: A 1,000-foot-radius circular area, approximately 40 to 70 feet deep, approximately 0.3 mile south of Alcatraz Island in the Central Bay (Figure 1-2). Since at least 1972, SF-11 has been the most heavily used placement site in SF Bay. Placement is currently regulated at a maximum of 400,000 CY per month from October to April; and 300,000 CY per month from May to September. Placement is limited to 4.0 million CY of dredged material per year.
- **SF-16, Suisun Bay Placement Site**: A single-user in-Bay unconfined placement site reserved for sand dredged from the Suisun Channel and New York Slough projects only. SF-16 is a 500-foot by 11,200-foot rectangle adjacent to the northern side of Suisun Bay Channel, approximately 1 mile upstream of the Interstate 680 Bridge (Figure 1-2). The depth at this site is approximately 30 feet below MLLW. Currently, the site is authorized to receive 200,000 CY of dredged sand per year.

Upland (Sponsor-Provided) Sites

Two existing upland (sponsor-provided) sites, Shollenberger Park and Imola Avenue, are described below.

- **Shollenberger Park**: Confined placement ponds at the City of Petaluma's Shollenberger Park are used for placement of sediment dredged from the Petaluma River and permitted by the Regional Water Board under R2-1992-080. Petaluma purchased this 165-acre ranch along the Petaluma River to use for dredged material placement. In 1975, an agreement was reached between Petaluma and the former California Department of Fish and Game (now CDFW) regarding management of the site. Pursuant to this agreement, Petaluma dedicated, in perpetuity, the 80-acre Alman Marsh for open space and fish and wildlife uses. The City also executed an open-space deed restriction for approximately 65 acres of the dredged material placement site. Petaluma continues to protect and maintain Alman Marsh and the 65-acre area. In 2002, Petaluma began the formal process to continue using the Shollenberger site as a decant area for dredged material. In response to resource agency requirements pertaining to salt marsh harvest

mouse habitat on the site, Petaluma proposed development and implementation of a management, maintenance, and monitoring plan to operate a 48-acre mitigation site adjacent to the dredged material placement site. Petaluma prepared the Shollenberger Marsh Plan and constructed a berm to separate the mitigation area from the dredged material placement area. As of 2024, the Shollenberger site is at capacity and cannot take any additional dredged material. The City of Petaluma has proposed moving sediment to another parcel or site to create additional capacity but has not found a suitable placement site at this time.

- **Imola Avenue**: The Napa County Flood Control and Water Conservation District's Imola Avenue dredged material rehandling site is in the City of Napa on the eastern bank of the Napa River, at the previous location of the Napa Sanitation District. The overall capacity of the Imola Avenue site is 55,000 CY permitted by the Regional Water Board under R2-2016-0040. Material must be dredged via the hydraulic cutterhead method to be placed at this site, because material must be pumped as a slurry. During placement of dredged material, any decant water is discharged into Tulocay Creek, which joins the Napa River to the west.

Deep Ocean Disposal, SF-DODS

Approximately 55 nautical miles west of the Golden Gate Bridge, SF-DODS is the farthest offshore and deepest (8,000 to 10,000 feet) dredged material placement site in the United States. SF-DODS is authorized to receive up to 4.8 million CY of dredged material per year. Data from the period beginning in 2012 and ending in 2021, which is the past 10 years of available data, shows annual disposal at SF-DODS for all dredging projects in SF Bay (not just the federal navigation channels maintained by USACE) has averaged 760,509 CY/year (DMMO Annual Reports). From 2006 through 2013, the amount of dredged material placed annually at SF-DODS by USACE ranged from 0 CY to 1,473,200 CY and averaged 471,590 CY. Annual monitoring by USACE has confirmed that disposal at SF-DODS has occurred without causing significant impacts on the ocean and the marine biology in and around SF-DODS.

Sediment disposed at SF-DODS can have levels of contaminants slightly above that of sediment placed at in-Bay placement sites. Therefore, the LTMS EIS/EIR determined disposal at SF-DODS to be environmentally superior to placement of the same material at the traditional unconfined placement sites in the more sensitive Estuary.

Possible Future Beneficial Use Placement Sites

In its 2023 RDMMP planning charrette, USACE, along with approximately 70 attendees from various state and federal agency partners, resource and regulatory agencies, industry, dredgers, stakeholders and interested parties, and environmental nonprofits, identified additional placement sites as possible future sites for BUDM. Environmental review processes have not been completed for these sites and there is insufficient information available to fully analyze the potential impacts of placing dredged material at these locations in this Draft EA/EIR. Potential impacts related to use of these sites are disclosed on a broad level in Chapter 3 because these sites may become authorized placement sites within the 10-year planning horizon for this document. Use of these sites by USACE would be conditioned upon the completion of supplemental environmental review under NEPA and/or CEQA, and upon acquisition of

required environmental approvals from resource and regulatory agencies. The ability of USACE to use a given site for placement would be dependent on the accessibility of the site to different dredge equipment, types of dredged material authorized for placement at the site, cost, and other parameters. Potential future beneficial use placement sites are described in the RDMMP and listed below:

- **Upland Direct Placement Sites**: Potential sites include Bel Marin Keys, Skaggs Island (Haire Ranch), Southern Eden Landing Ecological Reserve, Alviso Ponds (A8 Complex), Ocean Beach Onshore, Pacifica Onshore, Surfers Beach, and Stinson Beach Onshore.
- **Nearshore Strategic Placement Sites**: This is the placement of sediment in the shallow subtidal (or potentially intertidal) environment with the expectation that tidal and wave forces will transport that sediment onto the intertidal mudflat and marsh. Building upon the Eden Landing Whale's Tail 2023 pilot project, the RDMMP team in coordination with non-federal partners and based on feedback received during the June 2023 planning charrette, identified several opportunities to implement future nearshore strategic placement pilot projects. Potential sites include: Bel Marin Keys Nearshore (proximal to the Petaluma River and Across the Flats Channel), Cogswell Marsh Nearshore (proximal to the Oakland Inner and Outer Harbor and Redwood City Harbor Channels), Emeryville Crescent Nearshore (proximal to the Oakland Outer Harbor Channel), Faber Tract (proximal to the Redwood City Harbor Channel), Giant Marsh Nearshore (proximal to the San Pablo Bay Pinole Shoal Channel), Ryer Island Nearshore (proximal to the Suisun Bay Channel), Stege Marsh Nearshore (proximal to the Richmond Inner Harbor Channel), Stinson Beach Nearshore (proximal to the MSC), and Surfers Beach Nearshore (proximal to the MSC), and Whale's Tail Nearshore[16] (proximal to the Redwood City Harbor Channel).
- **Elevation Augmentation/Marsh Spraying Sites**: This is the transport of sediment by pipeline to an existing marsh and the use of a modified pipeline offloader to fan the sediment over top of the existing marsh plain to provide an elevation boost of inorganic sediment, thus facilitating continued natural organic marsh sedimentation. Potential sites include Bothin Marsh in Marin County and Sears Point in Sonoma County.
- **Water Column Seeding Sites**: This is the transport of dredged sediment to the mouth of an existing tidal marsh channel using a modified pipeline offloader, and the placement of that sediment on a flood tide to leverage the tidal flux into the marsh channel and facilitate sediment deposition on the slack high tide. Potential Sites include Arrowhead Marsh, Corte Madera Marsh, Faber Tract, Pond A6 (Knapp Tract), and Ravenswood.

For descriptions of these types of future beneficial use placement sites and/or descriptions of the individual sites above, see the companion RDMMP to this Draft EA/EIR.

[16] Preliminary evaluation of Whale's Tail was conducted under a pilot program that was implemented in December 2023, in which sediment was place in shallow subtidal areas to evaluate transport to intertidal mudflat and marsh areas under tidal and wave forces.

1.6 Regulatory Authorities

Key federal and state laws applicable to of regulation USACE's maintenance dredging program and the development of this Draft EA/EIR are summarized below.

1.6.1 Federal Laws

Key federal laws applicable to of regulation USACE's maintenance dredging program and the development of this Draft EA/EIR are summarized in the following sections. Additional detail on federal laws and regulations specific to resource areas evaluated in this Draft EA/EIR is provided in Regulatory Setting sections in Chapter 3.

1.6.1.1 Operation and Maintenance of the US Army Corps of Engineers Civil Works Projects Involving the Discharge of Dredged or Fill Material into Waters of the United States or Ocean Waters (33 C.F.R. pt. 335-338)

USACE's maintenance dredging program, including discharge of dredged or fill material into waters of the United States and transportation of dredged material for the purpose of disposal into ocean waters, is regulated under 33 C.F.R. pt. 335-338. Part 335 identifies applicable laws and provides relevant definitions, including the Federal Standard. Part 336 describes factors to be considered in the evaluation of USACE dredging projects involving the discharge of dredged material into waters of the United States and ocean waters, including compliance with Section 404(b)(1) of the CWA, and Section 103 of the MPRSA. Part 337 addresses practice and procedures to be followed in implementing state requirements, responding to emergency actions, and notifying the public of disposal sites.

1.6.1.2 National Environmental Policy Act

NEPA (42 United States Code [U.S.C.] § 4331 et seq.), enacted by Congress and signed into law in 1970, was the first major environmental law in the United States. Under NEPA, federal agencies must assess the environmental effects of proposed major federal actions. The Council on Environmental Quality, which was established within the Executive Office of the President, oversees NEPA implementation by issuing guidance, reviewing procedures, and resolving disputes. NEPA outlines a process of environmental analysis and documentation to facilitate decision making that is better informed and includes public involvement (CEQ and California Governor's Office of Planning and Research [CalOPR] 2014). Under NEPA, the lead federal agency, in this case USACE, is the agency that proposes an action and supervises the preparation of an environmental document. This Draft EA/EIR is intended to fulfill the requirements of NEPA, the CEQ regulations (40 C.F.R. pt. 1500-1508), and USACE Procedures for Implementing NEPA (Engineer Regulation 200-2-2).

1.6.1.3 Clean Water Act

The Federal Water Pollution Control Act, or CWA (33 U.S.C. §§ 1251 et seq.) was enacted in 1972, to establish a structure to restore and maintain clean and healthy waters.

Section 401 (Certification)

Section 401 of the CWA (33 U.S.C. § 1341) requires states to issue WQCs for any activity that requires a federal permit or license, and that may result in discharge into navigable waters, defined in the CWA as "waters of the United States." Under the CWA, waters of the United States include traditional navigable waters and tributaries; impoundments of "waters of the United States;" territorial seas and interstate waters; and some wetlands, lakes, ponds, and streams. (33 C.F.R. Part 328, Final rule, published January 18, 2023). In areas subject to tidal influence, Section 404 jurisdiction extends to the high tide line or boundary of any adjacent wetlands.

In California, the State and Regional Water Boards have the authority to regulate these discharges and issue WQCs. A certification must set forth any effluent limitations and other limitations, and monitoring requirements necessary to assure that any applicant for a Federal license or permit will comply with any applicable effluent limitations and other limitations, under section 1311 or 1312 of the CWA, standard of performance under section 1316 of the CWA, or prohibition, effluent standard, or pretreatment standard under section 1317 of the CWA, and with any other appropriate requirement of State law set forth in such certification. (33 U.S.C. section 1341, subd. (d).) To issue a WQC, agencies must ensure compliance with sections 301, 302, 306, and 307 of the CWA, which address, respectively, effluent limitations, water-quality-related effluent limitations, national standards, and toxic and pretreatment effluent standards. The Regional Water Board issued WQC permits for USACE for maintenance dredging for 2015–2024 (Regional Water Board 2015, 2020). Development of this Draft EA/EIR provides the basis for the permit application for CWA Section 401 WQC.

Section 404 (Permits for Dredged or Fill Material)

Under Section 404 of the CWA (33 U.S.C. § 1344), USACE regulates the discharge of dredged and fill materials into waters of the United States. USACE implements Section 404 of the CWA, and USEPA has oversight authority (under Section 404c). Section 404(b)(1) of the CWA establishes procedures for the evaluation of permits, typically by states, for discharge of dredged or fill material into waters of the United States. The law is administered by USACE and USEPA. USACE does not issue permits for its own projects that discharge dredged or fill material into waters of the United States; however, USACE projects must comply with the requirements of the Section 404(b)(1) guidelines. The 2015 EA/EIR (USACE and Regional Water Board) included a Section 404(b)(1) analysis for fiscal years 2015 to 2024. This Draft EA/EIR includes Section 404(b)(1) analysis for continued maintenance dredging in compliance with the CWA (Appendix A).

1.6.2 State Laws

Key state laws applicable to of regulation USACE's maintenance dredging program and the development of this Draft EA/EIR are summarized in the following sections. Additional detail on state laws and regulations specific to resource areas evaluated in this Draft EA/EIR is provided in Regulatory Setting sections in Chapter 3.

1.6.2.1 California Environmental Quality Act

CEQA was signed into law in 1970, about eight months after the signing of NEPA. Similar to NEPA, CEQA requires public agencies to consider and disclose to the public the environmental implications of proposed actions, supporting informed decision making on projects and operations that may affect the environment (CEQ and CalOPR 2014). In addition, under CEQA, agencies are to minimize significant adverse environmental effects to the extent feasible. This Draft EA/EIR is intended to fulfill the requirements of CEQA and the CEQA Guidelines regarding the Water Board's issuance of a WQC. As a federal agency, USACE is not required to comply with CEQA.

1.6.2.2 McAteer-Petris Act

The McAteer-Petris Act, first enacted in 1965, created BCDC with a mandate to prepare a plan to protect SF Bay and its shoreline, and to provide for appropriate development and public access. The McAteer-Petris Act also gave BCDC the power and authority to limit fill, promote public access, prepare for rising sea levels, issue and deny permits within its jurisdiction (SF Bay waters and 100 feet above the shoreline). BCDC also reviews determinations of consistency with the CZMA for federally sponsored projects in SF Bay. The SF Bay Plan, first adopted in 1969 and most recently amended in 2019, is BCDC's policy document specifying goals, objectives, and policies for BCDC jurisdictional areas. BCDC has authority to enforce the CZMA under the policies of the Bay Plan, and USACE is required to be consistent, to the maximum extent practicable.

1.6.2.3 Porter-Cologne Act

The Porter-Cologne Water Quality Control Act, also known as the California Water Code, was established in 1969 and last amended in 2019. , Water Code sections 13000 et seq., (Porter-Cologne Act or Act) establishes a comprehensive statutory program for water quality control. The Act is administered by the State Water Resources Control Board and nine Regional Water Quality Control Boards (Regional Water Boards). The Regional Water Boards have primary responsibility for the adoption of waste discharge requirements (WDRs), which regulate the discharge of waste to waters of the state, and for the adoption of water quality control plans for all waters within their respective regions. See Water Code sections 13240, 13260, and 13263. Water quality control plans, or basin plans, consist of a designation for waters within a specified area of (1) beneficial uses to be protected, (2) water quality objectives, and (3) a program of implementation needed for achieving water quality objectives. Id. at section 13050(j). Waste discharge requirements must implement the relevant basin plan. Id. at section 13263. As a federal agency, USACE does not believe it is required to apply for WDRs; however, the Water Board may issue WDRs with the WQC.

1.6.3 Additional Key Environmental Compliance Requirements

USACE and the Regional Water Board, as the lead agencies, are responsible for documenting compliance with other relevant federal and state environmental laws and regulations, and USACE is responsible as the project lead for obtaining the regulatory permits needed to implement the chosen alternative. Table 1-3 lists the key required regulatory permits along with the authorizing agency. More detail on these regulations and relevant required coordination with the issuing agencies is discussed in the regulatory setting sections for each relevant resource area in Chapter 3, as appropriate. A complete list of the relevant federal, state, and local laws and regulations is provided in Appendix B.

Table 1-3. Additional Key Regulatory Requirements

Permits and Approvals	Relevant Resource Areas	Agency
Rivers and Harbors Act	Hazards and Hazardous Materials, Hydrology and Water Quality	USACE
Endangered Species Act Section 7 consultation	Biological Resources	USFWS, NMFS
EFH consultation. Sections 305(b)(1)(D) and 305(b) (2-4) of the Magnuson-Stevens Fishery Conservation and Management Act	Biological Resources	NMFS
Marine Protection, Resources, and Sanctuaries Act	Geology, Soils, and Sediment Quality, Hydrology and Water Quality	USACE
California Endangered Species Act coordination	Biological Resources	CDFW
CZMA Consistency Determination	Geology, Soils, and Sediment Quality, Hydrology and Water Quality, Land Use and Planning	BCDC

Key: BCDC = San Francisco Bay Conservation and Development Commission
CDFW = California Department of Fish and Wildlife
CZMA = Coastal Zone Management Act
EFH = essential fish habitat
NMFS = National Marine Fisheries Service
USACE = US Army Corps of Engineers
USFWS = US Fish and Wildlife Service

2.0 Proposed Project and Alternatives

This Draft EA/EIR includes six alternatives for detailed evaluation: the NEPA No Action Alternative, the CEQA No Project Alternative, and four action alternatives. The Proposed Action/Proposed Project Alternative is described in Section 2.4. This chapter also describes the alternatives development process and screening criteria, and the alternatives that were considered but not carried forward for detailed evaluation in this Draft EA/EIR.

2.1 National Environmental Policy Act and California Environmental Policy Act Requirements for Evaluation of Alternatives

2.1.1 General NEPA/CEQA Requirements

Both NEPA and CEQA Guidelines emphasize the need for an evaluation of a range of alternatives. The lead agencies are responsible for selecting the range of reasonable alternatives to the project. Because the lead agencies have determined that the level of significance of the potential environmental impacts of this project differ under NEPA and CEQA, they have elected to prepare a joint EA/EIR that involves different levels of detail in the review of alternatives under NEPA and CEQA. The joint NEPA/CEQA approach presents many opportunities for coordination and efficiency. There are, however, a few important differences between the NEPA and CEQA approach to alternatives analysis that are discussed in detail as part of the discussion of each alternative (CEQ and CalOPR 2014). Consistent with NEPA regulations and the CEQA Guidelines, USACE and the Regional Water Board considered a range of alternatives that: 1) could feasibly attain most of the basic project objectives; and 2) would avoid or substantially lessen any significant adverse impacts from the project.

2.1.2 Requirements Unique to the National Environmental Policy Act

NEPA requires that federal agencies explore and objectively evaluate a range of reasonable alternatives to a proposed federal action to provide a clear basis for choice among options by the decision-makers and the public (40 C.F.R. § 1502.14). Under NEPA, agencies are also required to describe and analyze a "no action" alternative. The No Action Alternative for an existing or ongoing federal project considers what would happen if the federal agency continued to operate and maintain the project as authorized with no changes. Thus, the No Action Alternative describes the continuation of the maintenance dredging program in SF Bay as authorized with no changes.[17]

[17] The No Action Alternative does not meet requirements for a feasible alternative under CEQA. Per CCR Title 14 Section 15364, feasible means "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors." Current regulatory constraints and dredging equipment limitations preclude USACE's ability to implement the No Action Alternative, thus the No Action Alternative is not technologically or environmentally feasible, respectively, per CEQA.

2.1.3 Requirements Unique to the California Environmental Policy Act

CEQA Guidelines (Section 15126.6) require that an EIR "describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects." An EIR should briefly describe the rationale for selecting the alternatives; identify any alternatives that were considered but eliminated by the lead agency; and briefly explain the lead agency's determination. Every conceivable alternative does not need to be considered, but a reasonable range of potentially feasible alternatives should be examined to foster informed decision making and public participation.

Also, an EIR must evaluate a "No Project" alternative (CEQA Guidelines Section 15126.6(e)). Evaluation of a No Project Alternative considers the existing conditions at the time the Notice of Preparation (NOP) is published, or if no NOP is published, at the time environmental analysis is commenced, as well as what impacts would be reasonably expected to occur if the Proposed Project were not approved and implemented. An alternative analysis is one means by which an EIR identifies ways to mitigate or avoid significant effects a project may have on the environment. Lead agencies may not approve projects as proposed if there are feasible alternatives or feasible mitigation measures available which would substantially lessen the significant environmental effects of such projects, unless certain findings and a statement of overriding considerations can be made (PRC sections 21002 and 21081; CEQA Guidelines Section 15091.[18])

2.2 Alternatives Development and Screening Process

USACE San Francisco District developed an RDMMP for the District's SF Bay O&M dredging program that outlines the plan for dredging and dredged sediment management over the next 20 years, starting in 2025. The RDMMP presents a detailed assessment of dredging and placement alternatives for federally authorized navigation channels within the study area and establishes a regional Federal Standard Base Plan, i.e., the least cost, environmentally acceptable, and technically feasible dredging and placement option across the SF Bay region. During development of the RDMMP, in the identification of relevant scientific knowledge gaps (which informed subsequent gap analysis studies), and throughout the past ten-year dredging cycle, USACE has continually engaged the public, agencies, and interested parties through its RDMMP planning process, including development of alternatives. Agency input on the

[18] CEQA Guidelines section 15091 states that "no public agency shall approve or carry out a project for which an environmental impact report has been certified which identifies one or more significant effects on the environment that would occur if the project is approved or carried out unless both of the following occur:
(a) The public agency makes one or more of the following findings with respect to each significant effect:
(1) Changes or alterations have been required in, or incorporated into, the project that mitigate or avoid the significant effects on the environment.
(2) Those changes or alterations are within the responsibility and jurisdiction of another public agency and have been, or can and should be, adopted by that other agency.
(3) Specific economic, legal, social, technological, or other considerations, including considerations for the provision of employment opportunities for highly trained workers, make the mitigation measures or alternatives identified in the environmental impact report infeasible.
(b) With respect to significant effects that were subject to a finding under paragraph (3) of subdivision (a), the public agency finds that specific overriding economic, legal, social, technological, or other benefits of the project outweigh the significant effects on the environment."

RDMMP was provided by the Regional Water Board, BCDC, the USEPA, state and federal fish and wildlife agencies, other resource and regulatory agencies, stakeholders and interested parties, industry, dredgers, environmental nonprofits, and others.

The RDMMP website (San Francisco District > Missions > Projects and Programs > Regional Dredge Material Management Plan (army.mil)) provides a history and overview of the public meetings and outreach that have taken place over the past ten-year dredging cycle. USACE has also given numerous presentations at public meetings to solicit feedback, including description of the RDMMP alternatives during the LTMS Committee meeting on April 12, 2024, and in a plenary presentation at the State of the San Francisco Estuary on May 27, 2024. Additionally, USACE leads an interagency working group, in partnership with the San Francisco Estuary Institute (SFEI), to solicit expert technical advice and decision support to USACE on gap analysis studies, including the regional analysis, sediment transport modeling, ecological modeling, sediment transport framework, and decision support and benefits-pathways analysis (Regional Analysis of Potential Beneficial Use Locations: San Francisco Bay | San Francisco Estuary Institute (sfei.org)). These meetings and outreach informed the development, refinement, and subsequent analysis of the alternatives analyzed in this document. Nine RDMMP meetings and outreach events occurred between July 2019 to March 2024 (SFEI 2024).

2.3 Project Description and Alternatives

This section provides a general description of dredging and placement practices that would be implemented under the project alternatives, followed by descriptions of the six alternatives that are analyzed in detail in this Draft EA/EIR. Placement locations for dredged material are presented in terms of placement category, rather than specific placement location. The description of the federal navigation channels maintenance dredging in Section 1.5 is incorporated herein by reference. The Proposed Action/Proposed Project, described in Section 2.4, comprises a phased implementation of the No Project Alternative, Alternative 1, and Alternative 2, which are described below.

2.3.1 Features and Measures Common to All Alternatives

This section describes measures, or components, that are common to all alternatives evaluated in this Draft EA/EIR.

Maintenance dredging typically involves the following steps: 1) surveying a site to identify sediment accumulated (shoaled) above the authorized project depth, then sampling and testing for sediment quality; 2) excavating shoaled sediment from the dredging site; 3) transporting dredged sediment via scows, hopper dredges, or pipeline to the designated placement site; and 4) placing and managing the dredged material at the designated site, or transfer to another permitted location for placement or use.

The sampling results are reviewed by the DMMO to determine if the sediment is suitable for unconfined aquatic disposal at an in-Bay placement site, ocean disposal, and beneficial use sites (sediment testing requirements are discussed in Section 1.2.2.2).

Typical methods of maintenance dredging include hydraulic or mechanical dredging. Hydraulic dredging involves hopper dredges (a ship with a hopper bin to store and transport material) or suction/cutterheads

attached to hydraulic pipelines that convey the dredged material to a scow or directly to a placement site. Mechanical dredging involves bucket or clamshell dredges that scoop material from the channel bed and place it directly into a scow for transport to a placement site. The various methods of dredging and equipment used are discussed below.

2.3.1.1 Dredge Equipment and Methods

The choice of dredging method for a particular area is determined by various site-specific factors. These include the type of substrate, sediment quality, site bathymetry and layout, wave energy, dredging depth, desired production rate, placement method and distance, environmental concerns, and spatial constraints. Additionally, considerations such as equipment costs and availability play a significant role in the decision-making process for selecting the most suitable dredging approach. For the purposes of this Draft EA/EIR, dredging equipment is categorized by two mechanisms (see Figure 2-1):

- **Hydraulic dredging:** Material is removed through a hydraulic pumping or forcing mechanism. For USACE-maintained navigation channels in SF Bay, this can be done with cutterheads, hoppers, or hydraulic pipelines.
- **Mechanical dredging:** Material is removed by using mechanical systems to remove sediments from the dredging site. This can be done with clamshell, bucket, excavator, dipper, or ladder dredges.

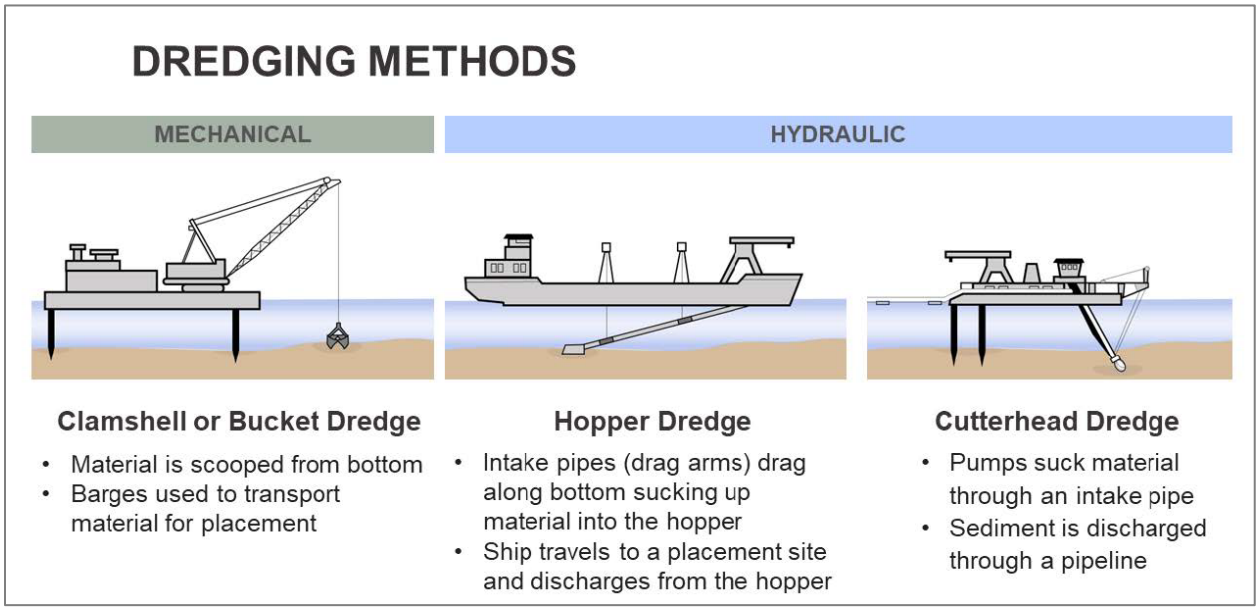


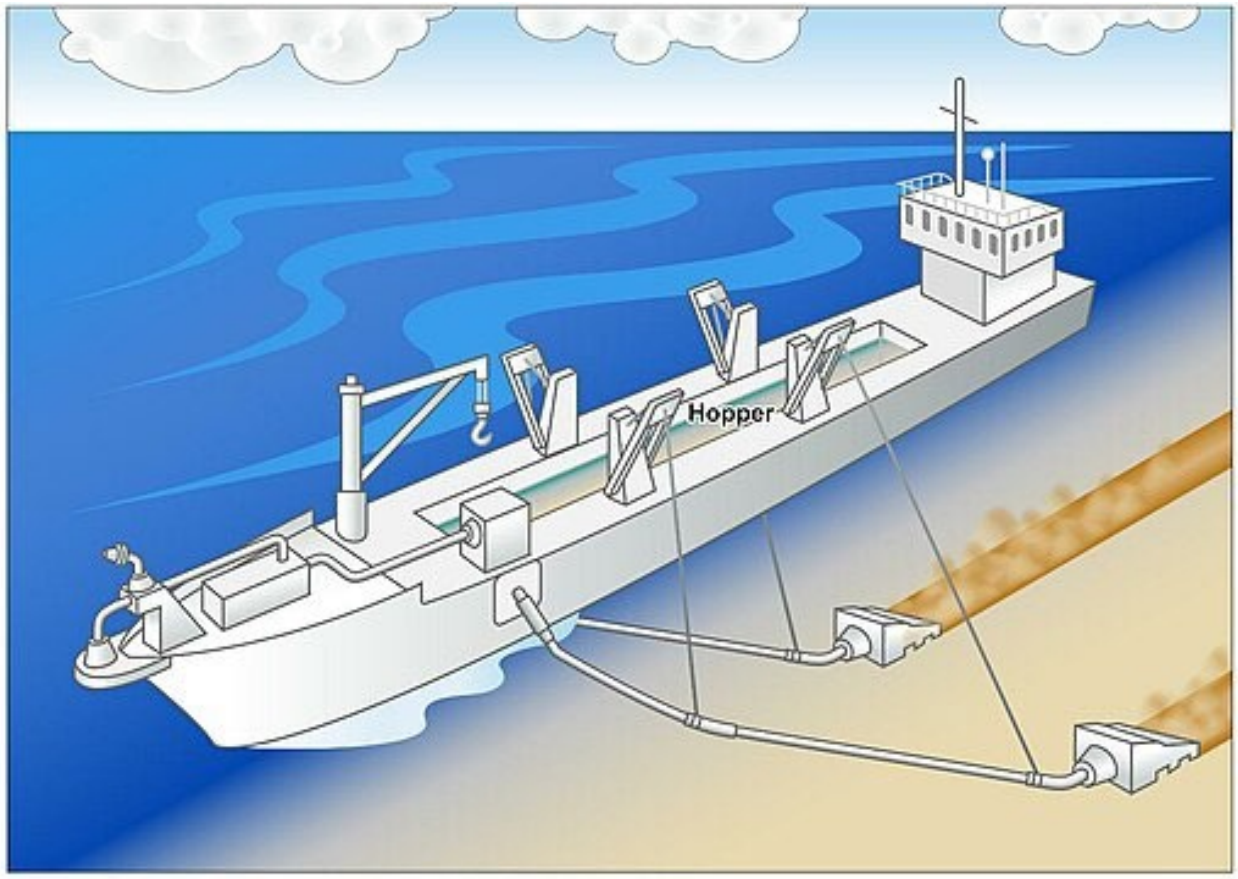
Figure 2-1. Depiction of Mechanical (left, clamshell or bucket) and Hydraulic (right, hopper or cutterhead) Dredge Methods

Hydraulic Dredges

Hydraulic dredges are used to remove and transport sediment in the form of a liquid slurry, typically comprising 80 percent water and 20 percent sediment by weight. Among these, hopper dredges are a specific type of apparatus that pump the dredged material into a self-contained hopper bin onboard the dredge, rather than using a pipeline or scow. Hopper dredges store and transport the sediment in their hopper bins temporarily. Other types of hydraulic dredges, like cutterhead dredges, are generally mounted on barges and use diesel or electric-powered centrifugal pumps with discharge pipes ranging from 6 to 48 inches in diameter. These pumps create a vacuum on the intake side, drawing water and sediments through the suction pipe. The resulting slurry is then transported to the placement site via a pipeline or scow (USACE and Regional Water Board 2015).

Hopper Dredges

Hopper dredges are seagoing vessels designed for dredging and transporting material from navigation channels to open-water disposal areas. They are equipped with a drag arm on each side, consisting of long suction pipes with drag heads at their ends. During dredging, the drag arms are lowered until the drag heads reach the channel bottom. Suction is then activated, and the drag heads are slowly moved across the sediment by the vessel's forward motion (Figure 2-2). Sediment and water slurry are drawn up through the drag heads and arms by onboard pumps and deposited in the hopper bin located in the midsection of the vessel. Once the hopper bin is full, the drag arms are raised, and the dredge moves to a designated disposal or placement area to release the dredged material through large doors at the vessel's bottom. The advantages of hopper dredges include their ability to operate in rough, open water, their capability to move quickly to project sites under their own power, and their minimal interference with vessel traffic during operation. Hopper dredgers also have a low cost in comparison to other mechanical dredging methods. However, technical limitations include draft and maneuvering requirements that restrict their use in shallow waters and narrow channels, interrupted production during transit to and from placement sites, and difficulties in dredging around structures (USACE and Regional Water Board 2015).



Source: US GAO 2014

Figure 2-2. Hopper Dredge Schematic

Table 2-1 lists specifications of the two federally owned hopper dredges used in the SF Bay Area, the *Essayons* and the *Yaquina.* The *Essayons* is the larger of the two and has a higher production rate, 6,000 CY/load and 43,000 CY/day, respectively, in comparison to the *Yaquina*, 1,050 CY/load and 13,000 CY/day. While it is not commonly used in SF Bay, the *Yaquina* did conduct dredging in the region from 2012 to 2014.

The *Essayons* and the *Yaquina* operate similarly, with one difference being that the *Yaquina* uses a priming system while the *Essayons* features self-priming drag arms that eliminate the need for a separate priming pump. On the *Yaquina*, once the priming system is filled with water, the main pump is activated. In both vessels, priming takes about 15 to 40 seconds and happens within 3 feet of the sediment surface. Priming allows the pipeline to fill with water, eliminating all air from the system. If there is any air in the system when the main pump starts, it can cause cavitation, which disrupts the pump's operation and can damage the equipment.

Table 2-1. Specifications of Federally Owned Hopper Dredges

Parameter	*Essayons*	*Yaquina*
Length	350 feet	200 feet
Drag arm extension	-94 feet MLLW	-45 to -55 feet MLLW
Hopper capacity	6,000 CY	1,050 CY
Draft (when fully loaded)	-27 feet MLLW	-14 feet MLLW
Max speed (when fully loaded)	13.5 knots	10.5 knots
Size of intake pipe	28 inches	20 inches
Size of drag head	100 × 100 inches	54 × 54 inches
Pump size (gpm)	2 at 28,500	2 at 15,000
Water: Sediment Ratio[1]	80:20	80:20
Production Rate[2]	43,000 CY/day	13,000 CY/day
Locations dredged annually	San Francisco Harbor (MSC) Richmond Outer Harbor Pinole Shoal	Varies annually[3]
Volume dredged annually	900,000 CY (annual average)	Varies annually[3]

Source: USACE and Regional Water Board 2015

[1] Average ratio; actual ratio varies by sediment type.
[2] Average Daily Production
[3] The Yaquina does not often dredge in the San Francisco Bay Area. At times, it is scheduled to dredge the federal navigation channels in place of the Essayons. As such, volumes of dredged material vary annually.

Key: CY = cubic yard
CY/day = cubic yards per day
gpm = gallons per minute
MLLW = mean lower low water

In both vessels, once the drag head is embedded in the sediment, the dredge moves forward, cutting through and removing the shoaled sediment along with water, forming a slurry. This slurry is vacuumed through the drag arm to the hopper for temporary storage. Both the *Essayons* and the *Yaquina* have four water intake doors located on top of each drag head, each measuring approximately 6 inches square. If the drag arms become clogged during dredging, one or more of these doors need to be opened to allow water to flow through the drag arm and clear the clog. The doors should ideally remain closed during dredging to maximize productivity, except for when they are opened to address clogs.

The drag head doors are manually operated. To open the doors, the drag heads are lifted out of the water, and the doors are tied back. To clear a clog, the drag head is lifted from the sediment, and water is pumped through the drag arm to remove any remaining sediment. The drag head lacks a watertight door or valve at its end so when it is lifted out of the water and the pipe tilts enough to allow air in, the system will need to be re-primed before resuming dredging. Clearing clogs and sediment from the drag arm, like priming, takes about 15 to 40 seconds and is done within 3 feet of the sediment surface. Typically, the drag arms do not clog in areas with mostly sand, but in regions with more silt or mud, one or two doors might need to be opened.

When the hopper is full of dredged material, the drag heads are lifted entirely out of the water and secured in their resting positions on the side of the dredge. The dredge then travels to the designated placement site.

At the placement site, the hopper doors at the bottom of the dredge's hull open, allowing the dredged material to fall through and settle on the site floor. Sandy material settles quickly, while finer materials like silts and clays remain suspended in the water column for a longer period. Water is taken in at the bottom of the ship and stored in the sea chest. This water is used to both to cool the engines and to flush the hopper bins. On the *Yaquina* or a contractor hopper dredge, water for flushing may also come from the drag arms, which are positioned just below the water surface. In this situation, maintaining the drag head near the surface is crucial to maintaining vessel maneuverability and safety.

The *Yaquina* employs a jetting system with a screened water intake on each of its four sea chests—two forward and two aft. The depth of these sea chests varies due to displacement and can range from 8 to 16 feet at the bow and 11 to 14 feet at the stern. The *Essayons* has six sea chests, four for flushing the hopper and two for cooling the engines. The depth of the forward sea chests ranges from 12 to 25 feet, and the rear ones from 18 to 29 feet. For both the *Yaquina* and *Essayons*, the hopper is flushed after each in-Bay placement, a process that takes 5 to 10 minutes.

It is often beneficial to release excess water from hopper dredges to increase the sediment load in the hopper. This process is called overflow dredging and restrictions may limit its use due to water quality concerns near the dredging site. Overflow dredging happens when the hopper reaches capacity with sediment slurry, and pumping continues to fill the hopper with both water and sediment. Coarser materials settle to the bottom of the hopper, while finer sediments remain suspended in the water. Typically, the hopper retains all dredged material for the first 6 to 7 minutes, after which overflow begins. The amount of fine-grained material reintroduced to the water column varies depending on the sediment type being dredged. In SF Bay, overflow dredging for fine-grained sediments is limited to 15 minutes at all times during hopper maintenance dredging, whereas overflow is unrestricted for sandy sediments (containing over 80 percent sand) due to minimal fine-grained material remaining suspended in the overflow.

On the *Essayons*, overflow from the hopper is directed through overflow weirs, which are tubes extending from the top of the hopper bin to the vessel's bottom, releasing into the water column at the draft level of the ship. In contrast, the *Yaquina* uses a skimmer—a floating pipe within the sediment collection bin—to remove excess water. This water is drained internally within the ship's hull into a collection tank, then released through a valve below the water's surface. Unlike the *Yaquina*, the *Essayons* is equipped with anti-turbidity valves on its overflow weirs. These butterfly-type valves regulate the water volume passing through the overflow tube, thereby minimizing air entrainment during the dredging overflow process, which allows for more efficient settling of sediments and reduced turbidity.

California requires that diesel-powered hopper dredges be equipped with timing retards and turbocharging to minimize nitrogen oxide emissions. The engines on the *Essayons* and *Yaquina* comply with current Tier II standards. USACE holds the appropriate permits from air resource agencies for the operation of both vessels.

Cutterhead-Pipeline Dredges

Cutterhead-pipeline dredges are a type of hydraulic dredge that are equipped with a cutterhead positioned at the end of a pipeline (Figure 2-3). These dredges use onboard pumps to suction material through the intake pipe and subsequently discharge it directly onto the placement site through the pipeline. Due to their direct pumping to the placement site, cutterhead-pipeline dredges can operate continuously and often offer greater cost-efficiency compared to mechanical dredging methods.

A cutterhead is a mechanical device equipped with rotating blades or teeth designed to break up or loosen bottom materials, enabling their suction through the dredge. Some cutterheads are robust enough to handle and remove rock. Cutterhead-pipeline dredges are most effective in deep shoal areas where the cutterhead can penetrate into the sediment. The pipeline itself is made of durable plastic material and is slightly buoyant, designed to float about 2 inches above the water's surface when empty and sink to the bottom when filled with dredged slurry. Water mixed with dredged material must be contained at the placement site until the solids settle out, after which it is typically discharged back into the waterway. Cutterhead-pipeline dredges are not suitable for use in areas where sediments are contaminated with chemicals that could dissolve in the dredge water and potentially spread into the environment during discharge.

Pipeline dredges are typically installed on barges, which are not self-propelled and are therefore towed to the dredging site and anchored in place using specialized anchor pilings known as spuds or pivot pipes. Once positioned, the pipeline and cutterhead are lowered to the channel bottom using a ladder. The cutterhead then begins rotating slowly, usually at approximately 30 revolutions per minute, to break up the sediment. As it becomes buried in the sediment, the dredge pumps are activated, suctioning sediment slurry through the pipeline to the designated placement site. During operation, the cutterhead moves from side to side, using the port and starboard spuds as pivots. Cables connected to anchors on either side of the dredge control its lateral movement and assist in propelling the dredge forward.

Cutterhead-pipeline dredges offer several benefits, including the capability to excavate various materials and pump them over long distances; continuous operation, which makes them cost-effective; and the ability to handle certain rock formations without the need for blasting. However, technical limitations include that they are not suitable for projects in open, rough waters and can cause increased turbidity during dredging operations. They also require towboats for transportation, are hard to deploy in strong currents, and can impact navigation due to the presence of the dredge's pipeline leading to the disposal site, particularly in areas with congested, heavy traffic (USACE and Regional Water Board 2015). Due to the need to create a pipeline connecting the source and placement sites, this method can only be paired with BUDM sites when both the dredging and beneficial use sites can be connected without creating a navigation safety hazard.



Source: USACE 2022b

Figure 2-3. Example of a Cutterhead-Type Dredge

Mechanical Dredges, Including Clamshell Dredges

Mechanical dredges remove sediment from the bottom by applying direct mechanical force to dislodge and contain the sediment into a barge or scow for transport to a placement/disposal site. These dredges are typically mounted on barges, towed to the dredging location, and secured using anchors or spuds. Mechanical dredging offers precise positioning and cutting accuracy, making them suitable for use in harbors, around docks, and in protected channels. However, they may be less effective in high-traffic areas or rough seas, where stability can be compromised. Mechanical dredges excel in removing moderately compacted materials and handling large particles, such as gravel, cobbles, and debris. They are, however, inefficient for lighter, free-flowing materials and are unable to excavate relatively hard substances.

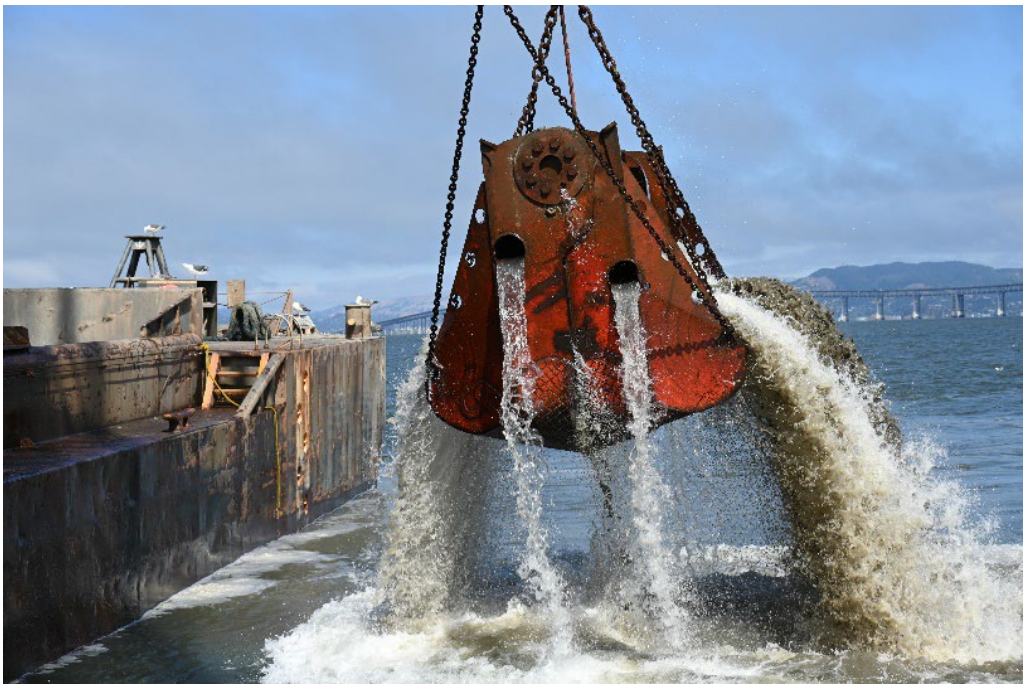
Typically, mechanical dredges operate with two or more scows or barges. While one barge is filled, another is towed to the dredged material placement site. This allows for continuous work, with interruptions only occurring when switching scows/barges or relocating the dredge. This setup makes mechanical dredges especially effective for projects where the placement/disposal site is located several miles away. Mechanical dredging is the preferred dredge type when sediment is taken to an upland beneficial use site, such as MWRP or Cullinan Ranch (USACE and Regional Water Board 2015).

A clamshell dredge is a type of mechanical dredging that uses a vertical-loading grabber connected to a wire rope (Figure 2-4). Bucket, dipper, and backhoe dredges are also categorized as mechanical dredges and function similarly to clamshell dredges. Clamshells are equipped with various bucket configurations

designed to optimize the removal of different types of sediment such as silt, mud, clay, sand, gravel, rock, and boulders. In operation, the clamshell dredge lowers the vertical-loading grabber in an open position. The weight of the grabber allows it to penetrate the substrate, after which the bucket is closed around the material. The dredge then raises the loaded bucket above the level of the scow or barge and deposits the material inside.

The grabbers or buckets used for loading can range in size up to 50 CY, although 10- to 20-CY grabbers are typically employed, with 1-CY buckets used for smaller projects. Larger sizes can be custom made for special projects. The operational depth of a clamshell dredge is limited by the length of its wire rope. The dredging production rate is dependent on cycle time, bucket size, dredging depth, type of material being dredged, thickness of the cut, and the efficiency of the transport equipment. According to a study conducted by the USACE San Francisco District, dredging a channel in the SF Bay using a clamshell-bucket dredge can take up to ten times longer than dredging with a hopper dredge (USACE 2013b).

Environmental buckets are primarily used for maintenance dredging tasks because they are not designed for excavating hard materials. They operate similarly to regular clamshell buckets but lack digging teeth and instead feature a seal where the teeth would normally be. This design characteristic enables environmental buckets to retain a higher proportion of water and fine sediment that might otherwise escape from a standard clamshell bucket. Although not typically mandated for USACE maintenance dredging contracts in SF Bay, contractors have the option to use environmental buckets on mechanical dredges. In specific situations, such as dredging sediments of concern, the use of environmental buckets may be mandated (USACE and Regional Water Board 2015).



Source: USACE no date

Figure 2-4. Mechanical (Clamshell) Dredge

2.3.1.2 United States Army Corps of Engineers Hopper Dredge Timing Constraints

USACE uses hopper dredges *Essayons* and *Yaquina*, as well as contract dredgers (West Coast hopper contract) in numerous locations within the West Coast Districts every year. Maintenance dredging in SF Bay deep draft projects (including Richmond Outer, MSC, and Pinole Shoal) has historically been conducted in the early weeks of June and is anticipated to continue during this period for all alternatives evaluated in this Draft EA/EIR. The timing of this work is incorporated into the overall regional maintenance dredging schedule through extensive and rigorous collaborative planning exercises. Every year, navigation managers from each USACE district on the West Coast and surrounding Pacific Ocean regions (Seattle, Portland, San Francisco, Los Angeles, Honolulu, and Alaska) meet to discuss a two-year look ahead plan for the USACE hopper dredging schedule for the next two fiscal years. Because of uncertainty due to many variables and unforeseen events there is more certainty on the upcoming dredging cycle and less on the second year. The discussion includes days allocated to each project, and how the needs of projects are split up and balanced between the small and medium government hopper dredges and the West Coast hopper contract.

Currently, draft restrictions are frequently implemented in place at Richmond Outer Harbor when shoaling reduces the depth to less than 43 feet below MLLW, with areas that have shoaled to even shallower depths. These conditions can lead to economic impacts because ships carry lighter/reduced loads or change schedules based on tides to reach ports, and shoaling also increases the risk of grounding, which poses health and safety issues from potential oil release into the Bay. Therefore, Richmond Outer Harbor is prioritized for dredging of high spots as soon as possible, with a typical planned start date of June 1. Richmond Outer Harbor has historically been dredged with the *Essayons*, since the other West Coast USACE hopper dredge, the *Yaquina*, does not have the capacity to dredge this location in an efficient manner. The small hopper capacity of the *Yaquina* (1,050 CY versus 6,000 CY for the *Essayons*), coupled with the haul distance to the disposal site, would not make it possible to clear the channel in the time allotted.

Aside from the need to address shoaling issues in June, there are equipment availability issues that preclude use of USACE hopper dredges in SF Bay during later June through September

While a change to the start date for dredging from June 1 to later in the season August 1 for the SF in-Bay projects (Richmond Outer Harbor and Pinole Shoal) has the potential to reduce impacts to some species, a change in the start date would very likely result in projects, such as the Richmond Outer Harbor, not receiving the necessary dredging. This is because dredging equipment typically may not be available due to the timing of work and needs in the other USACE districts. Project site conditions and environmental constraints at each of the USACE navigation projects throughout the West Coast vary greatly, in terms of both timing and severity, and necessitate some amount of flexibility in the scheduling of dredging. Constricting the timing of dredging in SF Bay at one location would affect the ability to maintain all the West Coast projects due to limited availability of existing dredge equipment, as all contractor hopper dredges are home-ported on the East and Gulf coasts. This limited availability also contributes to extremely high cost (up to $10 million) for mobilization and demobilization from the East and Gulf Coast regions, typically between $6 and $8 million per mobilization. Due to these constraints, it is assumed that hopper dredging in Richmond Outer Harbor will only occur in June under all alternatives.

Proposed Project and Alternatives

Shoaling in Portland District navigation channels requires the use of the *Essayons* and a contract hopper dredge from late June through mid-November. Dredging during these months is prioritized to address the severe and rapidly changing/developing shoaling In the Columbia River associated with the high flows during spring snowmelt. Two decades ago, the SF dredging projects started in the June and July time frame. However, the period of increased streamflow caused by heavy rain and rapid snowmelt into the Columbia River have been starting earlier than in the past. Changing climate conditions are causing more intense storms and more variable precipitation. This has significant consequences for the amount and type of sediment that accumulates at the mouth of the Columbia River, which needs to be dredged. It is critical that project depth is reached throughout the river before the low water period in the Columbia River begins in September. Not reaching full project depth would result in draft restrictions in the channel and would greatly hinder the deep draft import/export operations of the various ports located on the Columbia River, resulting in major economic losses for the region, and ultimately the nation.

In the July through November timeframe, the focus of hopper dredging shifts to the Columbia River, where on average 2.5 million to 3.5 million CY are dredged every year by a combination of *Essayons* and the West Coast hopper contract dredge. Timing of this work, like that of the dredging upstream, is critical. Shoaling at the mouth of the Columbia River continues to build well into August, and by the end of September, deteriorating weather conditions at the mouth of the Columbia River become prohibitive for dredging. Insufficient maintenance dredging at the mouth of the Columbia River during the August and September months results in potential draft restrictions, as well as the possibility for more dangerous bar conditions for the rest of year. Even with the multiple dredging events with two hopper dredges concurrently at the Columbia River there are still regular and reoccurring ship closures mandated by the United States Coast Guard (USCG). The mouth of the Columbia River sees an average of two to three bar closures per year due hazardous conditions, which result from a combination of the immense amount of sediment coming from the largest river in the Pacific Northwest colliding with incoming tides, ocean swells, and winds that create unpredictable and dangerous conditions for vessels attempting to transit the river. During these closure periods, no vessel traffic is permitted to transit the bar, which results in severe economic impact. Insufficient maintenance dredging would increase the number of bar closures every year. Even with multiple dredging events by USACE during the July to November time frame, the USCG still restricts transit across the bar at the mouth of the Columbia River when conditions pose a life and safety hazard to vessels.

In 2024, USACE closely coordinated with other West Coast districts to explore flexibility in the regional dredging schedule, considering potential impacts on the San Francisco District. These discussions included an assessment of each district's environmental windows for threatened and endangered species, as shifting project schedules could jeopardize compliance with those windows. Each project faces unique constraints that influence the overall regional schedule. Given the limited availability of hopper dredges, maintaining flexibility is crucial, but limited; it is not typically possible to schedule around all threatened and endangered species work windows. The Columbia River's dredging schedule, due to its scale and impact, is the overwhelming factor in determining the overall availability of the *Essayons*. Further constraints include the aging government hopper dredge fleet, which is becoming less reliable, and the infeasibility of adding capacity, especially as the government fleet undergoes scheduled maintenance in mid-November to mid-March each year.

2.3.1.3 Transportation of Dredged Material

Dredged material is typically transported using pipelines, hopper dredges, barges, or scows, and occasionally trucks or trains. Hydraulic dredges, like cutterhead dredges, commonly use pipelines to transport material over several miles, with booster pumps extending pumping distances at increased cost. Hopper dredges, equipped with self-contained hoppers that store dredged sediment, can transport material over long distances and either discharge the material through bottom doors, as is the case for the *Essayons* and *Yaquina*, or by pumping off sediment to shore or a placement location. Barges and scows, often paired with mechanical dredges, are widely used for transporting large quantities of dredged material over long distances. Truck and train transport, more costly than barge transport, is reserved for material that requires rehandling and secondary placement after drying (USACE and Regional Water Board 2015). For comparison, hopper dredge capacities can vary from 130 to 3,300 CY, while scows for typical dredging projects range from about 500 to 5,000 CY (Agarwal 2021; SunCam 2024). Dump trucks can carry about 10 to 16 CY of material, and one rail car can carry 30 to 60 CY. Transport of material to upland placement sites is typically the most expensive option, followed by transport to ocean disposal sites at intermediate cost, while dredged material transport to in-Bay placement sites is the least costly option.

2.3.1.4 Material Placement or Disposal Operations

Proper selection of dredging and transport equipment must align with placement or disposal site requirements. Various methods are used for placement at open-water sites (i.e., in-Bay placement sites or deep ocean disposal), including direct pipeline discharge, mechanical placement, or release from hopper dredges or scows. These sites are categorized as either nondispersive or dispersive. Over the long-term, material placed at nondispersive sites is expected to settle and remain on the bottom, possibly forming mounds. Conversely, over the long-term, predominantly dispersive sites experience material dispersal during placement or through erosion over time due to currents or wave action (USACE and Regional Water Board 2015). Most open-water sites tend to be dispersive.

Placement of dredged material at existing upland direct placement sites or at upland (sponsor-provided) sites involves placing dredged material in diked nearshore or upland confined facilities using pipelines or other methods directly from a dredge vessel or scow used to transport material closer to the placement site. Material deposited in these sites initially may occupy several times its original volume due to water content. Over time, through settling and desiccation, the sediment will consolidate to its original volume or less (USACE and Regional Water Board 2015).

Placement site categories for alternatives are as described in Chapter 1, Section 1.5.2.2 and include the following:

- Existing Beneficial Use Sites:
  - Upland Direct Placement Sites: Cullinan Ranch and MWRP for tidal wetland restoration
  - Nearshore Strategic Placement Site: SF-17 (Ocean Beach Nearshore Placement Site)

- Transitional Placement Sites:
  - SF-8 (San Francisco Bar Channel Placement Site)
  - In-Bay Placement Sites: SF-9 (Carquinez Strait Placement Site), SF-10 (San Pablo Bay Placement Site), SF-11 (Alcatraz Placement Site), SF-16 (Suisun Placement Site)
  - Upland (sponsor-provided) Sites: Shollenberger Park, Imola Avenue
- Deep Ocean Disposal: SF-DODS
- Possible Future Beneficial Use Placement Sites:
  - Upland Direct Placement Sites: Bel Marin Keys, Skaggs Island (Haire Ranch), Southern Eden Landing Ecological Reserve, Alviso Ponds (A8 Complex), Ocean Beach Onshore, Pacifica Onshore, Surfers Beach, and Stinson Beach Onshore
  - Nearshore Strategic Placement Sites: Bel Marin Keys Nearshore (proximal to Petaluma River and Across the Flats Channel), Cogswell Marsh Nearshore, (proximal to Oakland Inner and Outer Harbor and Redwood City Harbor Channels), Emeryville Crescent Nearshore (proximal to Oakland Outer Harbor Channel), Faber Tract (proximal to Redwood City Harbor Channels), Giant Marsh Nearshore (proximal to San Pablo Bay Pinole Shoal Channel), Ryer Island Nearshore (proximal to Suisun Bay Channel), Stege Marsh Nearshore (proximal to Richmond Inner Harbor Channel), Stinson Beach Nearshore (proximal to MSC), Surfers Beach Nearshore (proximal to MSC), and Whale's Tail Nearshore (proximal to Redwood City Harbor Channels)
  - Elevation Augmentation/Marsh Spraying Sites: Bothin Marsh in Marin County, Sears Point in Sonoma County
  - Water Column Seeding Sites: Arrowhead Marsh, Corte Madera Marsh, Faber Tract, Pond A6 (Knapp Tract), Ravenswood

2.3.1.5 Dredging and Placement Measures

Under all alternatives, dredging and placement would be conducted in accordance with the following measures:

- Dredging at each project location would be limited to the authorized depth.
- Knockdowns (i.e., knocking down high spots or isolated shoals) may be performed in all locations except the MSC. The volume of material above project design depth to be knocked down is not anticipated to exceed 15,000 CY per year in each deep-draft channel. Knockdowns are subject to the same sediment testing requirements and approvals as full dredging episodes.
- No overflow would be discharged from any barge during transportation, except for spillage incidental to clamshell dredge operations.
- Overflow from hopper-type suction dredges would be limited to no longer than 15 minutes at the dredge site during any one excavation action (cut). Overflow would be unrestricted when dredging material is greater than 80 percent sand.

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- Dredging would be conducted during the following time periods (see Table 2-2):
  - Between June 1 and November 30, to the extent feasible, at Oakland Inner and Outer Harbor, Redwood City Harbor (Channels and San Bruno Shoal), Richmond Inner and Outer Harbor, MSC, San Pablo Bay (Pinole Shoal), Petaluma (River Channel and Across the Flats), and San Rafael Creek.
  - Only between August 1 and November 30 at Suisun Bay Channel/New York Slough, and Napa River.
  - Due to the priority hopper dredging in the Columbia River, hopper dredging would only occur in June at Richmond Outer Harbor and Pinole Shoal; hopper dredging would occur between December and February for Oakland Harbor and Richmond Inner Harbor.
- Dredging and placement activities would be consistent with the work window requirements set out by NMFS, and USFWS in their BiOps on the LTMS (USFWS 2004a; NMFS 2015) (Table 2-3).
- Dredging would stop immediately following any fuel or hazardous waste leaks or spills, and cleanup actions would be implemented.
- During dredging and placement activities, notes to mariners and navigational warning markers would be used as needed to prevent navigational hazards.
- Avoidance and minimization measures, as identified in current and future LTMS BiOps (NMFS 1998, 2015; USFWS 1999, 2004a, 2004b, 2024) and EFH Consultation (USACE and USEPA 2011) would be employed to reduce impacts to species and habitat.
- The following measures would be implemented for hydraulic dredging to protect longfin smelt and delta smelt:
  - No dredging would occur in water ranging from 0 to 5 parts per thousand (ppt) salinity between December 1 and June 30.
  - At the beginning and end of each hopper load, pump priming, drag head clearing, and suction of water would be conducted within 3 feet of the seafloor.
  - Hopper drag head suction pumps would be turned off when raising and lowering the drag arms from the seafloor when turning the dredge vessel.
  - USACE would implement a worker education program for listed fish species that could be adversely impacted by dredging. The program would include a presentation to all workers on biology, general behavior, distribution, and habitat needs, sensitivity to human activities, legal protection status, and project-specific protective measures. Workers would also be provided with written materials containing this information.
  - The drag head, cutterheads, and pipeline intakes will remain in contact with the seafloor during suction dredging.
  - The drag head water intake doors will be kept closed to the maximum extent practicable in locations most vulnerable to entraining smelt. In circumstances when the doors need to be opened to alleviate clogging, the doors will be opened incrementally (i.e., the doors will be opened in small increments and tested to see if the clog is removed) to ensure that doors are not fully opened unnecessarily.

  - USACE will set up a pilot study to assess the potential for directing fish away from the hopper dredge during operations to reduce entrainment. To start, USACE will work with the *Essayons* crew (and/or the future federal hopper dredging vessel) to install and operate fish deterrent equipment such as lights, sound speakers, and/or air jets that would trigger an avoidance response in fish and thus push them from the area of exposure and substantially reduce the risk of entrainment. Light and sound have been shown to trigger avoidance behavior in some fish species, though they may attract others (HDR 2015). There is no data on avoidance or attraction for longfin smelt. Should light and/or sound attract listed species, it will immediately be discontinued. Accordingly, installing fish deterrent equipment that emits light and/or sound prior to initiating priming the hopper dredge and prior to retracting the hopper from the sediment may reduce impacts to longfin smelt and other fish species by triggering avoidance behavior. This is a new technology that was not available in 2015 when fish entrainment impacts and mitigation were last analyzed. This pilot study will be implemented for two years to determine its effectiveness. If the methods as set up are shown not to be successful, the pilot study will be refined, and tools adjusted and retested.
  - USACE has been testing both environmental DNA (eDNA) sampling and the use of an echosounder in conjunction with hopper dredging activities. From July 21 through July 31, 2023, during hopper dredging by the *Essayons* at Pinole Shoal Channel, six eDNA sampling events with three replicates per sample occurred. These samples later were assessed for the presence of longfin smelt. Despite being repeatedly observed during the physical entrainment monitoring aboard the *Essayons*, no longfin smelt were detected in the eDNA samples (ICF 2023). However, USACE also funded a study of new eDNA collection methodologies in wetlands, which found good detection probabilities of longfin smelt when sampling a large volume of water with a tow net and concentrating the eDNA (Bowen et al. 2024). Prior to dredging, eDNA samples could be collected from two potential dredging locations (likely Pinole Shoal Channel and Richmond Outer Harbor), tested the same day for the presence of longfin smelt, and then used to prioritize the order of dredging based on the presence or absence of longfin smelt. Similarly, echosounder data could be collected to assess the fish community in potential dredging locations, and prioritization for dredging could be based on those results. Results of data collected will be evaluated and will inform measures for avoidance and minimization measures to fish species from dredging operations.
- Under all alternatives, USACE would meet all federal environmental compliance requirements (e.g., CWA Section 404, Endangered Species Act), including those federal requirements implemented by state agencies as applicable (e.g., CWA Section 401, CZMA).

Table 2-2. USACE San Francisco Bay Maintenance Dredging Timing

Dredging Channel	January		February		March		April		May		June		July		August		September		October		November		December	
	1–14	15–31	1–14	1–29	1–14	15–31	1–14	15–30	1–14	15–31	1–14	15–30	1–14	15–31	1–14	15–31	1–14	15–30	1–14	15–31	1–14	15–30	1–14	15–31
Oakland: Inner and Outer Harbor[1]						California Least Tern[2]																		
Redwood City Harbor: Channels																								
Redwood City Harbor: San Bruno Shoal																								
Richmond Inner Harbor[1]																								
Richmond Outer Harbor																								
San Francisco Main Ship Channel																								
San Pablo Bay (Pinole Shoal)																								
Suisun Bay Channel/New York Slough																								
Napa River																								
Petaluma: River Channel[3]																								
Petaluma: Across the Flats[3]																								
San Rafael Creek																								

[1] Under Alternatives 2 and 3 only, dredging may occur later (December 1 through February 29) at Oakland Inner and Outer Harbor and Richmond Inner Harbor
[2] Dredging during this period will require consultation with USFWS.
[3] Dredging can occur in areas that are not upstream or within 1,000 feet bayward in these locations if impacts are mitigated with beneficial use of dredged material
[4] No dredging can occur within 250 feet of suitable clapper rail habitat during this period.

Dredge Timing Key:

Typical dredge timing
Beneficial Use required (if dredging occurs in this window, beneficial use of dredged material is required by National Marine Fisheries Service to mitigate to for impacts to salmonids)
Consultation with USFWS required
Dredging Prohibited

Table 2-3. Long-Term Management Strategy Maintenance Dredging Work Windows by Area and Species[1]

Site	Species	Dredge Location (see Figure 1-2)	Jan 1–15	Jan 16–31	Feb 1–15	Feb 16–28	Mar 1–15	Mar 16–31	Apr 1–15	Apr 16–30	May 1–15	May 16–31	Jun 1–15	Jun 16–30	Jul 1–15	Jul 16–31	Aug 1–15	Aug 16–31	Sep 1–15	Sep 16–30	Oct 1–15	Oct 16–31	Nov 1–15	Nov 16–30	Dec 1–15	Dec 16–31
SF Bay Bridge to Sherman Island	Chinook Salmon and Steelhead	1-7																								
Carquinez Bridge to Collinsville	Delta Smelt Water ≤10 feet	7																								
Carquinez Bridge to Collinsville	Delta Smelt Water >10 feet	7																								
Napa and Petaluma Rivers, Sonoma Creek	Steelhead	3, 4, 6																								
Napa River	Delta Smelt	3, 6																								
All areas within 150 feet of eelgrass or eelgrass habitat	*Dungeness Crab*	*Various*																								
San Francisco Bay from Pinole Point to Redwood Creek	*Pacific Herring*	*1, 2, 8, 10*																								
Richardson Bay & San Francisco Waterfront (Hard stop at Nov 30)	*Pacific Herring*	*2*																								
Waters of Marin County from the Golden Gate Bridge to Richmond–San Rafael Bridge	Coho Salmon	1, 2, 12																								
Berkeley Marina to San Lorenzo Creek within 1 mile of coastline	California Least Tern	8																								
South of Highway 92 Bridge (San Mateo-Hayward)	California Least Tern	10																								
In Areas with Eelgrass Beds	California Least Tern	Various																								
Bay-wide in Areas of Salt Marsh Habitat	Ridgeway's Rail	Various																								
Bay-wide within 250 feet of Salt Marsh Habitat	Ridgeway's Rail	Various																								
In and adjacent to Salt Marsh Habitat	Salt Marsh Harvest Mouse	Various																								
Within 300 feet of known roost site	California Brown Pelican	Various																								

Sources: CDFW 2020; NMFS 2015; USFWS 1999, 2004a, 2004b, 2024

[1] Italicized rows are work windows related to non-federally listed species.
[2] Work may occur outside this window if impacts are mitigated by BUDM. This exemption does not apply to areas upstream or within 1,000 feet bayward of Napa River Channel/Mare Island Strait and Petaluma River.

Work Window | Consultation Required

2.3.2 No Action Alternative/No Project Alternative

Under NEPA, in cases where the project involves modification of an existing program or management plan, the No Action Alternative may be defined as no change from the current authorized program, or no change in management direction or intensity (43 CRF Part 46.30[1]). The No Action Alternative includes activities that may not be necessarily implemented in the current program, but are authorized to occur, such as more frequent dredging.

Section 15126.6 (e)(3)(A) of the CEQA Guidelines states that "when the project is the revision of an existing land use or regulatory plan, policy or ongoing operation, the No Project Alternative will be the continuation of the existing plan, policy or operation into the future." Therefore, under CEQA, the No Project Alternative is a continuation of existing dredging activities. USACE would continue current maintenance dredging practices for the projects it maintains in SF Bay, and the Regional Water Board would consider issuing a WQC/WDR based on USACE's current dredging practices.

The No Action Alternative and No Project Alternative differ in that the No Action Alternative represents the current authorized dredging program, regardless of current implementation, given that past implementation is different than current implementation due to recent restrictions (Regional Water Board 2020) placed on hydraulic dredging in SF Bay. The No Project Alternative, by contrast, represents the current, ongoing dredging operation as implemented over the last permit period per CEQA Guidelines Section 15126.6(e)(3)(A). The No Action Alternative is used as the baseline alternative for NEPA. The No Project Alternative is the baseline under CEQA because it is the same as the existing physical setting (CEQA Guidelines Section 15126.6(e)(1)).

The No Action Alternative and No Project Alternative assumptions are the same in all aspects, except that the No Action Alternative includes all authorized activities, even if they were not implemented at the time this document was prepared. Alternatively, the No Project Alternative includes only dredging activities that were carried out during the previously authorized ten-year program. Specifically, the difference between the No Action Alternative and the No Project Alternative is the dredging frequency at Richmond Outer Harbor and the Pinole Shoal Channel portion of San Pablo Bay. Under the No Action Alternative, dredging is assumed to occur every year via hopper at these locations; under the No Project Alternative, dredging occurs every other year via hopper. In addition, there are a few project depths that are authorized but not currently maintained by USACE at those depths, namely, Richmond Inner Harbor, Richmond Outer Harbor, and Napa River.

2.3.2.1 No Action Alternative (National Environmental Policy Act Baseline)

The No Action Alternative would continue to execute the navigation dredging program in the same way as it has been done in the past, as authorized. This alternative would place approximately 0 percent of dredged sediment at upland beneficial use sites, approximately 45 to 55 percent at deep ocean disposal sites, approximately 30 to 40 percent at in-Bay sites, approximately 5 to 15 percent at ocean beneficial use sites, approximately 0 to 10 percent at ocean sites, and approximately 0 to 10 percent at upland (sponsor-provided) sites. The specific details of the No Action Alternative are detailed in Table 2-4 and Table 2-5. This baseline condition was constructed based on the current navigation program, replicating how each channel would be dredged, how frequently each would be dredged, and where the sediment from each channel would be placed.

Table 2-4. No Action Alternative Placement Volume Summary

Placement Locations[1]	Minimum Volume (CY/year)	Average Volume (CY/year)	Maximum Volume (CY/year)[2]
Existing Beneficial Use Sites			
Upland Direct Placement Sites	0	0	0
Nearshore Strategic Placement Site: SF-17 (Ocean Beach Nearshore Placement Site)	112,850	270,840	338,550
Transitional Placement Sites			
SF-8, San Francisco Bar Channel Placement Site	0	90,280	225,700
In-Bay Placement Sites	677,100	789,950	902,800
Upland (Sponsor-Provided) Sites	0	22,570	225,700
Deep Ocean Disposal Site	1,015,650	1,083,360	1,241,350
Potential Future Beneficial Use Placement Sites[3]	0	0	0

Notes:
[1] See Section 1.5.2.2 for description of placement sites.
[2] Maximum placement volumes would not be realized across placement locations concurrently.
[3] Potential Future Beneficial Use Site Types include: Nearshore Strategic Placement Sites, Elevation Augmentation/Marsh Spraying Sites, Water Column Seeding Sites. Environmental review processes have not been completed for these sites and there is insufficient information available to fully analyze the potential impacts of placing dredged material at these locations in this Draft EA/EIR.

Key: CY = cubic yard

Oakland Harbor (Inner and Outer)

The Oakland Inner and Outer Harbor would be dredged annually using a clamshell; dredged sediment would be transported to the placement site by scow. Maintenance dredging activities would occur for a period of approximately 60 days between August 1 and November 30, if feasible. Dredging could start as early as June 1 if funds to the US Department of Agriculture for predator management on Alameda Island are contributed. The volume of dredged material generated by the Oakland Harbor would range between 120,000 and 1,225,000 CY per episode and the average volume of dredged material for the 10-year planning horizon would be 750,000 CY per year.

Table 2-5. No Action Alternative Summary

Channel	Placement Site	Likely Dredge Method	Alternate Dredge Method	Dredging Recurrence (years)	Dredging Episodes over 10-year Cycle	Average Volume per Episode (CY)	Maximum Volume per Episode (CY)	Average Annual Volume over 10-Year Cycle (CY)
Oakland: Inner and Outer Harbor	SF-DODS[1]	Clamshell	Not Applicable	1	10	750,000	1,225,000	750,000
Redwood City Harbor: Channels	SF-11[1]	Clamshell	Not Applicable	1	10	180,000	650,000	180,000
Redwood City Harbor: San Bruno Shoal	SF-DODS[1]	Hopper	Clamshell	Infrequent (as needed)	1	30,000	30,000	5,000
Richmond Inner Harbor	SF-DODS[1]	Clamshell	Not Applicable	1	10	300,000	630,000	300,000
Richmond Outer Harbor	SF-10, SF-11[1]	Hopper	Clamshell	1	10	210,000	730,000	210,000
San Francisco Main Ship Channel	SF-17, SF-8	Hopper	Not Applicable	1	10	255,000 90,000	455,000 160,000	255,000 90,000
San Pablo Bay (Pinole Shoal)	SF-10[1]	Hopper	Clamshell	1 and advance dredging as needed	10	150,000	560,000	150,000
Suisun Bay Channel and New York Slough	SF-16[1]	Clamshell	Not Applicable	1 and emergency episodes as needed[2]	10	165,000	425,000	165,000
Napa River	Upland (sponsor-provided) Site	Cutterhead-pipeline	Clamshell	6–11	2	110,000	165,000	20,000
Petaluma: River Channel	Upland (sponsor-provided) Site	Cutterhead-pipeline	Clamshell	4–7	2	150,000	210,000	30,000
Petaluma: Across the Flats	SF-10[1]	Clamshell	Not Applicable	3	3	70,000	70,000	20,000
San Rafael Creek	SF-11[1]	Clamshell	Not Applicable	4 - 6	3	110,000	280,000	35,000

[1] Upland beneficial use site outside of work windows as mitigation
[2] USACE does not anticipate performing more than three emergency dredging episodes consisting of less than 30,000 cy each per year.

Key: CY = cubic yard

Redwood City Harbor

Channels

The Redwood City Harbor Channels includes Entrance Channel, Outer Turning Basin, Connecting Channel, and Inner Turning Basin. These areas would be dredged annually using a clamshell and transported to the placement site by scow. Maintenance dredging activities would occur between June 1 and November 30. The volume of dredged material generated by the Redwood City Harbor Channels would range between 10,000 and 650,000 CY per episode and the average volume of dredged material for the 10-year planning horizon would be approximately 180,000 CY per year.

San Bruno Shoal

San Bruno Shoal would be dredged once over the 10-year cycle using a hopper dredge. Maintenance dredging activities would occur between June 1 and November 30. The volume of dredged material generated by San Bruno Shoal would be approximately 30,000 CY per episode. However, because this channel has historically been dredged infrequently, historical dredge volumes may not be representative of future dredge volumes.

Richmond Harbor

Inner Harbor

The inner reaches of Richmond Channel, excluding the Santa Fe Channel, would be dredged annually using a clamshell and transported to the placement site by scow. Maintenance dredging activities would occur for a period of approximately 45 days between June 1 and November 30, as feasible. The volume of dredged material generated by the Inner Harbor Channel would range between 10,000 and 630,000 CY per episode and the average volume of dredged material for the 10-year planning horizon would be approximately 300,000 CY per year. The Santa Fe Channel is not anticipated to be dredged within the planning horizon (2025 through 2034) and is therefore not included in the study area.

Outer Harbor

The Long Wharf and Southampton Shoal portions of the Outer Harbor would be dredged annually, alternating between using a hopper dredge or clamshell. Maintenance dredging activities would occur for a period of approximately 10 to 15 days for hopper dredging in June and 100 days for clamshell between August 1 and November 30, as feasible. The volume of dredged material generated by the Outer Harbor Channel would range between 85,000 and 730,000 CY per episode and the average volume of dredged material for the 10-year planning horizon would be approximately 210,000 CY per year.

San Francisco Harbor: Main Ship Channel

The MSC would be dredged annually using a hopper dredge. In-Bay channels within the San Francisco Harbor project are not scheduled for dredging within the planning horizon (2025 through 2034). Maintenance dredging activities would occur for a period of approximately 10 to 14 days in the months of May and June but may occur as late as September. Dredging of the San Francisco Harbor MSC typically

occurs with USACE's hydraulic dredge, *Essayons*, or as part of the west coast hopper contract, with the precise timing dependent on the sea conditions allowing for safe operations. The *Essayons* is the only USACE dredge that is large and stable enough to operate safely in the San Francisco Harbor MSC (USACE and Regional Water Board 2015). The volume of dredged material generated by the San Francisco Harbor MSC would range between 80,000 and 615,000 CY per episode and the average volume of dredged material for the 10-year planning horizon would be approximately 345,000 CY per year, with approximately 255,000 CY placed at SF-17 and approximately 90,000 CY placed at SF-8.

San Pablo Bay (Pinole Shoal)

The Pinole Shoal Channel would be dredged annually, alternating between a hopper dredge or clamshell. Maintenance dredging activities would occur for a period of approximately 5 to 15 days for hopper dredging in June and 85 days for clamshell between August 1 and November 30, if feasible. The volume of dredged material generated by the Pinole Shoal Channel would range between 60,000 and 560,000 CY per episode and the average volume of dredged material for the 10-year planning horizon would be approximately 150,000 CY per year.

Advance maintenance dredging may be performed in areas where it has previously been conducted. This includes the southern edge of the channel, between buoy markers 10 and 12; and further east along the northern edge of the channel starting at buoy marker 11 to just east of buoy 13. The extent of the advance maintenance dredging in these two areas would be 200 feet wide and 2 feet deep; the channel depth is 35 feet.

Suisun Bay Channel

The Suisun Bay Channel and New York Slough Channel would be dredged annually using a clamshell. The dredged sediment would be transported to the placement site by scow. Maintenance dredging activities would occur between August 1 and November 30 (USFWS 2024). The volume of dredged material generated by the Suisun Bay Channel and the New York Slough Channel would range between 50,000 and 425,000 CY per episode and the average volume of dredged material for the 10-year planning horizon would be approximately 165,000 CY per year.

At Bulls Head Reach, past maintenance has included dredging up to 4 feet of advance maintenance material to accommodate rapid shoaling. This practice would continue to be reviewed annually and implemented as warranted during the regularly scheduled maintenance dredging with a clamshell dredge. In the case of Bulls Head Reach Shoal, USACE typically elects advance maintenance every year because that area shoals faster than the annual dredging cycle, and it is essential for USACE to maintain the utility of the channel as long as possible before needing to address any shoaling issues outside of the work window. In recent years, advance maintenance at Bulls Head Reach has reduced USACE's emergency dredging episodes[19] outside of the work window. To address continued excessive shoaling, USACE recently requested to increase advance maintenance dredging for Bullshead Reach and a portion

[19] Emergency dredging episodes occur outside the regular annual maintenance dredging of Suisun Bay Channel to remove a hazard to navigation when the channel is less than 35 feet below MLLW near the shoal.

of the Suisun Bay/New York Slough Channel, from elevation 37 feet to 39 feet below MLLW plus 2 feet of allowable overdepth (USACE 2024c). Approval is anticipated for 2025.

Napa River Channel

The Napa River Channel would be dredged every 6 to 11 years using a cutterhead attached to hydraulic pipelines, or alternatively using a clamshell. Maintenance dredging activities would occur for a period of approximately 40 days between August 1 and November 30, if feasible[20] (NMFS 2015). The volume of dredged material generated by the Napa River Channel would range between 65,000 and 165,000 CY per episode and the average volume of dredged material for the 10-year planning horizon would be approximately 20,000 CY per year. However, because of the lower frequency at which this channel is dredged, future dredge volumes could be greater than historical volumes. The Lower Napa River Channel and Upper Napa River Channel are authorized to be dredged to depths of 15 feet below MLLW and 10 feet below MLLW, respectively.

Petaluma River

River Channel

The Petaluma River Channel would be dredged every four to seven years using a cutterhead attached to hydraulic pipelines, or alternatively using a clamshell. Maintenance dredging would occur for a period of approximately 65 days between June 1 and November 30 (NMFS 2015). Dredging may occur outside this work window if impacts are mitigated with BUDM. The volume of dredged material generated by the Petaluma River Channel would range between 75,000 and 210,000 CY per episode and the average volume of dredged material for the 10-year planning horizon would be approximately 30,000 CY per year.

Across the Flats

Dredging of Across the Flats would occur every three years using a clamshell dredge. The dredged sediment would be transported to the placement site by scow. Maintenance dredging would occur for a period of approximately 45 days between June 1 and November 30, if feasible (NMFS 2015). Within 1,000 feet bayward of the mouth of Petaluma River for this channel, dredging may occur outside this work window if impacts are mitigated with placement of material at beneficial use site(s). The volume of dredged material generated by the Across the Flats portion of the channel would be approximately 70,000 CY per episode and the average volume of dredged material for the 10-year planning horizon would be approximately 20,000 CY per year. However, because this channel has historically been dredged infrequently, historical dredge volumes may not be representative of future dredge volumes.

San Rafael Creek

The San Rafael Creek Channel, which includes Across the Flats Channel and Inner Canal Channel, would be dredged every four to six years using a clamshell dredge. Maintenance dredging activities would occur for a period of approximately 35 days between June 1 and November 30, if feasible. The

[20] Feasibility is contingent upon the availability of federal funds (e.g., timing of Congressional appropriations) to execute the dredging work, as well as by the availability of dredging equipment to perform the dredging work at the referenced time and locations.

volume of dredged material generated by the San Rafael Creek Channel would range between 35,000 and 280,000 CY per episode and the average volume of dredged material for the 10-year planning horizon would be approximately 35,000 CY per year.

2.3.2.2 No Project Alternative (California Environmental Quality Act Baseline)

The No Project Alternative (Table 2-6 and 2-7) represents a continuation of existing dredging activities and is the current dredging program as implemented by USACE irrespective of current federally authorized dredging frequencies for channels. This alternative, overall, includes less dredging than the No Action Alternative because dredging in Richmond Outer Harbor and Pinole Shoal occurs every other year under the No Project Alternative. Dredging in the Napa River Channel would be done to a higher depth. In all other aspects, this alternative is the same as the No Action Alternative.

Detailed descriptions of the dredging activities for channels that differ than the No Action Alternative are provided below. For a detailed description of all other channels under the No Project Alternative, please refer to the discussion of the No Action Alternative above.

Table 2-6. No Project Alternative Placement Volume Summary

Placement Locations[1]	Minimum Volume (CY/year)	Average Volume (CY/year)	Maximum Volume (CY/year)[2]
Existing Beneficial Use Sites			
Upland Direct Placement Sites	0	0	0
Nearshore Strategic Placement Site – SF-17 (Ocean Beach Nearshore Placement Site)	105,850	254,040	317,550
Transitional Placement Sites			
SF-8, San Francisco Bar Channel Placement Site	0	84,680	211,700
In-Bay Placement Sites	635,100	740,950	846,800
Upland (Sponsor-Provided) Sites	0	21,170	211,700
Deep Ocean Disposal Site	952,650	1,016,160	1,164,350
Potential Future Beneficial Use Placement Sites[3]	0	0	0

[1] See Section 1.5.2.2 for description of placement sites.
[2] Maximum placement volumes would not be realized across placement locations concurrently.
[3] Potential Future BU Site Types include: Nearshore Strategic Placement Sites, Elevation Augmentation/Marsh Spraying Sites, Water Column Seeding Sites. Environmental review processes have not been completed for these sites and there is insufficient information available to fully analyze the potential impacts of placing dredged material at these locations in this Draft EA/EIR.

Key: CY = cubic yard

Richmond Harbor

Inner Harbor

For the No Project Alternative, Richmond Inner Harbor would continue to be dredged to depth of 38 feet below MLLW. Richmond Inner Harbor is authorized to be dredged to 41 feet below MLLW; however, due to funding constraints, USACE consistently maintains the depth of the channel at 38 feet below MLLW.

Outer Harbor

Under the No Project Alternative, the Long Wharf and Southampton Shoal portions of Outer Harbor would be dredged every two years using a hopper dredge. Maintenance dredging activities would occur for a period of approximately 10 to 15 days in June. The volume of dredged material generated by the Outer Harbor Channel would range between 85,000 and 730,000 CY per episode; the average volume of dredged material for the 10-year planning horizon would be approximately 125,000 CY per year if Richmond Outer Harbor is dredged every year, and 250,000 CY/episode if dredging occurs every other year.

San Pablo Bay/Mare Island Strait

The Pinole Shoal Channel would be dredged every two years using a hopper dredge under the No Project Alternative. Maintenance dredging activities would occur for a period of approximately 5 to 15 days in June. The volume of dredged material generated by the Pinole Shoal Channel would range between 60,000 and 560,000 CY per episode; the average volume of dredged material for the 10-year planning horizon would be approximately 190,000 CY per episode if dredging occurs every other year.

Napa River Channel

Under the No Project Alternative, Lower Napa River Channel and Upper Napa River Channel would be dredged to 9 feet below MLLW, rather than the authorized depths of -15 feet and -10 feet, respectively.

Table 2-7. No Project Alternative Summary

Channel	Placement Site	Likely Dredge Method	Alternate Dredge Method	Dredging Recurrence (years)	Dredging Episodes over 10-year Cycle	Average Volume per Episode (CY)	Maximum Volume per Episode (CY)	Average Annual Volume over 10-Year Cycle (CY)
Oakland: Inner and Outer Harbor	SF-DODS[1]	Clamshell	N/A	1	10	750,000	1,225,000	750,000
Redwood City Harbor: Channels	SF-11[1]	Clamshell	N/A	1	10	180,000	650,000	180,000
Redwood City Harbor: San Bruno Shoal	SF-DODS[1]	Hopper	N/A	Infrequent (as needed)	1	30,000	30,000	5,000
Richmond Inner Harbor	SF-DODS[1]	Clamshell	N/A	1	10	300,000	630,000	300,000
Richmond Outer Harbor	SF-10/SF-11[1]	Hopper	N/A	2	5	250,000	730,000	125,000
San Francisco Main Ship Channel	SF-17, SF-8	Hopper	N/A	1	10	255,000 90,000	455,000 160,000	255,000 90,000
San Pablo Bay (Pinole Shoal)	SF-10[1]	Hopper	Clamshell	2	5	190,000	560,000	95,000
Suisun Bay Channel and New York Slough	SF-16[1]	Clamshell	N/A	1 and emergency episodes as needed[2]	10	165,000	425,000	165,000
Napa River	Upland (sponsor-provided) Site	Cutterhead-pipeline	Clamshell	6–11	2	110,000	165,000	20,000
Petaluma: River Chanel	Upland (sponsor-provided) Site	Cutterhead-pipeline	Clamshell	4–7	2	150,000	210,000	30,000
Petaluma: Across the Flats	SF-10[1]	Clamshell	N/A	3	3	70,000	70,000	20,000
San Rafael Creek	SF-11[1]	Clamshell	N/A	4–6	3	110,000	280,000	35,000

[1] Upland beneficial use site outside of work windows as mitigation.
[2] USACE does not anticipate performing more than three emergency dredging episodes consisting of less than 30,000 cy each per year.

Key: CY = cubic yard
N/A = not applicable

2.3.3 Beneficial Use: Diversion from Deep Ocean Disposal (Alternative 1)

This alternative proposes to implement the No Action Alternative/No Project Alternative scenarios, except that a federal project otherwise slated for ocean disposal at SF-DODS may be split between placement in-Bay and at an upland beneficial use site to achieve additional BUDM while maintaining the same cost. In taking this approach, at the Bay-wide programmatic level, this alternative proposes to increase placement of dredged sediment at upland beneficial use sites from approximately 0 percent (No Action Alternative/No Project Alternative) to 5 to 20 percent; to decrease deep ocean disposal from approximately 45 to 55 percent (No Action Alternative/No Project Alternative) to 10 to 40 percent; and to increase in-Bay placement from approximately 30 to 40 percent to 35 to 55 percent at in-Bay sites annually. The remaining placement category percentage ranges would remain the same as No Action Alternative/No Project Alternative. The percentages of material going to each category vary depending on the level of maintenance dredging required and the federal channel being diverted from SF-DODS.

This alternative was constructed by identifying the opportunities to divert material from deep ocean disposal, i.e., which channels' previous Federal Standard Base Plan sites were SF-DODS under the No Action Alternative/No Project Alternative, including Oakland Inner and Outer Harbor and Richmond Inner Harbor. Based on the cost estimates developed through the RDMMP's cost engineering process (see Section 2.2), the optimal split for each channel between in-Bay placement and upland beneficial use placement was determined by matching the combined cost of the two placements with the cost of disposal at SF-DODS. Based on the volume to be placed at in-Bay and upland beneficial use sites from each channel, it was then determined which channel would be the more efficient split to pursue based on the current economic conditions, or whether pursuing both would be a viable option. The current cost estimates suggest that it is more effective to use Richmond Inner Harbor, which produces a higher percentage of beneficial use placement than Oakland (55 percent in-Bay to 45 percent upland beneficial use split for Richmond Inner Harbor, rather than 65 percent in-Bay to 35 percent beneficial use split for Oakland Inner and Outer Harbor). However, it is feasible that a different federal channel, such as Oakland, may be the source of the diversion in the future due to different economic and market conditions, equipment availability, technical feasibility, or environmental acceptability. Therefore, for the purposes of this Draft EA/EIR, different potential scenarios for meeting the Federal Standard Base Plan may occur under Alternative 1 by using hopper dredging to increase placement at in-Bay/upland sites and to provide flexibility in achieving the split. To mitigate for entrainment impacts to longfin smelt from the increase in hydraulic dredging, this alternative includes BUDM as a minimization measure to reduce the impacts to longfin smelt from hopper dredging.

The minimum amount of BUDM that would be required to offset impacts to longfin smelts will be calculated using the CDFW formula and conversion factors, including restoration costs and the unit cost of sediment to divert material to beneficial use sites. The CDFW formula is (USACE and Regional Water Board 2015):

$$Acres\ mitigation\ required = \frac{800\ acres * \ Pump\ Volume}{3.0\ million\ acre - feet}$$

The CDFW formula is used to calculate the acres of restored wetland necessary to adequately mitigate for the Central Valley and State Water Projects entrainment impacts from hydraulically pumping to extract water from the Delta. This formula is also appropriate for SF Bay dredging since it results in similar impacts to delta smelt and longfin smelt (i.e., entrainment resulting from extracting material via hydraulically pumping water).

For hopper dredging, the actual pump volume in acre-feet during dredging events will be used to solve the equation for acreage of habitat restoration required. In this case, that pump volume in the equation is a formula that includes pump rate, which is the minutes of pump time multiplied by the pump rate to get the volume of water pumped during that dredging episode, in units of acre-feet. The dredging formula is:

$$Acres\ mitigation\ required = \frac{800\ acres * Volume_{water\ \ pumped\ \ by\ hopper\ \ dredge}}{3.0\ million\ acre - feet}$$

Then the acres of mitigation are converted to a volume of sediment that would be sent to a beneficial use site by multiplying the acres of mitigation required by the cost of mitigation credits ($1,325,000 per acre), divided by the incremental cost of BUDM between the Federal Standard Base Plan placement site (for the channel in which the impact is occurring) and beneficial use at a tidal wetland restoration site. This is then multiplied by a factor of 2 to account for project uncertainty. The resulting formula is:

$$Volume\ BUDM = \frac{acres\ mitigation\ required\ \times\ \$1{,}325{,}000\ \text{per acre}}{Cost_{Increment}\ \ per\ cubic\ yard} \times 2$$

A multiplier of 2 was used to account for uncertainty in the timing of restoration, likely distance of the impact sites from the beneficial use site(s), temporal losses in aquatic resource functions, and the likelihood of success of the restoration activities at the beneficial use site(s). This multiplier is consistent with Regional Water Board permit requirements for compensatory mitigation of dredge and fill impacts under § 230.93(f)(2) of the State Supplemental Dredge and Fill Guidelines when mitigation is offsite and will take a relatively long time (over 10 years) to fully develop ecosystem functions and values. See Section 3.3.4.1 for more discussion of the basis of calculations.

Using this formula and choosing an example of total pump volume of approximately 1,168 acre-feet to hopper dredge both Pinole Shoal and Richmond Outer Harbor, the amount of BUDM needed to minimize entrainment impacts on longfin smelt would be approximately 45,000 CY. Under this alternative, it is anticipated that each year, a minimum of approximately 115,000 CY of material will be beneficially used at upland direct placement sites to restore tidal wetland habitat used by longfin smelt (see Table 2-8).[21] Accordingly, the amount of upland BUDM to restore longfin smelt habitat in this alternate is over two times the volume needed to minimize entrainment impacts to longfin smelt.

For a detailed description of all the dredging sites under Alternative 1, please refer to the discussion of the No Action Alternative/No Project Alternative above and to Tables 2-8 and 2-9. Alternative 1 has more BUDM than the No Action Alternative/No Project Alternative.

[21] Other fish species, including salmonids, Pacific herring, and Dungeness crab may also benefit from creation of nursery grounds from beneficial use.

Table 2-8. Estimated Potential Placement Volume Summary for Alternative 1

Placement Locations[1]	Minimum Volume (CY/year)	Average Volume (CY/year)	Maximum Volume (CY/year)[2]
Existing Beneficial Use Sites			
Upland Direct Placement Sites (Tidal Wetland Restoration Sites)	112,850	135,420	451,400
Nearshore Strategic Placement Site: SF-17 (Ocean Beach Nearshore Placement Site)	112,850	270,840	338,550
Transitional Placement Sites			
SF-8, San Francisco Bar Channel Placement Site	0	90,280	225,700
In-Bay Placement Sites	789,950	947,940	1,241,350
Upland (Sponsor-Provided) Sites	0	22,570	225,700
Deep Ocean Disposal Site	225,700	789,950	902,800
Potential Future Beneficial Use Placement Sites[3]	0	0	0

[1] See Section 1.5.2.2 for description of placement sites.
[2] Maximum placement volumes would not be realized across placement locations concurrently.
[3] Potential Future Beneficial Use Site Types include: Nearshore Strategic Placement Sites, Elevation Augmentation/Marsh Spraying Sites, Water Column Seeding Sites. Environmental review processes have not been completed for these sites and there is insufficient information available on these sites to fully analyze the potential impacts of placing dredged material at these locations in this Draft EA/EIR.

Key: CY = cubic yard

Table 2-9. Alternative 1 Example Implementation Summary

Channel	Placement Site[1]	Likely Dredge Method	Alternate Dredge Method	Dredging Recurrence (years)	Dredging Episodes over 10-Year Cycle	Average Volume per Episode (CY)	Maximum Volume per Episode (CY)	Average Annual Volume over 10-Year Cycle (CY)
Oakland: Inner and Outer Harbor	SF-DODS[2]	Clamshell	N/A	1	10	750,000	1,225,000	750,000
Redwood City Harbor: Channels	SF-11[2]	Clamshell	N/A	1	10	180,000	650,000	180,000
Redwood City Harbor: San Bruno Shoal	SF-DODS[2]	Hopper	Clamshell	Infrequent (as needed)	1	30,000	30,000	5,000
Richmond Inner Harbor	SF-11[2] Upland BU Site	Clamshell	Hopper Cutterhead-pipeline	1	10	160,000 140,000	335,000 295,000	160,000 140,000
Richmond Outer Harbor	SF-11[2]	Hopper	Clamshell	1	10	210,000	730,000	210,000
San Francisco Main Ship Channel	SF-17, SF-8	Hopper	N/A	1	10	255,000 90,000	455,000 160,000	255,000 90,000
San Pablo Bay (Pinole Shoal)	SF-10[2]	Hopper	Clamshell	1 and advance dredging as needed	10	150,000	560,000	150,000
Suisun Bay Channel and New York Slough	SF-16[2]	Clamshell	N/A	1 and emergency episodes as needed[3]	10	165,000	425,000	165,000
Napa River	Upland (sponsor-provided) Site, Upland BU Site	Cutterhead-pipeline	Clamshell	6–11	2	110,000	165,000	20,000

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Channel	Placement Site[1]	Likely Dredge Method	Alternate Dredge Method	Dredging Recurrence (years)	Dredging Episodes over 10-Year Cycle	Average Volume per Episode (CY)	Maximum Volume per Episode (CY)	Average Annual Volume over 10-Year Cycle (CY)
Petaluma: River	Upland (sponsor-provided) Site, Upland BU Site	Cutterhead-pipeline	Clamshell	4–7	2	150,000	210,000	30,000
Petaluma: Across the Flats	SF-10[2]	Clamshell	Cutterhead-pipeline	3	3	70,000	70,000	20,000
San Rafael Creek	SF-11[2]	Clamshell	N/A	4–6	3	110,000	280,000	35,000

[1] Placement sites can vary over the 10-year dredging cycle and are provided as one example of how this alternative can be executed.
[2] Upland beneficial use site outside of work windows as mitigation.
[3] USACE does not anticipate performing more than three emergency dredging episodes consisting of less than 30,000 CY each per year.

Key: BU = beneficial use
CY = cubic yard
N/A = not applicable

2.3.4 Beneficial Use: Regional Optimization, Leverage Hopper Dredging (Alternative 2)

This alternative proposes to increase hopper dredging in the Bay to offset the increased cost of beneficial use to achieve more BUDM than Alternative 1 and the No Action Alternative/No Project Alternative. Hopper dredging can be increased to include Richmond Inner Harbor or Oakland Harbor, or a mixture of both projects. Placement with a hopper dredge is usually limited to in-Bay sites as the government dredge, the *Essayons*, is unable to place material upland. Therefore, BUDM volume from another project using a clamshell or hydraulic dredge with pumpoff capability would be required. Ultimately, this alternative proposes to increase BUDM placement from approximately 0 percent (No Action Alternative/No Project Alternative) to 20 to 30 percent; to decrease deep ocean disposal from approximately 45 to 55 percent (No Action Alternative/No Project Alternative) to 0 to 10 percent; and to increase in-Bay placement from approximately 30 to 40 percent (No Action Alternative/No Project Alternative) to 50 to 60 percent. The other category percentage ranges remain the same as for the No Action Alternative/No Project Alternative. These percentages at the Bay-wide, programmatic level may vary depending on the level of maintenance dredging required and which channels are dredged hydraulically for material placement at in-Bay sites. This alternative in the RDMMP identifies that Richmond Inner Harbor would be dredged hydraulically to allow most of Oakland Harbor to be placed at an upland beneficial use site. This is one example of how to execute the navigation program in line with the theme of this alternative (Table 2-10). However, it is possible that hydraulic dredging could occur in other channels (e.g., Oakland Inner and Outer Harbor) in exchange for mechanical dredging in others for upland beneficial use (e.g., Richmond Inner and/or Outer Harbor) to execute the program differently than above in the future due to different economic and market conditions, technical feasibility, or environmental acceptability.

This alternative was constructed by first identifying the least-cost dredging method and placement site combination for each channel. In most cases, the least-cost options were in-Bay sites, and the least-cost dredging methods were hydraulic dredging where technically feasible. However, since this would result in nearly all dredged sediment being placed at in-Bay sites, a cost effectiveness analysis was done to determine which channels should be diverted from in-Bay placement to upland beneficial use placement. This approach used the cost difference between each channel's BUDM placement and least-cost placement site option and resulted in the selection of the most cost-effective channels to be diverted to upland beneficial use. BUDM placement was prioritized over ocean disposal as the diversion destination to maximize beneficial use and avoid ocean disposal. Importantly, this alternative also sought to achieve cost parity with the No Action Alternative/No Project Alternative, like Alternative 1, but at the regional scale. As such, the maximum volume of sediment was diverted to upland beneficial use that kept the regional cost the same as the No Action Alternative/No Project Alternative. In doing so, it represents the regionally optimal approach (i.e., maximum BUDM, minimum ocean disposal, and equal cost to the No Action Alternative/No Project Alternative).

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This breakdown is one example of how to execute this alternative at the regional scale (Table 2-10). While some channels can achieve cost savings by placing dredged material at a different in-Bay site than its placement site under the No Action Alternative/No Project Alternative (e.g., San Pablo Bay [Pinole Shoal]), the bulk of the cost savings comes from Richmond Inner Harbor and a portion of Oakland Harbor, which would use hydraulic (hopper) dredging and would place dredged material at an in-Bay site. This contrasts with the No Action Alternative/No Project Alternative, in which both channels would be mechanically dredged and transported to SF-DODS for ocean disposal. This cost savings is then applied to other channels and reaches to cover the additional cost of taking material to beneficial use sites (i.e., the most expensive option). In the example listed in Table 2-10, the cost savings is applied to the majority (approximately 70 percent) of Oakland Harbor and a portion (approximately 20 percent) of Suisun Bay Channel. Suisun Bay Channel, while clean, can only send approximately 20 percent to beneficial use due to suitability concerns resulting from the historical Port Chicago explosion at the nearby Military Ocean Terminal Concord, and the possibility of unexploded ordnance in the sediment.

This Draft EA/EIR evaluates hydraulic dredging in channels other than those listed in the example above in exchange for mechanical dredging in others for upland beneficial use, to provide flexibility to execute the program differently than above due to technical feasibility or environmental acceptability, or if the economic conditions change and other combinations become more cost-effective. This alternative includes BUDM, which will minimize potential longfin smelt population impacts from entrainment through habitat creation. The quantity of BUDM needed to offset longfin smelt impacts would be calculated as described in Alternative 1 above. Under Alternative 2, the amount of beneficial use needed to minimize entrainment impacts on longfin smelt for hopper dredging in Oakland Harbor Richmond Inner and Outer Harbor, and Pinole Shoal, would be approximately 125,000 CY. Under this alternative, it is anticipated that each year, a minimum of approximately 450,000 CY of material will be beneficially used at upland direct placement sites to restore tidal wetland habitat used by longfin smelt (see Table 2-10). Accordingly, the amount of upland BUDM to restore longfin smelt habitat in this alternative is over three times the required volume needed to minimize entrainment impacts to longfin smelt

For a detailed description of all the dredging sites under Alternative 2, please refer to the discussion of the No Action Alternative/No Project Alternative above and to Table 2-10 and 2-11.

Table 2-10. Estimated Potential Placement Volume Summary for Alternative 2

Placement Locations[1]	Minimum Volume (CY/year)	Average Volume (CY/year)	Maximum Volume (CY/year)[2]
Existing Beneficial Use Sites			
Upland Direct Placement Sites (Tidal Wetland Restoration Sites)	451,400	609,390	677,100
Nearshore Strategic Placement Site: SF-17 (Ocean Beach Nearshore Placement Site)	112,850	270,840	338,550
Transitional Placement Sites			
SF-8, San Francisco Bar Channel Placement Site	0	90,280	225,700
In-Bay Placement Sites[3]	1,128,500	1,263,920	1,354,200
Upland (Sponsor-Provided) Sites	0	22,570	225,700
Deep Ocean Disposal Site	0	0	225,700
Potential Future Beneficial Use Placement Sites4	0	0	0

[1] See Section 1.5.2.2 for descriptions of placement sites.
[2] Maximum placement volumes would not be realized across placement locations concurrently.
[3] Noting that in-Bay placement volumes suggest potential to exceed LTMS agency goals, the RDDMP acknowledges that at the triennial LTMS review, if the average in-Bay disposal volume from the prior three years exceeds the in-Bay targets plus the 250,000-cy contingency, the LTMS agencies will initiate consideration of allocations.
[4] Potential Future BU Site Types include: Nearshore Strategic Placement Sites, Elevation Augmentation/Marsh Spraying Sites, and Water Column Seeding Sites. Environmental review processes have not been completed for these sites and there is insufficient information available to fully analyze the potential impacts of placing dredged material at these locations in this Draft EA/EIR.

Key: CY = cubic yard

Table 2-11. Alternative 2 Example Implementation Summary

Channel	Placement Site[1]	Likely Dredge Method	Alternate Dredge Method	Dredging Recurrence (years)	Dredging Episodes over 10-Year Cycle	Average Volume per Episode (CY)	Maximum Volume per Episode (CY)	Average Annual Volume over 10-Year Cycle (CY)
Oakland: Inner and Outer Harbor	Upland BU site	Clamshell	Cutterhead-pipeline	1	10	540,000	880,00	540,000
	SF-11[2]	Hopper	Clamshell	1	10	210,000	345,000	210,000
Redwood City Harbor: Channels	SF-11[2]	Clamshell	N/A	1	10	180,000	650,000	180,000
Redwood City Harbor: San Bruno Shoal	SF-11[2]	Hopper	Clamshell	23	1	30,000	30,000	5,000
Richmond Inner Harbor	SF-11[2]	Hopper	Clamshell	1	10	300,000	630,000	300,000
Richmond Outer Harbor	SF-10[2]	Hopper	Clamshell	1	10	210,000	730,000	210,000
San Francisco Main Ship Channel	SF-17, SF-8	Hopper	N/A	1	10	255,000 90,000	455,000 160,000	255,000 90,000
San Pablo Bay (Pinole Shoal)	SF-9[2]	Hopper	Clamshell	1 and advance dredging as needed	10	150,000	560,000	150,000
Suisun Bay Channel and New York Slough	SF-16,[2] Upland BU site	Clamshell	N/A	1 and emergency episodes as needed[3]	10	130,000 35,000	355,000 90,000	130,000 35,000
Napa River	Upland (sponsor-provided) Site, Upland BU Site	Cutterhead-pipeline	Clamshell	6–11	2	110,000	165,000	20,000

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Channel	Placement Site[1]	Likely Dredge Method	Alternate Dredge Method	Dredging Recurrence (years)	Dredging Episodes over 10-Year Cycle	Average Volume per Episode (CY)	Maximum Volume per Episode (CY)	Average Annual Volume over 10-Year Cycle (CY)
Petaluma: River	Upland (sponsor-provided) Site, Upland BU Site	Cutterhead-pipeline	Clamshell	4–7	2	150,000	210,000	30,000
Petaluma: Across the Flats	SF-10[2]	Clamshell	Cutterhead-pipeline	3	3	70,000	70,000	20,000
San Rafael Creek	SF-9[2]	Clamshell	N/A	4–6	3	110,000	280,000	35,000

[1] Placement sites can vary over the 10-year dredging cycle and are provided as one example of how this alternative can be executed.
[2] Upland beneficial use site outside of work windows as mitigation.
[3] USACE does not anticipate performing more than three emergency dredging episodes consisting of less than 30,000 CY each per year.

Key: BU = beneficial use
CY = cubic yard
N/A = not applicable

2.3.5 Beneficial Use: Cost Share Opportunity (Alternative 3)

This alternative proposes building on Alternative 2 (above) and taking more sediment to upland beneficial use sites within the WRDA 2020 Section 125a threshold to more easily justify the cost share of the BUDM incremental cost for O&M budgets. At the Bay-wide programmatic level, this alternative proposes to increase BUDM placement from approximately 0 percent (No Action Alternative/No Project Alternative) to 35 to 45 percent; to decrease deep ocean disposal from approximately 45 to 55 percent (No Action Alternative/No Project Alternative) to 0 to 10 percent; and to increase in-Bay placement from approximately 30 to 40 percent (No Action Alternative/No Project Alternative) to 35 to 45 percent. The other category percentage ranges remain the same as the No Action Alternative/No Project Alternative. This alternative is not a candidate to be the Federal Standard Base Plan given it is not the least-cost alternative, but it would be feasible with non-federal funding for 35 percent of the incremental cost above the Federal Standard Base Plan given that the benefits are qualitatively justified.

This alternative was built upon the regional optimization Alternative 2, with the level of increased BUDM calculated as the 25 percent threshold identified in WRDA 2020 Section 125a, which is described as the point at which the federal share of the incremental cost share (i.e., 65 percent of the incremental cost) is 25 percent above the Federal Standard Base Plan cost (see above for definition and description of the Federal Standard Base Plan). This authority delineates between simpler, qualitative articulation of benefits below the threshold, and more comprehensive, quantitative articulation of benefits above the threshold to justify the federal investment from the O&M budget on the incremental cost of beneficial use. The alternative, therefore, uses this 25 percent federal share of the incremental cost above the Federal Standard Base Plan to determine what level of BUDM can be justified using the simpler, qualitative approach described above. This amount provides information on the approximate amount of additional BUDM volume that can be achieved in a relatively straightforward fashion. For more information, see the WRDA 2020 section of the RDMMP. The specific volumes from each channel are described as an example of how this alternative can be executed in Table 2-12.

This alternative includes BUDM, which will minimize potential longfin smelt population impacts from entrainment through habitat creation. The quantity of BUDM needed to offset longfin smelt impacts would be calculated as described in Alternative 1 above. Under Alternative 3, the amount of BUDM needed to minimize entrainment impacts on longfin smelt would be approximately 85,000 CY. Under this alternative, It is anticipated that each year, a minimum of approximately 800,000 CY will be beneficially used at upland direct placement sites to restore tidal wetland habitat used by longfin smelt (see Table 2-12). Accordingly, the minimum amount of upland BUDM to restore longfin smelt habitat in this alternate is over nine times the required volume.

For a detailed description of all the dredging sites under Alternative 3, please refer to the discussion of the No Action Alternative/No Project Alternative above, and to Table 2-12 and 2-13.

Table 2-12. Estimated Potential Placement Volume Summary for Alternative 3

Placement Locations[1]	Minimum Volume (CY/year)	Average Volume (CY/year)	Maximum Volume (CY/year)[2]
Existing Beneficial Use Sites			
Upland Direct Placement Sites (Tidal Wetland Restoration Sites)	789,950	970,510	1,015,650
Nearshore Strategic Placement Site: SF-17 (Ocean Beach Nearshore Placement Site)	112,850	270,840	338,550
Transitional Placement Sites			
SF-8, San Francisco Bar Channel Placement Site	0	90,280	225,700
In-Bay Placement Sites	789,950	902,800	1,015,650
Upland (Sponsor-Provided) Sites	0	22,570	225,700
Deep Ocean Disposal Site	0	0	225,700
Potential Future beneficial use Placement Sites3	0	0	0

[1] See Section 1.5.2.2 for description of placement sites.
[2] Maximum placement volumes would not be realized across placement locations concurrently.
[3] Potential Future Beneficial Use Site Types include: Nearshore Strategic Placement Sites, Elevation Augmentation/Marsh Spraying Sites, and Water Column Seeding Sites. Environmental review processes have not been completed for these sites and there is insufficient information available to fully analyze the potential impacts of placing dredged material at these locations in this Draft EA/EIR.

Key: CY = cubic yard

Table 2-13. Alternative 3 Example Implementation Summary

Channel	Placement Site[1]	Likely Dredge Method	Alternate Dredge Method	Dredging Recurrence (years)	Dredging Episodes over 10-Year Cycle	Average Volume per Episode (CY)	Maximum Volume per Episode (CY)	Average Annual Volume over 10-Year Cycle (CY)
Oakland: Inner and Outer Harbor	Upland BU Site	Clamshell	Cutterhead-pipeline	1	10	750,000	1,225,000	750,000
Redwood City Harbor: Channels	SF-11[2], Upland BU Site	Clamshell	N/A; Cutterhead-pipeline	1	10	100,000 80,000	360,000 290,000	100,000 80,000
Redwood City Harbor: San Bruno Shoal	SF-11[2]	Hopper	Clamshell	Infrequent (as needed)	1	30,000	30,000	5,000
Richmond Inner Harbor	SF-11[2]	Hopper	Clamshell	1	10	265,000	555,000	265,000
	Upland BU Site	Clamshell	Cutterhead-pipeline	1	10	35,000	75,000	35,000
Richmond Outer Harbor	SF-10[2]	Hopper	Clamshell	1	10	195,000	680,000	195,000
	Upland BU Site	Clamshell	Cutterhead-pipeline	1	10	15,000	50,000	15,000
San Francisco Main Ship Channel	SF-17 SF-8	Hopper	N/A	1	10	255,000 90,000	455,000 160,000	255,000 90,000
San Pablo Bay (Pinole Shoal)	SF-9[2]	Hopper	Clamshell	1 and advance dredging as needed	10	140,000	520,000	140,000
	Upland BU Site	Clamshell	N/A	1 and advance dredging as needed	10	10,000	40,000	10,000
Suisun Bay Channel and New York Slough	SF-16,[2] Upland BU Site	Clamshell	N/A	1 and emergency episodes as needed[3]	10	130,000 35,000	335,000 90,000	130,000 35,000

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Channel	Placement Site[1]	Likely Dredge Method	Alternate Dredge Method	Dredging Recurrence (years)	Dredging Episodes over 10-Year Cycle	Average Volume per Episode (CY)	Maximum Volume per Episode (CY)	Average Annual Volume over 10-Year Cycle (CY)
Napa River	Upland (Sponsor-Provided) Site, Upland BU Site	Cutterhead-pipeline	Clamshell	6–11	2	110,000	165,000	20,000
Petaluma: River	Upland (Sponsor-Provided) Site, Upland BU Site	Cutterhead-pipeline	Clamshell	4–7	2	150,000	210,000	30,000
Petaluma: Across the Flats	SF-10[2]	Clamshell	Cutterhead-pipeline	3	3	70,000	70,000	20,000
San Rafael Creek	SF-9[2] Upland BU Site	Clamshell	N/A; Cutterhead-pipeline	4–6	3	65,000 45,000	165,000 115,000	20,000 15,000

[1] Placement sites can vary over the 10-year dredging cycle and are provided as one example of how this alternative can be executed.
[2] Upland beneficial use site outside of work windows as mitigation.
[3] USACE does not anticipate performing more than three emergency dredging episodes consisting of less than 30,000 cy each per year.

Key: BU = beneficial use
CY = cubic yard
N/A = not applicable

2.3.6 Beneficial Use: Maximized (Alternative 4)

This alternative proposes placing all suitable material at upland beneficial use sites, including a portion of sediment being placed at nearshore strategic placement beneficial use sites designed to leverage tidal and wave energy to transport sediment from shallow subtidal placement areas to existing intertidal mudflats and marshes. Alternative 4 can also be executed with the volume of sediment placed at the nearshore strategic placement beneficial use sites being placed at upland beneficial use sites instead.

At the Bay-wide programmatic level, this alternative proposes to increase BUDM from approximately 0 percent (No Action Alternative/No Project Alternative) to 65 to 75 percent; to increase beneficial use nearshore strategic placement from approximately 0 percent (No Action Alternative/No Project Alternative) to 5 to 15 percent; to decrease deep ocean disposal from approximately 45 to 55 percent (No Action Alternative/No Project Alternative) to 0 to 10 percent; and to decrease in-Bay placement from approximately 30 to 40 percent (No Action Alternative/No Project Alternative) to 0 to 10 percent. The other category percentage ranges remain the same as No Action Alternative/No Project Alternative. This alternative is not a candidate to be the Federal Standard Base Plan given that it is not the least-cost alternative and would require non-federal funding for the full incremental cost above the Federal Standard Base Plan, or for 35 percent of the incremental cost given the benefits justify and quantitatively exceed the incremental cost under the WRDA 2020 Section 125a cost-sharing authority. Currently, no non-federal entity has expressed interest in such a programmatic-wide-scale partnership. However, USACE remains open to the possibility should any non-federal entity express such interest or for any partnerships on a project-by-project or year-by-year basis.

This alternative was constructed based on maximizing the amount of suitable material for upland beneficial use and nearshore strategic placement beneficial use. All channels capable of supplying dredged material for beneficial use do so under this alternative, including placement of MSC sand directly on Ocean Beach for beach nourishment (see Ocean Beach Onshore section of the RDMMP for more details). The alternative outlines the amount of BUDM that would be achievable given the more comprehensive, quantitative articulation of benefits above the threshold to justify federal investment from the O&M budget on the incremental cost of BUDM placement. Additionally, should the federal investment not be deemed justified, it is still possible to execute this alternative if non-federal partners are willing to fund the full 100 percent of the incremental cost for BUDM placement above the Federal Standard Base Plan. For more information, see the WRDA 2020 section of the RDMMP. The specific volumes from each channel are described as an example of how this alternative can be executed in Table 2-14.

Alternative 4 includes BUDM, which will provide habitat and species benefits, consistent with the objectives of the project.

For a detailed description of all the dredging sites under Alternative 4, please refer to the discussion of the No Action Alternative/No Project Alternative above and to Table 2-14 and 2-15. Additional BUDM placement concepts (e.g., upland direct placement, nearshore strategic placement, elevation augmentation/marsh spraying, and/or water column seeding) and sites may be considered by USACE under this alternative. Potential impacts related to use of these sites are disclosed on a broad level in Chapter 3 because these sites may become authorized placement sites within the 10-year planning

horizon for this document. Use of these sites by USACE would be conditioned upon the completion of supplemental environmental review under NEPA and/or CEQA, and acquisition of required environmental approvals from resource and regulatory agencies. The ability of USACE to use a given site for placement would be dependent on the accessibility of the site to different dredge equipment, types of dredged material authorized for placement at the site, cost, and other parameters.

Table 2-14. Estimated Potential Placement Volume Summary for Alternative 4

Placement Locations[1]	Minimum Volume (CY/year)	Average Volume (CY/year)	Maximum Volume (CY/year)[2]
Existing Beneficial Use Sites			
Upland Direct Placement Sites (Tidal Wetland Restoration Sites)	1,467,050	1,602,470	1,692,750
Nearshore Strategic Placement Site: SF-17 (Ocean Beach Nearshore Placement Site)	112,850	270,840	338,550
Transitional Placement Sites			
SF-8, San Francisco Bar Channel Placement Site	0	0	225,700
In-Bay Placement Sites	0	135,420	225,700
Upland (Sponsor-Provided) Sites	0	22,570	225,700
Deep Ocean Disposal Site	0	0	225,700
Potential Future Beneficial Use Placement Sites3	112,850	203,130	338,550

[1] See Section 1.5.2.2 for description of placement sites.
[2] Maximum placement volumes would not be realized across placement locations concurrently.
[3] Potential Future BU Site Types include: Nearshore Strategic Placement Sites, Elevation Augmentation/Marsh Spraying Sites, and Water Column Seeding Sites. Environmental review processes have not been completed for these sites and there is insufficient information available to fully analyze the potential impacts of placing dredged material at these locations in this Draft EA/EIR.

Key: CY = cubic yard

Table 2-15. Alternative 4 Example Implementation Summary

Channel	Placement Site[1]	Likely Dredge Method	Alternate Dredge Method	Dredging Recurrence (years)	Dredging Episodes over 10-Year Cycle	Average Volume per Episode (CY)	Maximum Volume per Episode (CY)	Average Annual Volume over 10-Year Cycle (CY)
Oakland: Inner and Outer Harbor	Upland BU Site, Future BU Placement Site[2]	Clamshell	Cutterhead-pipeline	1	10	650,000 100,000	1,060,000 165,000	650,000 100,000
Redwood City Harbor: Channels	Upland BU Site, Future BU Placement Site[2]	Clamshell	Cutterhead-pipeline	1	10	80,000 100,000	290,000 360,000	80,000 100,000
Redwood City Harbor: San Bruno Shoal	Upland BU site	Hopper	Clamshell	Infrequent (as needed)	1	30,000	30,000	5,000
Richmond Inner Harbor	Upland BU Site	Clamshell	Cutterhead-pipeline	1	10	300,000	630,000	300,000
Richmond Outer Harbor	Upland BU Site	Clamshell	Cutterhead-pipeline	1	10	210,000	730,000	210,000
San Francisco Main Ship Channel	SF-17, Onshore BU Site	Hopper	Not Applicable	1	10	260,000 85,000	465,000 150,000	260,000 85,000
San Pablo Bay (Pinole Shoal)	Upland BU site	Clamshell	Not Applicable	1 and advance dredging as needed	10	150,000	560,000	150,000
Suisun Bay Channel and New York Slough	SF-16[3] Upland BU Site	Clamshell	Not Applicable	1 and emergency episodes as needed[4]	10	130,000 35,000	335,000 90,000	130,000 35,000
Napa River	Upland (sponsor-provided) Site, Upland BU Site	Cutterhead-pipeline	Clamshell	6–11	2	110,000	165,000	20,000

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Channel	Placement Site[1]	Likely Dredge Method	Alternate Dredge Method	Dredging Recurrence (years)	Dredging Episodes over 10-Year Cycle	Average Volume per Episode (CY)	Maximum Volume per Episode (CY)	Average Annual Volume over 10-Year Cycle (CY)
Petaluma: River	Upland (sponsor-provided) Site, Upland BU Site	Cutterhead	Clamshell	4–7	2	150,000	210,000	30,000
Petaluma: Across the Flats	SF-10[3], Upland BU Site	Clamshell	Cutterhead-pipeline	3	3	70,000	70,000	20,000
San Rafael Creek	Upland BU site	Clamshell	Cutterhead-pipeline	4–6	3	110,000	280,000	35,000

[1] Placement sites can vary over the 10-year dredging cycle and are provided as one example of how this alternative can be executed.
[2] Use of potential future beneficial use sites would be subject to completion of required environmental review and permitting approvals from resource and regulatory agencies. The ability of USACE to use a given site for placement would be dependent on the accessibility of the site to different dredge equipment, types of dredged material authorized for placement at the site, cost, and other parameters.
[3] Upland beneficial use site outside of work windows as mitigation.
[4] USACE does not anticipate performing more than three emergency dredging episodes consisting of less than 30,000 cy each per year.

Key: BU = beneficial use
CY = cubic yard
N/A = not applicable
USACE = US Army Corps of Engineers
SF-10 = San Pablo Bay placement site
SF-16 = Suisun Bay placement site
SF-17 = Ocean Beach Demonstration Site

2.4 Proposed Action/Proposed Project

The requirement for review under NEPA is triggered by a "federal action." (40 C.F.R. pt. 1508.1[w]). The Proposed (federal) Action described in this section would meet the purpose and need described in Chapter 1, which is to allow maintenance dredging of the federal navigation channels in SF Bay consistent with the goals and adopted plans of the LTMS, while adequately protecting the environment, including listed species.

Under CEQA, a detailed and stable project description (Proposed Project) is fundamental to the purpose of the study, which is to identify and analyze impacts from the Proposed Project. The CEQA Guidelines defines the types of information that must be included in an EIR project description. The project description must include the specifics of the Proposed Project, the project site and its surroundings, but does not need to include extensive detail beyond what is needed to evaluate environmental impacts (CEQA Guidelines Section 15124).

The Proposed Action/Proposed Project is the phased implementation of the USACE Federal Standard Base Plan alternatives – the No Project Alternative, Alternative 1, and Alternative 2. The No Project Alternative, Alternative 1 (diversion from ocean disposal), and Alternative 2 (regional optimization) are all least cost, while Alternative 3 (cost-share opportunity) and Alternative 4 (maximum BUDM) are progressively more expensive. Of the three least cost options that are candidates to be the Federal Standard Base Plan, the No Project Alternative results in the most ocean disposal and least BUDM, and Alternative 2 results in the most BUDM and the least ocean disposal. As described previously, Alternative 3 and Alternative 4 are not least cost and, therefore, do not qualify to be the Federal Standard Base Plan. If non-federal funding become available or incremental cost-sharing opportunities present themselves, USACE will seek to implement Alternatives 3 or 4, when practicable. Figure 2-5 provides an overview of the differing dredged material disposal/placement details across alternatives, with hatched bars indicating the potential maximum range of sediment placement options for each alternative. Figure 2-6 provides more detail on cost share scenarios for the percentage range of combined BUDM for each alternative; the red line indicates the least Federal Standard Base Plan threshold.

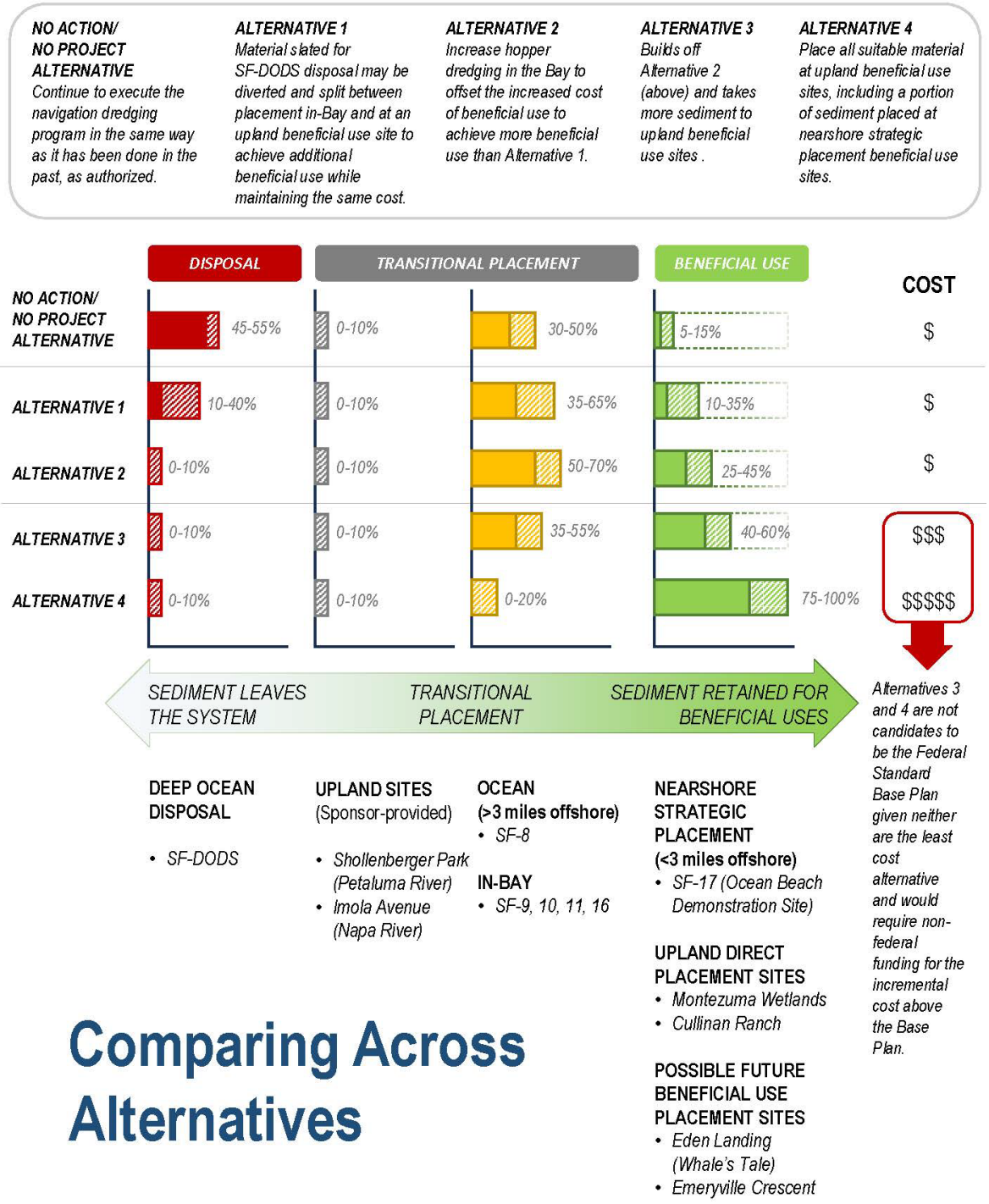


Figure 2-5. Comparison of Dredged Material Disposal and Placement Across Alternatives

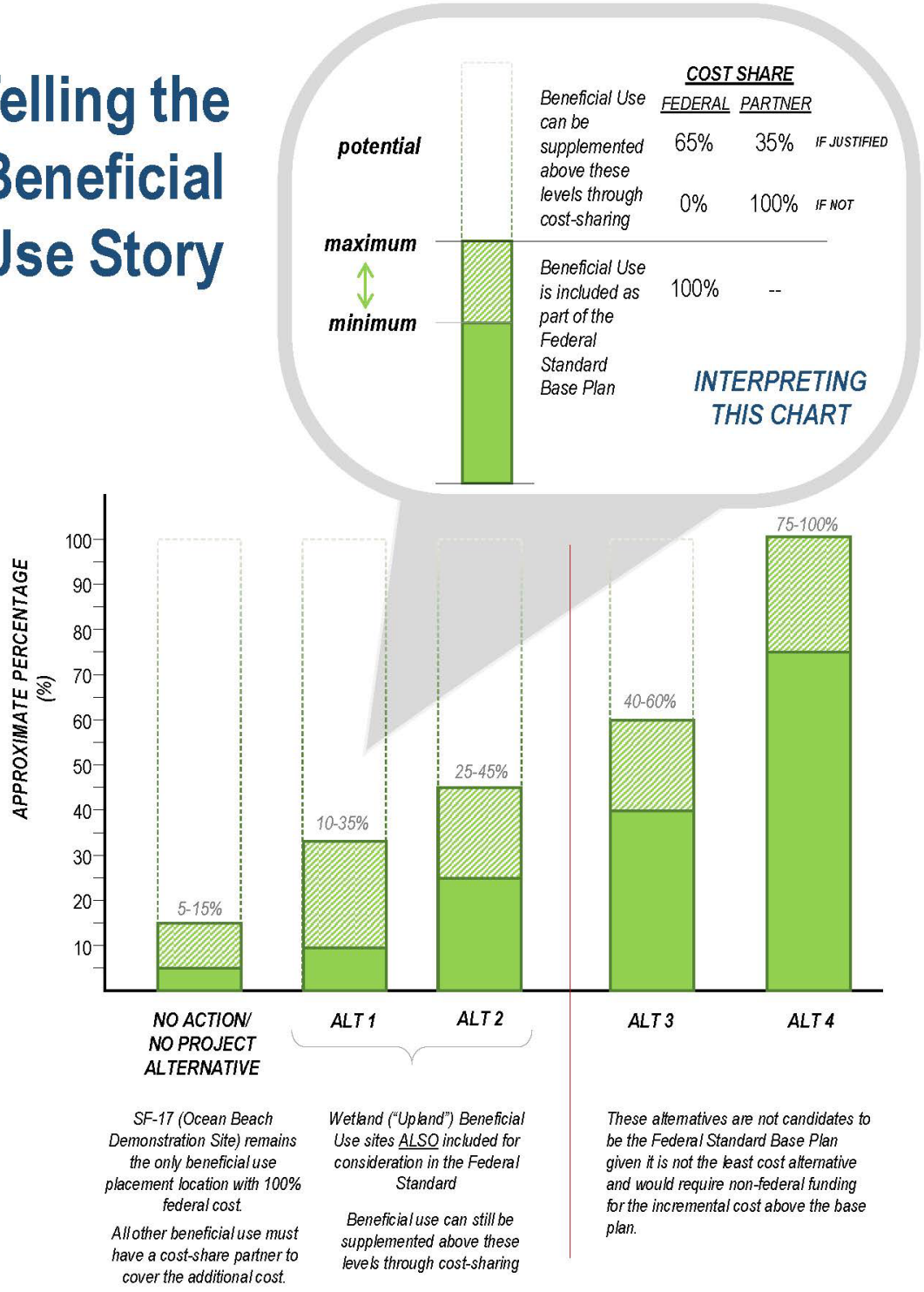


Figure 2-6. Summary of Alternatives and Example of Cost-sharing Mechanism Described in All Alternatives.

The proposed phased implementation is as follows:

- 2025, No Project Alternative: Continuing the No Project Alternative allows USACE the time necessary to appropriately plan for and implement the changes required for Alternative 1 and eventually Alternative 2.
- 2026–2027, Alternative 1: The earliest USACE would be able to implement Alternative 1 would be in 2026.
- 2027–2034, Alternative 2: The earliest USACE would be able to implement Alternative 2 would be in 2027. This time is necessary to allow USACE to work to expand the capacity of its hopper dredges, including using the West Coast Hopper Dredging contract.

The potential environmental impacts associated with each of the alternatives that compose the Proposed Action/Proposed Project are analyzed in Chapter 3 of this Draft EA/EIR. The impacts of the phased Proposed Action/Proposed Project as a whole are also addressed in Chapter 3.

The implementation schedule for the alternatives included in the Proposed Action/Proposed Project will be determined by project need—which can vary from year to year—and by USACE's available dredging equipment. The implementation schedule and associated mitigation measures for the Proposed Action/Proposed Project must be approved by the Regional Water Board through the issuance of the WQC/WDR.

2.5 Alternatives Considered but Eliminated from Further Consideration

Several other alternatives to the Proposed Action/Proposed Project were identified and evaluated during project planning and development but were eliminated from detailed analysis and are therefore not analyzed in detail in this Draft EA/EIR.

These alternatives were eliminated from analysis because one or more of the following criteria apply, as discussed for each alternative below:

- It is ineffective (it would not achieve overall project purpose, need, and objectives).
- Its implementation would not minimize effects on human/environmental resources.
- It is technologically infeasible.
- Its implementation is remote or speculative.

2.5.1 No Maintenance Dredging

Under this potential alternative, USACE would cease all maintenance dredging of the federal navigation channels in SF Bay, which would eventually leave the channels unnavigable for commerce and recreation. This alternative was eliminated from further consideration because it would not meet the purpose, need, and objectives of the project to maintain safe navigation of all the federal navigation channels and would be expected to have significant economic and safety impacts.

2.5.2 Maintenance Dredging of Select Federal Channels

Under this scenario, USACE would conduct maintenance dredging for some, but not all, of the federal navigation channels in SF Bay during the 10-year planning period to reduce the impacts from maintenance dredging. This would include maintenance dredging of fewer channels than what is currently proposed in the alternatives. This would leave the unmaintained channels unusable, limiting navigation in the Bay and creating navigation hazards, which increase the risks of groundings and oil spills. Like the No Maintenance Dredging of All Channels alternative discussed above, this alternative was eliminated from further consideration because it would not meet the purpose and need of the project to maintain safe navigation of all the federal navigation channels and it would be expected to have significant negative economic and safety impacts.

2.5.3 Eliminate the Use of Hydraulic Dredging

Under this scenario, USACE would cease use of hydraulic equipment for any maintenance dredging. This alternative is not feasible. Primarily, this alternative would not allow for dredging of the San Francisco Harbor MSC, which requires use of a hopper dredge because it is the only type of dredge that can safely operate at this channel, as explained under Section 2.3.1.1. In addition, mechanical dredging can be three times as expensive and take 10 times as long as hopper dredging. Such increases in time and cost would limit USACE's ability to complete dredging of all the federal channels and result in increased impacts from the length of dredging required. For instance, the increase in duration of dredging could potentially increase the amount of dredging occurring outside of work windows which would have detrimental impacts on fish species. Therefore, even if only in-Bay channels were considered, implementation of this alternative would lead to the same issues as in Section 2.5.2, as funding for dredging is limited nationally and such a significant increase would mean that some channels would not be dredged. This scenario would not be feasible for the reasons stated above. Therefore, this alternative was eliminated because it would not meet the overall purpose and need of the project to maintain safe navigation of all the federal navigation channels.

2.5.4 Eliminate the Use of Mechanical Dredging

Under this scenario, USACE would use hydraulic equipment only for maintenance dredging of the federal navigation channels in SF Bay. This alternative is not feasible because it would limit USACE's ability to complete maintenance dredging of all the channels because of channel features (e.g., depth, sediment characteristics, and environmental conditions), current placement practices, and costs. Increased use of hydraulic dredge equipment could also increase the likelihood of entrainment of protected fish species. Therefore, this alternative was eliminated because it would not meet the overall purpose and need of the project.

2.5.5 Screening Water Intakes on US Army Corps of Engineers Hopper Dredges

Under this scenario, USACE would consider the addition of screens to the grating at the bottom of the drag heads and the water intake doors on top of the drag heads on hopper dredges to protect small fish from being entrained. CDFW established a velocity criterion of 0.2 foot per second to protect small fish from being impinged.

USACE's hopper dredges *Essayons* and *Yaquina* use drag heads that require velocities of 15 to 20 feet per second throughout the drag head, suction, and discharge piping to ensure sediments remain suspended. These velocities are up to 50 times greater than the 0.2 foot per second approach velocity recommended to prevent impingement of delta smelt (NMFS 2022). Attaching a pipe or screen to reduce velocities to meet CDFW's criterion would be extremely impractical or unworkable for the following reasons:

- The dredge operates at varying water depths, in heavy sea states, over undulating bottom contours, all of which change the angle of the drag head with respect to the drag arm, requiring a robust, flexible connection between the screen appendage and drag head.
- The screen appendage would need to be very large to achieve an open area sufficient to reduce water velocity to 0.2 foot per second (i.e., 165 square feet for the *Yaquina* and 595 square feet for the *Essayons*).
- The screen support would need to be of sufficient strength to withstand the severe environment in which the drag arms operate. The drag arms operate in a very physical environment, often physically impacting with the dredge's bottom, sideshell, and/or davit/cradle when being breasted-in/out. The drag arms often experience impact with floating and submerged debris such as logs, rope, cable, chain, etc.
- The appendage would add significant weight to the drag arm, jeopardizing sufficiency of the drag arm lifting infrastructure.
- Sediment would create blockage on the screens, and it would be extremely impractical to create a crossflow or to stop dredging every few minutes to clean the screens.

Therefore, this alternative was eliminated from further consideration as technologically infeasible.

2.5.6 Modification of the Federal Navigation Channels

USACE considered modification of the federal navigation channels, including realignment of the channels to different location(s), and the institution of scouring systems or other structural channel modifications. These alternative options were eliminated because they are outside the current scope of USACE's maintenance program for the existing federally authorized channels. Moreover, such an undertaking would require years of study, modeling, and more funding than USACE currently has available in its budget. Realigning channels and other options considered here would result in an unacceptable level of impact on benthic and aquatic habitats. The degree of environmental impact and the time necessary to implement this alternative were inconsistent with the basic project objectives, so this alternative was eliminated from consideration.

2.5.7 Additional Areas Requested for Inclusion During the Scoping Process

During the public scoping period held in accordance with CEQA, several commentors suggested adding federally authorized and other navigation channels to the list of channels included in USACE's alternatives for O&M dredging. Review of Mare Island Strait (a portion of San Pablo Bay) was requested during scoping and was added to the analysis area for alternatives. The channels listed below were considered by USACE but not included in alternatives:

- Sausalito navigation channel was considered but is currently not included among the alternatives because this is not a federally authorized navigation channel.
- Redwood Creek (referred to in scoping comment as "Redwood City Creek) is encompassed within Redwood City Harbor and included in this Draft EA/EIR; the Redwood Creek portion was unintentionally omitted in the version of the study area figure provided in the NOP.
- Advance maintenance dredging at Bulls Head Reach portion of Suisun Bay Channel (O&M dredging for Suisun Bay Channel is included in alternatives).
- The Richardson Bay (Marinship Channel) portion of San Francisco Harbor is dredged infrequently and is not anticipated for O&M dredging during the 10-year planning period; therefore it is not included among the alternatives.
- Islais Creek portion of San Francisco Harbor is dredged infrequently and is not anticipated for O&M dredging during the 10-year planning period; therefore it is not included among the alternatives.
- Santa Fe Channel portion of Richmond Harbor is dredged infrequently and is not anticipated for O&M dredging during the 10-year planning period; therefore it is not included among the alternatives.
- Suisun Slough is dredged infrequently and is not anticipated for O&M dredging during the 10-year planning period; therefore it is not included among the alternatives.
- Jack Maltester (San Leandro Marina) was removed per scoping comment questioning why this was included but not Suisun Slough Channel, since neither channel were planned for dredging.

3.0 Environmental Setting and Environmental Analysis

This chapter describes the scope of analysis in this Draft EA/EIR, including a description of resources not applicable to the project alternatives and those considered in detail. It describes the regulatory and environmental setting for each resource area carried forward and discusses impacts and mitigation measures (where relevant) for resources that may be impacted by the project alternatives.

3.1 Scope of Environmental Analysis

This chapter describes the environmental setting and the environmental impacts of key resource categories associated with the alternatives as well as avoidance and mitigation, where applicable, to reduce potential impacts.

The environmental setting sections provide an environmental baseline of each resource category, describing the conditions in the study area at the time this document was prepared. The environmental conditions described in these environmental setting sections constitute the baseline physical conditions against which impacts are assessed. The CEQA Guidelines, Section 15125, describe the baseline as "the physical environmental conditions in the vicinity of the project, as they exist at the time the NOP is published, or if no NOP is published, at the time environmental analysis is commenced." Because maintenance dredging of the federal navigation channels has occurred on a regular basis for several decades, USACE's maintenance dredging and impacts are considered part of the existing physical conditions that comprise the baseline. Accordingly, USACE's existing maintenance dredging practices, as represented by the No Action Alternative and No Project Alternative, and the environmental impacts of these practices, are part of the baseline conditions to which the impacts of the action alternatives are compared.

The environmental analysis discussion provides an analysis of the potential environmental impacts that could result from implementing the No Action Alternative and No Project Alternative compared to Alternatives 1 through 4. Impacts from dredging, transport of dredged material, and placement[22] of dredged material are evaluated. Specific analysis of dredged material placement is limited to the existing placement sites listed in Section 1.5.2.2. Where possible, potential impacts associated with the use of future placement are broadly discussed; however, use of these sites by USACE would be conditioned upon completion of a separate, site-specific supplemental environmental review under the NEPA and/or CEQA, and acquisition of required environmental approvals from resource and regulatory agencies.

For each navigation channel, the average dredge volume per episode and the number of dredging episodes over the 10-year cycle was used to obtain the total volume to be dredged for each channel over the 10-year cycle covered by this Draft EA/EIR. These total volumes were then used to calculate the range of placement volumes for each placement category, as shown in Tables 2-4, 2-6, 2-8, 2-10, 2-12 and 2-14. To evaluate the greatest impact for a given year, it was assumed that all channels would be

[22] Evaluation of placement for BU sites is not included in this analysis, because placement activities have been, or will be, evaluated under separate permitting processes. Potential impacts from placement at non-beneficial use sites, including in-Bay placement and deep ocean disposal, are included in this analysis.

dredged within that year using its average volume per dredge episode. The average volume per episode was used because it is unrealistic to assume that the maximum volume per dredge episode would be dredged for all channels within the same year. Impact analysis for each resource area generally followed this method and details and deviations from this approach are discussed in resource area sections below.

3.1.1 Resources Not Applicable to the Project Alternatives and/or Not Considered in Detail

Section 3.1.1 of the 2015 EA/EIR provided a detailed discussion of the resources that were not considered in detail in the previous study. That analysis has not changed. Therefore, the following resources were determined to not be present in the study area or would not be impacted by proposed maintenance dredging activities and are not considered in detail in this study: Aesthetics and Visual Resources, Agriculture, Energy, Forestry Resources, Minerals, Noise, Population and Housing, Public Services, Seismicity, Recreational Resources, Regional Growth, Socioeconomics, Utilities, and Wildfire Impacts (See Table 3-1).

Table 3-1. Resources Not Applicable to the Project Alternatives and/or Not Considered in Detail

Resource Area	Notes
Aesthetics and Visual Resources	Aesthetics and visual resources related to scenic views in and around San Francisco Bay and the Pacific Ocean may be slightly degraded during dredging and placement activities from the presence of dredge equipment and turbidity produced during dredging and placement activities. These potential impacts would be temporary and would occur in locations where dredging and placement activities have occurred regularly in the past. Additionally, the waters of San Francisco Bay currently and historically include similar uses and equipment, such as ferry terminals, ports, barges, and industrial and commercial shipping operations that are part of the existing visual landscape. In this context, impacts to aesthetics and visual resources from alternatives would be negligible. Some possible, including Bel Marin Keys, are presently used for agriculture. Use of future beneficial use placement sites would be conditioned upon the completion of supplemental environmental review under NEPA and/or CEQA, and acquisition of required environmental approvals from resource and regulatory agencies.
Agriculture	The proposed dredging and dredged material placement activities would be in offshore waters, waters in San Francisco Bay, and at sites approved for the placement of dredged materials. Agricultural resources are not present in the channels or existing placement areas and, therefore, would not be impacted by dredging and placement activities. Some possible future beneficial use placement sites, including Bel Marin Keys, are presently used for agriculture. Use of these sites by USACE would be conditioned upon the completion of supplemental environmental review under NEPA and/or CEQA, and acquisition of required environmental approvals from resource and regulatory agencies.
Energy	Alternatives would not require substantially more energy than USACE's historic and current maintenance dredging operations in San Francisco Bay; dredging and placement activities would require the use of fossil fuels for the operation of vessels and equipment, which would be similar to USACE's historic and current maintenance dredging operations in San Francisco Bay.
Forestry Resources	There are no forested areas in or adjacent to dredging or existing placement locations; therefore, there would be no impacts to forestry resources.

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Resource Area	Notes
Minerals	Alternatives would not involve construction or operation of any facilities on or adjacent to any land-based mineral resource areas delineated on land use plans and, therefore, would not result in the loss of availability of a land-based mineral resource. Sand is mined from the San Francisco Bay for industrial and agricultural uses. USACE's continued maintenance of the federal navigation channels, and placement of dredged materials under any of the alternatives, would not adversely impact sand mining because activities would not interfere with sand mining. Sediments in the San Francisco Main Ship, Pinole Shoal, and Suisun Bay channels are primarily sand, and the Federal Standard Base Plan placement sites for each of these channels is in water and adjacent to or very near the channels. USACE's continued maintenance dredging and placement activities would not be expected to deplete sand mineral resources, because dredged material would be redeposited relatively close to the location where it was removed.
Noise	Most of the federal navigation channels are not near sensitive receptors (e.g., residences, schools, and hospitals). Commercial and recreational ship traffic is an ambient noise source at the federal navigation channels. Several of the channels (e.g., Richmond Harbor, Oakland Harbor) are also in areas with surrounding commercial and industrial operations that are additional sources of ambient noise; noise from dredging at these locations would not be expected to exceed ambient conditions. Noise during transport of dredged materials would not be noticeable in the context of other vessel traffic in San Francisco Bay. Sensitive receptors may be near the San Rafael Creek, Napa River, and Petaluma River federal channels. Noise from dredging equipment such as an excavator and a dredging ship can generate noise levels of approximately 78 to 82 dBA, which is below the FTA guidelines for assessment of noise impacts for construction activities, namely, 90 dBA equivalent continuous sound level over a 1-hour period for residential land uses; 100 dBA equivalent continuous sound level over a 1-hour period for commercial/industrial areas (FTA 2018).[1]
Population and Housing, Public Services	Alternatives would not result in construction or modification of residences or commercial facilities, and would not require a large workforce; therefore, alternatives would have no adverse effect on population, housing, or public services.
Seismicity	Alternatives would not contribute to or directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault, the area or based on other substantial evidence of a known fault, strong seismic ground shaking, seismic-related ground failure including liquefaction, or landslides.
Recreation Resources	Alternatives would not involve the construction of recreation facilities, would not create demand for new recreational facilities, and would not result in increased use and deterioration of existing recreational facilities. Dredging and placement activities may delay or temporarily impede recreational watercraft, but there would be sufficient room at most locations for recreational vessels to maneuver around dredge equipment. Therefore, impacts would be negligible. Notifications to mariners and navigational warning markers are used as needed to prevent navigational hazards during dredging and placement activities. Additionally, maintenance dredging provides long-term positive effects for small craft by allowing for safe navigation. The SF-17 placement site is near the outer boundary of the National Park Service's Golden Gate National Recreation Area. Use of SF-17 as a placement site is not anticipated to result in adverse impacts or physical degradation of existing recreational resources, change in use of existing recreational resources, or any potential harm to the integrity of the Golden Gate National Recreation Area's cultural and natural resources. Indirect beneficial effects to recreational activities are likely from use of the SF-17 placement site through potential to feed sediment toward Ocean Beach and reduce ongoing shoreline erosion in the area.

Resource Area	Notes
Regional Growth	Alternatives would not result in any new residences or infrastructure that could facilitate growth in the San Francisco Bay Area. Maintenance dredging, transport, and placement would not require the expansion of water or energy conveyance, or require construction of new roads. Alternatives would not remove any existing obstacles to growth.
Socioeconomics	USACE's maintenance dredging of the federal navigation channels provides beneficial socioeconomic impacts to maritime commerce and the regional economy by maintaining navigability of the channels and access to local ports and harbors.
Utilities	Proposed dredging and dredged material placement activities would not result in the expansion of landfills or facilities that treat or convey wastewater, stormwater, or potable water. Alternatives would not create residences or commercial facilities that would increase the service population in the San Francisco Bay Area. Maintenance dredging of the federal channels to previously dredged depths and use of existing placement sites would not disturb existing utilities.
Wildfire Impacts	Alternatives would not affect areas or lands classified as very high fire hazard severity zones, nor would they substantially impair an adopted emergency response plan or emergency evacuation plan; exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire; require the installation or maintenance of associated infrastructure that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment; or expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes.

[1] General Assessment Construction Noise Criteria equivalent sound level for 1-hour duration.

Key: CEQA = California Environmental Quality Act
dBA = A-weighted decibels
NEPA= National Environmental Policy Act
SF-17 = Ocean Beach Nearshore Placement Site
USACE = US Army Corps of Engineers

3.1.2 Resources Considered in Detail

The resources discussed in detail in the sections that follow are:

- Air quality, climate change, and greenhouse gases
- Biological resources
- Cultural and tribal resources
- Geology, soils, and sediment quality
- Hazards and hazardous materials
- Hydrology and water quality
- Land use and planning
- Hazards and hazardous materials
- Transportation and traffic, including navigation

3.1.3 Approach to Environmental Analysis

Each resource section is presented as follows:

- **Environmental Setting** describes the existing environmental conditions in the study area. The region of influence varies by resource and is defined, where appropriate, for each resource.
- **Regulatory Setting** describes the federal, state, and local regulatory framework applicable to implementation of the project alternatives. Applicable federal, state, and local regulatory requirements specific to each resource area are presented in Chapter 3.
- **Methodology and Thresholds for Significance** discusses the scope considered in the analysis, the approach to the analysis, and those areas where none of the alternatives would have an impact and which are, therefore, not discussed in more detail in that section.
- **Impacts and Mitigation Measures** sections provide analysis of direct, indirect, and cumulative impacts, and a full description of the mitigation measures that are recommended or required to reduce project impacts. Direct, indirect, and cumulative impacts were evaluated. Direct impacts are the primary effects that are caused by the alternative and occur at the same time and place. Indirect impacts are secondary effects that are reasonably foreseeable and caused by the alternative but occur at a different time or place. Cumulative impacts result from the incremental impact of a proposed project when added to other past, present, and reasonably foreseeable future actions (see below for further discussion of cumulative impacts).

Significance criteria for each resource topic were used to assess the severity of the environmental impacts of the Proposed Project alternatives and, for CEQA compliance purposes, determine when mitigation measures to avoid or mitigate the significant impact may be required. Unlike CEQA, NEPA does not have specific impact thresholds that are used to assess the significance of impacts on a given resource topic, but rather states that when considering whether an adverse effect of the Proposed Action is significant, agencies shall examine both the context of the action and the intensity of the effect. In assessing context and intensity, agencies should consider the duration of the effect. Agencies may also consider the extent to which an effect is adverse at some points in time and beneficial at others.

The significance criteria presented in this chapter are primarily adapted from Appendix G of the CEQA Guidelines and relevant agency thresholds. Where possible, significance criteria are based on state or federal standards. Different significance criteria are identified for NEPA and CEQA when warranted because different regulatory standards or compliance requirements apply to USACE, a federal agency, and the Regional Water Board, a state agency. In addition, because of differences between NEPA and CEQA guidance, a significant impact under CEQA does not necessarily equate to significant impact under NEPA.

In each resource section, discussion of impacts is organized according to the impact type. Under each impact type title, impacts are analyzed for each alternative, and a determination of the level of the impact under NEPA and CEQA is presented. Where impacts would be the same for one or more alternatives, the impact discussion for these alternatives is combined to avoid redundancy.

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Impacts analyzed under NEPA are classified as beneficial, negligible, less than significant, or significant, which are defined as follows: A beneficial impact would generally be regarded as an improvement over current conditions. A negligible impact would cause a slight adverse change in the environment, but one that generally would not be noticeable. A less-than-significant impact would cause an adverse change in the environment that would likely be noticeable but does not meet or exceed the defined significance criteria. A significant impact would cause a substantial adverse change in the environment that would exceed the defined significance criteria.

Impacts analyzed under CEQA are classified as having no impact, less-than-significant impact, less-than-significant impact with mitigation, or potentially significant impact. CEQA specifically refers to effects and impacts as synonymous referring to them as a "physical change," and directs the lead agency to focus its analysis on the project's potential to cause an "adverse change in any of the physical conditions within the area affected by the project" (14 California Code of Regulations Sections 15358, 15378, 15382). CEQA does not specifically recognize beneficial effects as an impact. Avoidance or mitigation measures are identified to reduce the project's impacts, where feasible. Mitigation measures in this Draft EA/EIR are formulated to be consistent with the definitions of mitigation found in the Council on Environmental Quality NEPA regulations, Section 1508.20, and the CEQA Guidelines Section 15370.

The discussion of cumulative impacts provides an analysis of cumulative impacts of the project, taken together with other closely related past, present, and reasonably foreseeable future projects producing related impacts. Per NEPA, cumulative impacts can result from actions with individually minor but collectively significant effects taking place over time (40 C.F.R. § 1501.3). Similarly, CEQA considers cumulative impacts in reference to two or more individual effects that, when combined, are considerable; or that compound or increase other environmental impacts (CEQA Section 15355). Table 3-2 identifies the past, present, and reasonably foreseeable programs, projects, and policies considered in the cumulative analysis. The list of projects generally includes those near the federal channels or placement sites (i.e., those that could result in overlapping impacts, such as navigation and air quality), or other projects along SF Bay that could result in overlapping impacts on resources such as biological resources and water quality. A significant cumulative impact would occur when the project would make a "cumulatively considerable incremental contribution" to an overall significant cumulative impact. If an overall cumulative impact would not be significant, even when the project would make a cumulatively considerable incremental contribution to the cumulative impact, then it is determined that the project would not cause a significant cumulative impact.

Table 3-2. Programs, Projects, and Policies Included in Cumulative Impact Assessment

Project Number	Project Name/Location	Status/Anticipated Timeline	Project Summary	Relevancy	Entity
1	Non-federal Maintenance Dredging in San Francisco Bay	Ongoing	More than 100 marinas, ports, and berthing slips are maintenance dredged in the San Francisco Bay/Estuary. Most of the non-federal maintenance projects are along the shorelines and in the tributaries of the Estuary	Ongoing maintenance dredging activities by non-federal entities occurring throughout San Francisco Bay; approximately 560,000 CY per year.	Non-federal dredgers
2	San Francisco Bay and Delta Sand Mining Project	Undergoing permit review and CEQA review.	The State Lands Commission is developing a supplemental EIR for reissuance of authority to permit underwater commercial harvesting of sand from lease areas under the jurisdiction of the State Lands Commission within San Francisco Bay and the western Delta for an additional ten years. Current permits, issued in 2015 by BCDC, authorized 1.426 million CY of mining annually through 2025.	Proposed continuation of commercial harvesting of sand from specified areas in Central San Francisco Bay and in Suisun Bay for use in the construction industry.	BCDC, CSLC
3	South Bay Salt Pond Restoration	Ongoing	Begun in 2003, this a 50-year effort to restore South Bay wetlands, expand Bayside public access and provide for flood management. Various portions of the project have been completed, are under construction or implementation, in planning, or proposed.	Wetland restoration project in South San Francisco Bay that includes potential future placement sites for BUDM.	USACE, USFWS, Valley Water, SCC, CDFW,
4	Cullinan Ranch Restoration Project	Monitoring	A 1,500-acre tidal marsh restoration project along the northern shore of San Pablo Bay in Solano and Napa counties. Project also includes the Cullinan Ranch BUDM project.	Tidal marsh wetland restoration adjacent to San Pablo Bay and existing placement site for BUDM.	USACE

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Project Number	Project Name/Location	Status/Anticipated Timeline	Project Summary	Relevancy	Entity
5	Bel Marin Keys Unit V	Planning and Conceptual Design	Phase two of the Hamilton Wetland Restoration Project: This project adds 1,600 acres including 900 acres of tidal wetlands and 680 acres of non-tidal and freshwater wetlands, as well as upland, subtidal, and non-wetland tidal habitats, for a total acreage of approximately 2,600 acres for the expanded site. The project will provide for ecosystem and wetland restoration through BUDM, and for recreation, and involves the construction of new, improved, and containment levees, intertidal berms, and excavation of two tidal inlet channels.	Wetland restoration in San Pablo Bay and potential future placement site for BUDM.	USACE
6	South San Francisco Bay Shoreline Study Phase 1 Project	Under Construction	A multi-purpose flood-risk management, ecosystem restoration, and recreation project in San Jose, CA. The project manages reduces flood risks, restores 2,900 acres of tidal wetlands, and improves recreation in the area.	Wetland restoration project near potential beneficial use sites for dredged material placement.	USACE, USFWS, SCC, Valley Water
7	Brooklyn Basin Marina Expansion Project	In Progress	Modification of previously approved 2009 EIR for Brooklyn Basin. Project is the development of land and water for residential, boating, commercial, and public space and facilities.	Work will require in-water development for a marina expansion	Port of Oakland
8	Oakland Harbor Turning Basins Widening	Chief's Report submitted to the Secretary of the Army May 2024 recommending authorization of Draft EIR released October 2023; Integrated Feasibility Report and EA completed January 2024	Widening the existing turning basins at the Oakland Seaport to allow vessels to turn around more efficiently and safely upon entering and exiting the Oakland Harbor.	In-water work in San Francisco Bay. Dredged material from the project will be placed at appropriate landfills and at a beneficial use site for the protection, restoration, or creation of aquatic wetland habitats as either foundation (non-cover) or cover material.	Port of Oakland and USACE

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Project Number	Project Name/Location	Status/Anticipated Timeline	Project Summary	Relevancy	Entity
9	San Francisco Bay Strategic Shallow-Water Placement Pilot Project	Constructed 2023–monitoring underway	Beneficial use material from the federal channel at Port of Redwood City was placed in the eastern shallows of South San Francisco Bay, offshore of the marsh complex in Eden Landing Ecological Reserve, at an area referred to as Whale's Tail in December 2023.	Pilot project recently implemented by USACE for nearshore strategic placement of dredged material, and potential future placement site for BUDM.	USACE
10	Napa River Salt Marsh Restoration Project	Monitoring	Restored and enhanced 6,800 acres of former salt ponds to tidal marsh and managed ponds. Now complete, the project provides fish and wildlife benefits and public access, including signage and benches.	Wetland restoration project near existing upland beneficial use sites for dredged material placement.	SCC

Key: BCDC = San Francisco Bay Conservation and Development Commission

BUDM = beneficial use of dredged material
CEQA = California Environmental Quality Act
CSLC = California State Lands Commission
EA = Environmental Assessment
EIR = Environmental Impact Report
SCC = California State Coastal Conservancy
USACE = US Army Corps of Engineers
USFWS = US Fish and Wildlife Service
Valley Water = Santa Clara Valley Water

3.1.4 Approach to Impacts Assessment Associated with the Proposed Action/Proposed Project

As discussed in Chapter 2, the Proposed Action/Proposed Project is comprised of a phased implementation of the No Project Alternative, Alternative 1, and Alternative 2. USACE intends to follow the schedule described in Section 2.4. The final requirements for project implementation, including potential mitigation for project environmental impacts, will be set forth in the WQC/WDR permit issued by the Regional Water Board. The environmental impacts and proposed mitigation measures for the Proposed Action/Proposed Project are discussed in detail in this chapter.

USACE plans to continue the No Project Alternative in 2025 to allow time to implement and complete all the planning steps required for Alternatives 1 and 2, including this NEPA/CEQA document. The earliest USACE could implement Alternative 1 is 2026, with Alternative 2 beginning as early as 2027. USACE understands and shares the LTMS's priorities to increase BUDM, and thus supports Alternatives 1 and 2 to achieve those goals as the Federal Standard Base Plan.

In the event of unforeseen circumstances beyond the control of USACE, such as the lack of equipment availability and variations in sediment quality and quantity that prevent execution of the Proposed Action/Proposed Project, USACE will address those possibilities in the annual 404(b)1 alternatives analysis submission, and if required, subsequent NEPA or CEQA documentation in addition to coordination with the other LTMS agencies, as applicable. Unforeseen circumstances are by their nature not reasonably foreseeable and cannot be analyzed without speculation.

In assessing the potential environmental impacts of the Proposed Action/Proposed Project, it is assumed that USACE will proceed with a phased implementation approach as described above. The impact analysis of the Proposed Action/Proposed Project as a whole takes into consideration the phased implementation approach by considering the impacts described within the No Project Alternative for the first year, Alternative 1 for the next one to two years, approximately, and Alternative 2 for subsequent years to analyze the effect over the entire 10-year period.

3.2 Air Quality, Climate Change, and Greenhouse Gas Emissions

Proposed maintenance dredging and placement activities would burn fossil fuels, resulting in emissions that have the potential to impact air quality and contribute to greenhouse gas emissions. The combustion of fuel releases pollutants into the atmosphere that can adversely impact air quality and may add to global climate change considerations. The movement of dredged material from a dredge location to a placement location would also generate emissions through the use of barges or scows and/or pipelines.

Air quality is defined by ambient air concentrations of specific pollutants determined by the USEPA to be of concern with respect to the health and welfare of the public. For this analysis, air quality impacts are assessed against national standards for ambient air quality and hazardous air pollutants (HAP) as well as contributions to greenhouse gas (GHG) emissions.

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Ambient air quality refers to the atmospheric concentration of a specific pollutant that occurs at a particular geographic location. Ambient air quality concentrations are generally reported as a mass per unit volume (e.g., micrograms per cubic meter of air) or as a volume fraction of the air (e.g., parts per million by volume). The ambient air quality concentrations at a particular location are determined by the interactions of emissions, meteorology, and chemistry. Emission considerations include the types, amounts, and locations of pollutants emitted into the atmosphere. Meteorological considerations include wind and precipitation patterns affecting the distribution, dilution, and removal of pollutant emissions. Chemical reactions can transform pollutant emissions into other chemical substances.

The major pollutants of concern, called “criteria pollutants,” are carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), ozone (O_3), total suspended particulate matter less than or equal to 10 (PM_{10}) and 2.5 ($PM_{2.5}$) micrometers in aerodynamic diameter, and lead (Pb). USEPA has established National Ambient Air Quality Standards (NAAQS) for these pollutants, which are presented along with the California Standards in Table 3-3.

A design value is a statistic that describes the air quality status of a given location relative to the level of the NAAQS. Design values are relevant because they provide baseline air quality levels for the given area. The most recently published design values based on current ambient monitoring levels (2022) for the SF Bay Area are compared to the federal or California ambient air quality standards (AAQS), whichever is more stringent, in Table 3-4. Design values are computed based on monitoring data and published annually by USEPA's Office of Air Quality Planning and Standards and reviewed in conjunction with the USEPA Regional Offices (USEPA 2024).

HAPs are pollutants for which there are no NAAQS but are still regulated under the federal Clean Air Act because of their potentially adverse effects on human health and the environment. Also known as “air toxics,” these pollutants are comprised of a wide array of organic and inorganic compounds (e.g., formaldehyde, acetaldehyde, benzene, toluene, acrolein, 1,3-butadiene, xylene, lead, naphthalene, propionaldehyde). HAPs are generated by mobile sources through the incomplete combustion of fuel as well as through the evaporation of hazardous components of the fuel.

GHGs are gases that trap heat in the atmosphere. Both natural processes and human activities generate these emissions. Each GHG is assigned a global warming potential, which is its ability to trap heat, and is standardized to carbon dioxide (CO_2), which has a global warming potential (GWP) value of 1.0. A GHG is multiplied by its GWP to calculate the total equivalent emissions of carbon dioxide. The accumulation of GHGs in the atmosphere regulates the Earth’s temperature. Global warming observed over the past 50 years is due primarily to human-induced emissions of heat-trapping gases. These emissions come mainly from the burning of fossil fuels (coal, oil, and gas), with contributions from forest clearing, agricultural practices, and other activities.

Table 3-3. National Ambient Air Quality Standards and California Standards

Pollutant	NAAQS			California Standards	
	Averaging Time	Primary/Secondary	Concentration	Averaging Time	Concentration
CO	1 hour	Primary	35 ppm	1 hour	20 ppm
	8 hours	primary	9 ppm	8 hours	9.0 ppm
Pb	Rolling 3-month period	primary and secondary[1]	0.15 µg/m3	30-day average	1.5 µg/m^3
NO_2	1 hour	Primary	100 ppb	1 hour	0.18 ppm
	1 year	primary and secondary[2]	53 ppb	Annual	0.030 ppm
O_3	8 hours	primary and secondary[3]	0.070 ppm	1-hour	0.09 ppm
				8-hour	0.070 ppm
$PM_{2.5}$	1 year	Primary	9.0 µg/m^3	1 year	12 µg/m^3
	1 year	Secondary	15.0 µg/m^3		
	24 hours	primary and secondary	35 µg/m^3		
PM_{10}	24 hours	primary and secondary	150 µg/m^3	24 hours	50 µg/m3
				1 year	20 µg/m3
SO_2	1 hour	primary[4]	75 ppb	1 hour	0.25 ppm
	3 hours	Secondary	0.5 ppm	24 hours	0.04 ppm

Sources: USEPA 2024, CARB 2024

[1] In areas designated non-attainment for the lead standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 micrograms per cubic meter as a calendar quarter average) also remain in effect.

[2] The level of the annual nitrogen dioxide standard is 0.053 part per million. It is shown here in terms of parts per billion for the purposes of clearer comparison to the 1-hour standard level.

[3] Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) ozone standards additionally remain in effect in some areas. Revocation of the previous (2008) ozone standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards. Additionally, some areas may have certain continuing implementation obligations under the prior revoked 1-hour (1979) and 8-hour (1997) O_3 standards.

[4] The previous sulfur dioxide standards (0.14 parts per million 24-hour and 0.03 part per million annual) will additionally remain in effect in certain areas: 1) Any area for which it is not yet one year since the effective date of designation under the current (2010) standards, and 2) any area for which implementation plans providing for attainment of the current (2010) standard have not been submitted and approved, and which is designated non-attainment under the previous sulfur dioxide standards or is not meeting the requirements of a State Implementation Plan (SIP) call under the previous sulfur dioxide standards (40 Code of Federal Regulations 50.4(3)). An SIP call is a USEPA action requiring a state to resubmit all or part of its State Implementation Plan to demonstrate attainment of the require NAAQS.

Key: µg/m3 = micrograms per cubic meter
CO = carbon monoxide
NO_2 = nitrogen dioxide
O_3 = ozone
Pb = lead
PM_{10} = particulate matter less than or equal to 10 microns
$PM_{2.5}$ = particulate matter less than or equal to 2.5 microns
ppb = parts per billion
ppm = parts per million
SO_2 = sulfur dioxide

Table 3-4. Comparison of 2022 San Francisco Bay Area Design Values with Ambient Air Quality Standards

Pollutant	Averaging Time	Most Stringent AAQS	Maximum Design Values	% of AAQS
CO	1-hour	20 ppm (California)	1.9 ppm	10
	8-hour	9 ppm	1.1 ppm	12
O_3 (2015 standard)	8-hour	0.070 ppm	0.070 ppm	100
O_3 (2008 standard)	8-hour	0.075 ppm	0.070 ppm	93
$PM_{2.5}$	24-hour	35 µg/m^3	26 µg/m^3	74
	Annual	9 µg/m^3	8.2 µg/m^3	91

[1] Data from USEPA's Air Quality System site, San Francisco-Arkansas Street, Site ID 060750005, located at 10 Arkansas Street, San Francisco, California.

Key: µg/m^3 = micrograms per cubic meter
AQQS = ambient air quality standards
CO = carbon monoxide
O_3 = ozone
PM_{10} = particulate matter less than or equal to 10 microns
$PM_{2.5}$ = particulate matter less than or equal to 2.5 microns
ppm = parts per million

3.2.1 Regulatory Setting

The following sections describe the regulatory framework applicable to potential air quality impacts from the alternatives.

3.2.1.1 Federal

Federal regulations applicable to air quality are discussed in the following sections.

Clean Air Act

Clean Air Act (CAA) (42 U.S.C. Chapter 85) as amended, is a federal law that regulates air emissions from all sources, both stationary and mobile, to reduce and control air pollution in the United States. The CAA calls for state, local, federal, and tribal governments to implement the CAA in partnership to reduce pollution. For criteria pollutants, the law requires USEPA to establish health-based national air quality standards (i.e., NAAQS) to protect people with an "adequate margin of safety."

States are responsible for developing enforceable state implementation plans (SIP) to meet the standards. In California, local air pollution districts work with the state to produce air quality plans. Each SIP also must prohibit emissions that significantly contribute to air quality problems in a downwind state. USEPA provides guidance and technical assistance to assist state planning, issues national emissions standards for new stationary sources, and reviews state plans to ensure that they comply with the act. Pre-construction permits are required for major new and modified stationary sources. In the project area, the Bay Area Air Quality Management District (BAAQMD) serves as the CAA permitting authority.

3.2.1.2 State

State regulations applicable to air quality are discussed in the following sections.

California Clean Air Act

The California Clean Air Act (California Code of Regulations, Title 13, Div. 3 and California Code of Regulations, Title 17, Div. 3) allows the California Air Resources Board (CARB) to set standards for criteria pollutants in California that are more stringent than the NAAQS and includes the following additional contaminants: visibility-reducing particles, hydrogen sulfide, sulfates, and vinyl chloride. The BAAQMD has the responsibility to monitor ambient air pollutant levels throughout the basin, and to develop and implement strategies to attain the applicable federal and state standards. The San Francisco Bay Area Air Basin (SFBAAB) is currently classified as non-attainment for the one-hour state ozone standard as well as for the federal and state eight-hour standards. Additionally, the SFBAAB is classified as non-attainment for the state 24-hour and annual arithmetic mean PM_{10} standards, as well as the state annual arithmetic mean and the national 24-hour $PM_{2.5}$ standards. The SFBAAB is unclassified or classified as attainment for all other pollutant standards.

In December 1999, the BAAQMD adopted its initial CEQA Guidelines, Assessing the Air Quality Impacts of Projects and Plans, as a guidance document to provide lead government agencies, consultants, and project proponents with uniform procedures for assessing air quality impacts and preparing the air quality sections of environmental documents for projects subject to CEQA. The BAAQMD CEQA Guidelines is an advisory document, and local jurisdictions are not required to use the methodology outlined therein. The document describes the criteria that the BAAQMD uses when reviewing and commenting on the adequacy of environmental documents. It recommends thresholds for use in determining whether projects would have significant adverse environmental impacts, identifies methodologies for predicting project emissions and impacts, and identifies measures that can be used to avoid or reduce air quality impacts. BAAQMD updated quantitative thresholds of significance for its CEQA Air Quality Guidelines in 2010 and published its latest (as of October 2024) version of its CEQA Guidelines in April 2022 (BAAQMD 2022).2022. The 2023 BAAQMD CEQA Guidelines provide BAAQMD-recommended procedures for evaluating potential air quality impacts during the environmental review process consistent with CEQA requirements.

The guidelines specify recommended thresholds of significance for construction and operational criteria air pollutants and precursor emissions (volatile organic compounds [VOC] and nitrogen oxide [NOx] are precursors for ozone formation), GHG emissions, and risks and hazards associated with toxic air contaminants from an individual project and cumulative impacts. The applicable criteria pollutants thresholds are outlined in Table 3-5.

Commercial Harbor Craft Regulation

Since the original adoption of the Commercial Harbor Craft regulation in 2008 and its amendments in 2010, owners of commercial harbor craft vessels have replaced older engines with newer and cleaner engines. In 2022, additional amendments were adopted to expand the applicability of the regulation to more vessel types and require cleaner upgrades and new technology. Compliance dates for engine

upgrades depend on the vessel category and the model year of the engine. All types of tugs, including tow boats used in the Proposed Project, have phase-in requirements starting in 2024 through 2029, depending on current engine model year, to upgrade to Tier 4 engines with diesel particulate filters. Dredges, barges, and workboats have phase-in requirements for any pre-Tier 1 and Tier 1 engines, starting with the first group, which were completed by the end of 2023. Tier 2 and higher engines would be subject to phase-in requirements in 2028 through 2031 to upgrade to Tier 4 engines with diesel particulate filters. Newly acquired vessels have zero-emission requirements. Starting in 2023, all commercial harbor craft were required to use renewable diesel. In 2024, 15-minute idling limits for all commercial harbor craft took effect.

The *Yaquina's* engines are from 2008 and the *Essayons* are from 2012. Therefore, the *Yaquina* would need to have Tier 4 engines installed by December 31, 2028, and the *Essayons* by December 31, 2029. Currently, there are no commercially available dredges with Tier 4–compliant engines. USACE would likely seek extensions to compliance until the new (or rebuilt) *Essayons* and *Yaquina* can be brought into service.

3.2.2 Environmental Setting

The project's region of influence (ROI) is the SFBAAB, which encompasses all or portions of the following nine counties: Marin, Sonoma, Napa, Solano, Contra Costa, Alameda, Santa Clara, San Mateo, and San Francisco. The ROI is within the jurisdiction of the BAAQMD. While the LTMS program planning area included small portions of Sacramento and San Joaquin counties, the study area is limited to the SFBAAB because almost all project activities would occur within the SFBAAB. USACE, the Regional Water Board, USEPA, and BCDC identified additional placement sites as possible future BUDM sites as described in Section 1.5.2.2. Environmental review processes have not been completed for these sites and there is insufficient information available to fully analyze the potential impacts of placing dredged material at these locations in this Draft EA/EIR. Therefore, this assessment does not include the potential use of the future placement sites identified in Section 1.5.2.2. Use of these sites would be conditioned upon the completion of supplemental environmental review and required regulatory approvals.

The environmental setting constitutes the baseline physical conditions used to determine whether implementation of the Proposed Project would cause changes in air pollutant emissions that would result in significant air quality impacts according to applicable thresholds. It is important to note that because the project and its alternatives involve continuation of an existing operation, the projected impacts are compared to the impacts that have occurred under the existing dredging program, as described in Section 2.3.2, the No Action Alternative/No Project Alternative.

3.2.2.1 San Francisco Bay Area Air Basin Climate

The SFBAAB has a complex terrain consisting of coastal mountain ranges, inland valleys, and bays, which distort normal wind flow patterns. The Coast Range splits wind flows, resulting in a western coast gap (Golden Gate) and an eastern coast gap (Carquinez Strait), which allows air to flow in and out of the SFBAAB and the Central Valley. The SFBAAB is characterized by a Mediterranean-type climate, with mild, wet winters and warm, dry summers.

Climate change impacts have been ongoing in the region, with a 1.7-degree Fahrenheit (°F) maximum temperature increase since 1950, and an approximately 8-inch SLR in the last 100 years. Climate impacts that are forecast for the region in the future include an increase in ambient air temperatures of 3 to 4.5°F by year 2050 and between 5.5 to 8°F by year 2100. Warming average temperatures, regardless of total precipitation level changes, will cause droughts to become longer and more severe and, coupled with development in the wildland-urban interface, increased fire risk. The Bay Area will be severely impacted by SLR and, when combined with high tides and storms, by extreme flooding. Between 2020 and 2050, the region is projected to see between 0.20 and 1.16 feet of SLR, and between 0.53 and 5.46 feet by year 2100 (USACE, CPR, and CWBI 2024).

3.2.3 Methodology and Thresholds of Significance

Per the requirements of NEPA and CEQA, the Proposed Project and its alternatives are compared to an established baseline to assess the net change in emissions that would result from implementing a Proposed Action. For this analysis, the average annual volume of dredged material was used for each site, and the furthest transit distance for each placement site type was used to generate a conservative scenario for a representative activity/emissions envelope. This envelope is defined as a year when every site would be dredged. This is not an actual schedule scenario but presents a realistic, conservative situation to evaluate the alternatives. Because the principal difference in the No Action Alternative and No Project Alternative is based on select locations being dredged every year versus every two years at two sites, the air quality analysis has adopted the No Action Alternative as the baseline against which Proposed Project alternatives are compared. For CEQA analysis, the No Project Alternative remains the same as the No Action Alternative since the emissions evaluated would occur in a hypothetical year when all locations are dredged and represents a conservative assessment of the maximum air quality impacts under this alternative.

The air emissions for the alternatives are primarily defined by two factors: the variation in use of specific dredging equipment (hopper vs clamshell was used in this analysis), and the variation in placement sites selection. These variations across the alternatives are used as the primary basis for evaluating differences in emissions. Additionally, dredge equipment operations were evaluated with updated information on equipment used, emission factors and transit lengths. Much of the dredge equipment updates came from the Port of Oakland 2020 Emission Inventory and CARB Commercial Harbor Craft data. As a result, the No Action Alternative was recalculated to provide a realistic baseline against which the action alternatives are evaluated to ascertain the net change in emissions, and these data are presented in Table 3-5. The average dredging volume for each location was used for the one-year envelope (Appendix D, Baseline Alternative Tab), which represents a total dredge volume of 2,650,000 CY. This envelope is approximately 20 percent greater than the actual average annual dredging volume for the sites over the 2015 to 2022 period and so represents a more conservative emissions profile. The dredging volume for the No Action Alternative and No Project Alternative established the one-year baseline envelope; this volume was subsequently used in the analysis of all other alternatives. Placement sites were based on the average percentages of placement site types used as described in Section 3.2.4.1 for the No Action Alternative. As with the action alternatives analyzed, the maximum distance was used for each placement site transit.

Table 3-5. Annual Emission Estimates for Dredging and Placement Site Transit, All Sites Dredged in One-Year Envelope for the No Action Alternative

Activity	VOCs/ROG, Tons[1]	CO, Tons	NOx, Tons	PM_{10}, Tons	$PM_{2.5}$, Tons
Dredging	4.75	26.95	83.52	2.67	2.53
Transit	4.65	34.64	92.11	3.40	3.30
Total	**9.40**	**61.59**	**175.63**	**6.08**	**5.83**

[1] VOCs, as defined in the federal CAA, are equivalent to reactive organic gas (ROG) defined here and are hereafter referenced as VOCs.

Key: CO = carbon monoxide
NO_x = nitrogen oxides
PM_{10} = particulate matter less than or equal to 10 microns in diameter
$PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter
ROG = reactive organic gas
VOC = volatile organic compound

Each alternative was analyzed based on the percentage of use of dredge equipment, which varied by alternative, and the transits to placement sites. Table 3-6 present the variation of dredging equipment use across the alternatives.

Table 3-6. Use of Dredging Equipment by Alternative

Alternative	Clamshell (Mechanical) %[1]	Hopper (Hydraulic) %
No Action Alternative/No Project Alternative	69	31
Alternative 1: Beneficial Use—Diversion from Deepwater Disposal	71	29
Alternative 2: Beneficial Use—Regional Optimization	52	48
Alternative 3: Beneficial Use—Cost Sharing	62	38
Alternative 4: Beneficial Use—Maximized	85	15

[1] Clamshell dredging was used to represent both clamshell and cutterhead dredging. Cutterhead dredging represent a small quantity of the total volume of dredging, and emissions associated with pumping to near/shore locations is minimal in comparison to clamshell operations. As a result, substituting with clamshell dredging provides a reasonable estimation of total cutterhead dredging emissions.

Environmental Setting and Environmental Analysis

In order to achieve flexibility for the proposed alternatives, dredging volumes were not segregated by specific placement sites with individual transit distances; instead, the greatest distance for each placement site type was used. Table 3-7 denotes the transit distances used for placement site types. The differences in emissions between the placement areas historically used (No Action Alternative and No Project Alternative) and the increase in use of upland beneficial use locations (Alternatives 1 through 4) were estimated and compared to CEQA thresholds to determine level of significance.

Table 3-7. Maximum Transit Distances (One-Way) for Each Placement Site Location

Placement Location	Dredging Equipment Used	Maximum Transit Distance (nautical miles)
In-Bay placement sites	Clamshell (Mechanical)	41.2
In-Bay placement sites	Hopper (Hydraulic)	41.2
Nearshore strategic placement sites	Hopper (Hydraulic)	5.2
Potential future nearshore strategic placement sites	Clamshell (Mechanical)	4.8
Ocean placement sites	Hopper (Hydraulic)	1.5
Deep ocean disposal	Clamshell (Mechanical)	63.5
Deep ocean disposal	Hopper (Hydraulic)	63.5
Upland (sponsor-provided) sites	Clamshell (Mechanical)	3.2
Upland direct placement sites	Clamshell (Mechanical)	64.3

Maintenance dredging under any alternative would be conducted with mechanical dredges, hopper dredges, and cutterhead-pipeline dredges. Methods used to transport dredged material would include hopper dredges, barges or scows, and pipelines. Clamshell dredging was used as a surrogate for cutterhead-pipeline dredging because cutterhead dredging represents a small amount of the total volume and the clamshell operations emissions are sufficient to cover the pump emissions for the nearshore pipeline as well. The analysis considered CEQA Appendix G thresholds as well as the BAAQMD thresholds when evaluating significance under CEQA. Based on these thresholds, the impacts would be significant if the project:

- Conflicts with or obstructs implementation of an applicable air quality plan.
- Violates any air quality standard or contributes substantially to an existing or projected air quality violation.
- Results in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors).
- Exposes sensitive receptors to substantial pollutant concentrations.
- Results in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

The BAAQMD CEQA Thresholds of Significance provide comparative reference thresholds for considering whether a project would have an air quality impact and recommend procedures for evaluating potential air quality impacts. The analysis in this Draft EA/EIR was conducted in accordance with the

BAAQMD CEQA Guidelines (BAAQMD 2022). As the BAAQMD thresholds are stricter than federal thresholds, it can be assumed that if an alternative meets BAAQMD thresholds then federal thresholds are also satisfied, and therefore it is unnecessary to analyze federal thresholds separately in this joint document. The maximum annual criteria pollutant thresholds for ROG and NOx are based on the federal BAAQMD Offset Requirements for ozone precursors for which the SFBAAB is designated as a NAAQS non-attainment area. For PM10 and PM2.5, the federal New Source Review Significant Emission Rate annual limits of 15 and 10 tons per year, respectively, are used as the thresholds (BAAQMD 2022).

A project's emissions would constitute a less-than-significant air quality impact if they meet the net change thresholds for criteria pollutants. The BAAQMD thresholds for criteria pollutants emissions are summarized in Table 3-8. Calculations performed to compare action net change emissions against the CEQA thresholds can be found in Appendix D.

This analysis addresses project emissions of the following air criteria pollutants: reactive organic gas (ROG), nitrogen oxides, PM_{10}, and $PM_{2.5}$. Analysis for SO_2 was not included because the area is in attainment for federal and state AAQS (i.e., NAAQS and California Ambient Air Quality Standards) for SO_2 and therefore, BAAQMD does not have any mass emissions significance thresholds for SO_2. Furthermore, the USEPA requirement to use ultra-low-sulfur diesel fuel makes SO_2 emissions low enough to be considered negligible for impact analyses. CO was excluded because there would be no on road traffic emissions associated with the Proposed Action, the ROI is in attainment, and the design values demonstrate that CO emissions in the region are quite low, all of which indicates that individual actions are unlikely to result in significant impacts. Additionally, Pb was not included as there are no known sources of Pb emissions associated with the action. For the CEQA/NEPA assessment of impacts, only VOCs/ROG, nitrogen oxides, PM_{10} and $PM_{2.5}$ are evaluated, as these criteria pollutants are classified as non-attainment or maintenance for the ROI.

Table 3-8. Bay Area Air Quality Management District Criteria Pollutant Thresholds

Threshold Criteria	ROG[1]	NOx	PM_{10}	$PM_{2.5}$
Average Daily Emissions (lbs/day)	54	54	82	54
Maximum Annual Emissions (tpy)	10	10	15	10

Source: BAAQMD 2022

[1] VOC, as defined in the federal CAA, are equivalent to ROG defined here.

Key: lbs/day = pounds per day
tpy = tons per year
NO_X = nitrogen oxides
PM_{10} = particulate matter less than or equal to 10 microns in diameter
$PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter
ROG = reactive organic gas

GHG emissions are evaluated separately, as their ROI is global. GHGs can remain in the atmosphere for different amounts of time, ranging from a few years to thousands of years. All these gases remain in the atmosphere long enough to become well mixed, meaning that the amount that is measured in the atmosphere is roughly the same all over the world, regardless of the source of the emissions. CO_2 remains in the atmosphere for a very long time; changes in atmospheric CO_2 concentrations persist for thousands of years. The larger the GWP, the more that a given gas warms the Earth compared to CO_2

over a given period, which is most commonly defined as 100 years. As examples, methane has a GWP of 25 and nitrous oxide has a GWP of 298. Emissions for these two GHGs are multiplied by their GWP and added to CO_2 emissions to calculate the carbon dioxide equivalent (CO_2e) emissions.

To quantify the difference in GHG emissions from dredging and transiting varying quantities of dredged material at beneficial use and other strategic or onshore sites across the four alternatives, the analysis quantitatively assessed emissions of the three primary GHGs to determine the net change compared to the No Action Alternative and No Project Alternative in Table 3-9.

Table 3-9. Annual Greenhouse Gas Emission Estimates for Dredging and Placement Site Transit, All Sites Dredged in One-Year Envelope for the No Action Alternative and No Project Alternative

Activity	CO_2 (Tons)	CH_4 (Tons)	N_2O (Tons)	CO_2e (Tons)[1]
Dredging	10,379.37	0.40	0.43	10,518
Transit	8,254.83	0.34	0.33	8,363
Total	**18,634.21**	**0.74**	**0.77**	**18,881**

[1] CO_2e is calculated based on the GWP values of 25 for CH_4 and 298 for N_2O.

Key: CH_4 = methane
CO_2 = carbon dioxide
CO_2e = carbon dioxide equivalent
N_2O = nitrous oxide

3.2.4 Impacts and Mitigation Measures

For each of the alternatives, the use of upland direct placement sites increases, with a maximum of 65 to 75 percent of all material dredged evaluated for Alternative 4. Deep ocean disposal is reduced to 0 to 10 percent and for all alternatives. Increased upland beneficial use and reduced deepwater ocean placement decreases the distance material needs to be transported, reducing emissions.

The net change in the percent of material volume per placement type by alternative is presented in Table 3-10. Material volume would remain the same across all alternatives for nearshore strategic placement and upland (sponsor-provided) site placements.

Table 3-10. Average Net Change in Placement Site Type by Percentage of Total Volume

Alternative	In-Bay Placement	Potential Future Nearshore Strategic Placement	Ocean Placement	Deep Ocean Disposal	Upland Direct Placement
Baseline: No Action Alternative/No Project Alternative	**35%**	**0%**	**4%**	**48%**	**0%**
Alternative 1	42%	0%	4%	35%	6%
Change	**+7%**	**0%**	**0%**	**-13%**	**+6%**
Alternative 2	56%	0%	4%	0%	27%
Change	**+21%**	**0%**	**0%**	**-48%**	**+27%**
Alternative 3	40%	0%	4%	0%	43%
Change	**+5%**	**0%**	**0%**	**-48%**	**+43%**
Alternative 4	6%	9%	0%	0%	71%
Change	**-29%**	**+9%**	**-4%**	**-48%**	**+71%**

As can be seen in Table 3-10, deep ocean disposal is reduced at greater levels from Alternative 1 through Alternative 4, with a corresponding increase in upland direct placement sites and in-Bay placement sites (Alternatives 1 through 3). Alternative 4 would result in a decreased percentage of in-Bay placement and an increase in potential future nearshore strategic placement.

3.2.4.1 Impact AQ-1: Potential Violation of Any Air Quality Standard or Contribute Substantially to an Existing or Projected Air Quality Violation

No Action Alternative/No Project Alternative

Because the No Action Alternative represents the current authorized dredging program, it establishes the baseline for the air quality analysis. As the baseline envelope assumes that every location is dredged in a single year, the No Project Alternative is identical to the No Action Alternative for this analysis (the year when every site is dredged under the two-year No Project Alternative program). Dredged volumes evaluated for the baseline are representative of historical activities over the last 10 years, and so there would be no increase of emissions under the No Action Alternative and the No Project Alternative caused by maintenance dredging for each of the channels and so no contributions to an existing or projected air quality violation.

- **NEPA Determination**: Under the No Action Alternative, short and long-term impacts on air quality violations would be less than significant.
- **CEQA Determination**: Under the No Project Alternative short and long-term impacts on air quality violations would be less than significant.

Alternatives 1 Through 4

Table 3-11 presents the emissions from dredging and placement site transits under all alternatives. For hopper dredging, emissions include the hopper dredge *Essayons* performing operationally along with a tender boat, *Becky T*, as well as the *Essayons*'s transit carrying dredged material to placement sites for unloading. The clamshell dredging operations are evaluated using the *Njord* as the representative clamshell dredge. This equipment was used for channel dredging in 2020. As with the *Essayons*, the operation of the *Njord* includes a tender boat (the *Becky T* is again used as the representative tender), and the tugboat *Heidi Bruscoe* is used to evaluate transport of 4,500-CY capacity scows of dredged material to placement sites. Detailed calculations and associated emissions data are contained in Appendix D.

Table 3-11. Total Dredge Operation and Transit Emissions by Alternative, Compared to the Baseline in Tons per Year

Alternative	VOC	NOx	PM_{10}	$PM_{2.5}$
Baseline: No Action Alternative/No Project Alternative	**9.40**	**175.63**	**6.08**	**5.83**
Alternative 1: Dredge Operation Emissions	4.69	80.18	2.55	2.41
Alternative 1: Transit Emissions	4.77	65.65	2.42	2.34
Subtotal	9.46	145.83	4.97	4.75
Alternative 1 Net Change	**+0.06**	**-29.81**	**-1.11**	**-1.07**
Alternative 2: Dredge Operation Emissions	3.93	87.73	2.95	2.81
Alternative 2: Transit Emissions	4.24	78.90	2.91	2.82
Subtotal	8.18	166.63	5.86	5.63
Alternative 2 Net Change	**-1.23**	**-9.00**	**-0.22**	**-0.19**
Alternative 3: Dredge Operation Emissions	4.34	83.73	2.74	2.60
Alternative 3: Transit Emissions	4.87	65.25	2.40	2.33
Subtotal	9.20	148.99	5.14	4.93
Alternative 3 Net Change	**-0.20**	**-26.65**	**-0.94**	**-0.90**
Alternative 4: Dredge Operation Emissions	5.23	74.85	2.27	2.13
Alternative 4: Transit Emissions	5.60	48.56	1.78	1.72
Subtotal	10.83	123.40	4.05	3.85
Alternative 4 Net Change	**+1.42**	**-52.23**	**-2.03**	**-1.98**

The use of clamshell versus hopper dredging varies by alternative, ranging from a minimum of clamshell use under Alternative 2 at 52 percent to a maximum of 85 percent under Alternative 4. This is represented in the VOC emissions, which are the only criteria of pollutant emissions that do not decrease under every alternative. This reflects two analytical variables: the higher emission factor values for the clamshell dredge as compared to the hopper dredge, and the use of the tugboat, which has a higher VOC emission factor than the hopper dredge to transport scows to placement sites. Overall, the

implementation of any of the alternatives would result in a net reduction in total emissions as compared to the baseline and would not contribute to an existing or projected air quality violation.

- **NEPA Determination**: Under Alternatives 1 through 4, short and long-term impacts on air quality violations would be less than significant.
- **CEQA Determination**: Under Alternatives 1 through 4, short and long-term impacts on air quality violations would be less than significant.

3.2.4.2 Impact AQ-2: Potential Conflict with or Obstruction of Implementation of an Applicable Air Quality Plan

The US Long Term Strategy establishes a net-zero GHG emissions goal for the United States by 2050. As part of this goal, the United States has committed to an ambitious and achievable goal to reduce net GHG emissions to 50 to 52 percent below 2005 levels in 2030 (US State Department 2021).

The BAAQMD CEQA Guidelines (BAAQMD 2022), Appendix D lists the following recommended thresholds of significance for climate change:

- Meet the State's goals to reduce emissions to 40 percent below 1990 levels by 2030 and carbon neutrality by 2045, or
- Be consistent with a local GHG reduction strategy that meets the criteria under State CEQA Guidelines Section 15183.5(b).

No Action Alternative/No Project Alternative

As described in Section 3.2.3, the No Action Alternative represents the current authorized dredging program and establishes the baseline for the short-term, direct emissions that would be generated by maintenance dredging and evaluated in the GHG analysis. Dredged volumes evaluated for the baseline are representative of historical activities over the last 10 years, and so there would be no increase of GHG emissions under the No Action Alternative (and the No Project Alternative) caused by maintenance dredging for each of the channels.

There would be no conflict or obstruction of applicable air quality plans under the No Action Alternative and the No Project Alternative caused by maintenance dredging.

- **NEPA Determination**: Under the No Action Alternative, impacts on implementation of applicable air quality plans would be less than significant.
- **CEQA Determination**: Under the No Project Alternative, impacts on implementation of applicable air quality plans would be less than significant.

Alternatives 1 through 4

Table 3-12 presents the GHG emissions for each Alternative as compared to the baseline to assess the net change. Emissions are presented as total CO_2e (the sum of CO_2, CH_4 and N_2O emissions) and are listed in metric units. GHG emissions would decrease under all alternatives.

Table 3-12. Total Dredge Operation and Transit Emissions by Alternative, Compared to the Baseline in Metric Tons per Year

Alternative	CO_2e
Baseline No Action Alternative/No Project Alternative	**17,128**
Alternative 1: Dredge Operation Emissions	9,290
Alternative 1: Transit Emissions	5,727
Subtotal	15,017
Alternative 1 Net Change	**-2,111**
Alternative 2: Dredge Operation Emissions	8,961
Alternative 2: Transit Emissions	6,555
Subtotal	15,516
Alternative 2 Net Change	**-1,612**
Alternative 3: Dredge Operation Emissions	9,135
Alternative 3: Transit Emissions	5,721
Subtotal	14,856
Alternative 3 Net Change	**-2,273**
Alternative 4: Dredge Operation Emissions	9,522
Alternative 4: Transit Emissions	4,664
Subtotal	14,186
Alternative 4 Net Change	**-2,943**

Key: CO_2e = carbon dioxide equivalent

The social cost benefit of the reduction in GHGs over the 10-year period was analyzed using the USEPA 2.5 percent cost values for CO_2, CH_4 and N_2O. Alternative 2 was used to quantify the reductions as the reductions would be lowest for this alternative. Table 3-13 presents the reduction ($2,585,800) for Alternative 2.

Table 3-13. Social Cost of Carbon Evaluation for Alternative 2 (Smallest Reduction), 2025–2034

Emission Year	2020 Dollars per Metric Ton[1]			Metric ton/year			Total Cost
	SC: CO_2 2.5%	SC: CH_4 2.5%	SC: N_2O 2.5%	CO_2	CH_4	N_2O	CO_2e
2025	$130	$1,590	$39,972	-1,753.63	-0.12	-0.07	($230,912)
2026	$133	$1,657	$40,920	-1,753.63	-0.12	-0.07	($236,246)
2027	$136	$1,724	$41,868	-1,753.63	-0.12	-0.07	($241,580)
2028	$139	$1,791	$42,816	-1,753.63	-0.12	-0.07	($246,914)
2029	$141	$1,857	$43,764	-1,753.63	-0.12	-0.07	($250,495)
2030	$144	$1,924	$44,712	-1,753.63	-0.12	-0.07	($255,829)
2031	$147	$2,002	$45,693	-1,753.63	-0.12	-0.07	($261,166)
2032	$150	$2,080	$46,674	-1,753.63	-0.12	-0.07	($266,504)
2033	$153	$2,157	$47,655	-1,753.63	-0.12	-0.07	($271,842)
2034	$155	$2,235	$48,636	-1,753.63	-0.12	-0.07	($275,426)
10-Year Total Estimated Cost Reduction							**($2,585,800)**

[1] USEPA 2023

Key: SC = social cost
CO_2 = carbon dioxide
CO_2e = carbon dioxide equivalent
CH_4 = methane
N_2O = nitrogen dioxide

- **NEPA Determination**: Under Alternatives 1 through 4, short- and long-term GHG emissions would decrease and therefore provide a beneficial impact as compared to the baseline GHG emissions. Implementing any of the project alternatives would not conflict with or obstruct Federal climate action plans or goals.
- **CEQA Determination**: Under Alternatives 1 through 4, there would be no impact on air quality, as implementing any of the alternatives would not conflict with or obstruct state or local climate action plans or goals.

3.2.4.3 Impact AQ-3: Potential for Exposure of Sensitive Receptors to Substantial Pollutant Concentrations

No Action Alternative/No Project Alternative, Alternatives 1 Through 4

The maintenance dredging actions would occur offshore, with placement sites located as far as approximately 55 miles offshore from San Francisco (i.e., SF-DODS). The increased use of beneficial use sites would result in more placement of dredged material near the coastline, and so would represent the greatest possibility of vessel operation emissions reaching onshore localities. Sensitive receptors are individuals most susceptible to poor air quality: children, the elderly, and individuals with serious pre-existing health problems affected by air quality (CARB 2005). The predominant wind patterns in the area are strongly from the west, with two months of the year (January and December) showing the greatest

variety of wind direction patterns. It can be concluded that all emissions in the Bay tend to disperse to the east of the source generating the emissions.

Dredging areas and placement sites are located throughout the Bay Area and offshore. The locations of potential concern would be in the Bay and specifically in areas where placement would occur nearshore. These work areas would be active intermittently, as the dredged material arrives, is deposited, and the vessel departs. In addition to the temporary nature of nearshore air emissions, the State of California has adopted regulations for commercial harborcraft vessel engines. These requirements include the most recent regulation (CARB 2022), which expands the applicability of the regulation to more vessel types and requires cleaner upgrades and new technology. Refer to Commercial Harbor Craft Regulation (Section 3.2.1.2) for description of phased engine upgrade requirements for harbor craft. These improvements not only impact emissions from the harbor craft engaged in maintenance dredging in the near term but will continue to reduce emissions over the 10-year period as more phased-in reductions occur.

- **NEPA Determination:** Under the No Action Alternative, impacts on sensitive receptors would be less than significant. Under Alternative 1, impacts would be reduced over time due to new regulations for harborcraft engines. Under Alternative 2 through 4, potential impacts on sensitive populations would be less than significant compared to the No Action Alternative and would be further reduced by the new requirements for harborcraft engines.
- **CEQA Determination:** Under the No Project Alternative, impacts on sensitive receptors would be less than significant. Under Alternative 1, impacts would reduce over time due to new regulations for harborcraft engines. Under Alternatives 2 through 4, potential impacts on sensitive populations under would be less than significant compared to the No Project Alternative and would also be further reduced by the new requirements for harborcraft engines.

3.2.4.4 Impact AQ-4: Potential to Result in Other Emissions (Such as Those Leading to Odors) Adversely Affecting a Substantial Number of People

No Action Alternative/No Project Alternative, Alternatives 1 Through 4

Under all the alternatives, placement of dredged material in the Bay (in-water placement) or at a beneficial use site would result in less-than-significant odor impacts due to the distances involved and regulatory controls. In-water placement submerges materials and beneficial use sites are permitted facilities where odors are addressed in the permit.

- **NEPA Determination:** Under all alternatives, the odor impacts would be less than significant.
- **CEQA Determination:** Under all alternatives, the odor impacts would be less than significant.

3.2.4.5 Impact AQ-5: Potential for Dredging, Transport, and Placement Activities to Result in Cumulative Impacts on Regional Air Quality

No Action Alternative/No Project Alternative, Alternatives 1 Through 4

The reasonably foreseeable actions in Table 3-2 include several projects that would involve dredging and dredged material placement that could result in the same type of air emissions as the Proposed Project. However, the project alternatives would largely reduce emissions as compared to the No Action Alternative/No Project Alternative Baseline with a small amount of VOCs generated if Alternatives 1 or 4 were implemented. As a result, implementation of either of these alternatives, in addition to the reasonably foreseeable actions, would have a small but negative cumulative impact on air quality. The remaining alternatives would not add to cumulative air emissions, and as a result would not have a negative impact on air quality.

The project would facilitate continued use of federal navigation channels by petroleum-related shipping in San Fransisco Bay, which would therefore result in an indirect impact to air quality and greenhouse gas emissions. Large ships associated with the petroleum industry, such as tankers and cargo ships, burn fossil fuels, emitting CO_2 and other GHGs into the atmosphere. In addition, the sustained maintenance and use of the channels by petroleum-related ships supports the existing petroleum-related activities in upland areas, for example, refineries. The emissions from these refineries contribute to local air pollution and global warming, impacting both air quality, climate, and public health in surrounding communities.

- **NEPA Determination:** None of the alternatives would contribute to cumulatively considerable impacts on regional air quality.
- **CEQA Determination:** None of the alternatives would contribute to cumulatively considerable impacts on regional air quality.

3.3 Biological Resources

This section describes the environmental setting in the study area for biological resources. Existing species, including special-status species, and habitats, including designated critical habitat, are described. The potential impacts of the project alternatives on these resources are analyzed.

3.3.1 Regulatory Setting

The following sections describe the regulatory framework applicable to potential biological resources impacts from the alternatives.

3.3.1.1 Federal

Federal regulations applicable to biological resources are discussed in the following sections.

Endangered Species Act

The federal Endangered Species Act (ESA) of 1973 was established to protect and recover imperiled species and the ecosystems upon which they depend. The USFWS and NMFS administer the act. The USFWS has jurisdiction over non-anadromous fish and wildlife species, and NMFS has jurisdiction over anadromous fish species.

ESA Section 7 states that all federal agencies must ensure that their actions do not jeopardize the continued existence of a listed species or destroy or adversely modify critical habitat. Consultation with USFWS or NMFS under Section 7 can be initiated only by federal agency project-related activities and may result in an incidental take statement that authorizes activities that may result in take, but would not jeopardize the continued existence of a listed species or adversely modify critical habitat.

For threatened species, the ESA does not automatically prohibit take, but instead authorizes regulations deemed necessary for species conservation (ESA Section 4(d)). Such Section 4(d) regulations may include the take prohibitions of ESA Section 9.

In 1998, NMFS issued a BiOp for the LTMS program and its effects on federally listed species under NMFS's jurisdiction at the time the consultation was completed (NMFS 1998). The BiOp was revised in 2015, at which time NMFS determined that the proposed maintenance dredging program for 2015 to 2025 would not jeopardize federally listed salmonid species or green sturgeon (NMFS 2015). In the Letter of Clarification, NMFS clarified that the reasonable and prudent mitigation measures contained in the incidental take statement accompanying the original 2015 NMFS BiOp do, in fact, apply to maintenance dredging in SF Bay (NMFS 2015). USACE will comply with the terms and conditions of the 2015 updated BiOp .

In 1999, USFWS issued a programmatic BiOp for the LTMS program for federally listed species under USFWS's jurisdiction (USFWS 1999). The BiOp concluded that USACE's continued maintenance dredging is not likely to jeopardize the continued existence of the clapper rail, harvest mouse, least tern, pelican, Pacific Coast population of plover, delta smelt, and splittail, and is not likely to destroy or adversely modify designated critical habitat. The 1999 USFWS BiOp specified conversation recommendations, including the establishment of mitigation banks and predator management (USFWS 1999).

In 2023, USFWS issued a BiOp for effects on California least tern from USACE maintenance dredging activities in Oakland Harbor (USFWS 2023). The BiOp specified reasonable and prudent measures that included monitoring and reporting during dredging activities and conservation measures, including implementation of recovery actions and ecological studies.

Since 2011, USACE has been required to consult on impacts on delta smelt during dredging of Suisun Bay Channel and New York Slough because of documented occurrences of entrainment during monitoring of hopper dredge use. Since 2011, USACE has received non-jeopardy opinions from USFWS

to maintain Suisun Bay Channel with a hopper or clamshell dredge. In 2024, USFWS issued a BiOp addressing impacts to delta smelt from maintenance dredging activities in Suisun Bay Channel (USFWS 2024). The BiOp concluded that maintenance dredging using mechanical clamshell dredging and sediment testing is not likely to jeopardize the continued existence of the delta smelt or destroy or adversely modify its designated critical habitat.

Longfin smelt was federally listed by USFWS on July 30, 2024 (50 CFR Part 17). USACE is in the process of consulting with USFWS on longfin smelt for the LTMS.

Magnuson-Stevens Fishery Conservation and Management Act

In response to growing concern about the status of United States fisheries, Congress passed the Sustainable Fisheries Act of 1996 (Public Law 104 297) to amend the Magnuson-Stevens Fishery Conservation and Management Act (Public Law 94-265), the primary law governing marine fisheries management in the federal waters of the United States. Under the Sustainable Fisheries Act, consultation is required by NMFS on any activity that might adversely affect EFH, which includes those habitats on which commercially valuable fish rely throughout their life cycles. It encompasses habitats necessary to allow sufficient production to support a long-term sustainable fishery and contribute to a healthy ecosystem. Fish species managed under EFH by NMFS within the Estuary include, but are not limited to, Pacific salmon, starry flounder, California halibut, northern anchovy, Pacific herring, and Dungeness crab.

In 2011, the LTMS agencies and NMFS completed a programmatic EFH consultation for compliance with this act. The EFH agreement includes a number of conservation measures that enhance the environmental protectiveness of the LTMS program. No further EFH consultation is required for USACE maintenance dredging in SF Bay performed in accordance with the provisions established through the formal programmatic federal EFH consultations for the LTMS (USACE and USEPA 2011).

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (16 U.S.C. §§ 703-712) of 1918 prohibits the take of protected migratory bird species through killing, capturing, selling, trading, or transport without prior authorization. This includes feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 C.F.R. pt. 21). The law is administered by USFWS.

Marine Mammal Protection Act

The Marine Mammal Protection Act (MMPA) (16 U.S.C. §§ 1361-1421h) of 1972 prohibits take or import any marine mammals and/or their products. Under the MMPA, incidental harassment permits may be issued for activities other than commercial fishing that may have negligible effects on marine mammals. Harassment under the MMPA can be either Level A, defined as “any act of pursuit, torment, or annoyance that has the potential to injure a marine mammal or marine mammal stock in the wild” or Level B, defined as “acts that have the potential to disturb (but not injure) a marine mammal or marine mammal stock in the wild by disrupting behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering.” The law is administered by the National Oceanic and Atmospheric Administration (NOAA).

Clean Water Act

See sections 1.2.1.1 and 1.6.1.3 for discussion of the CWA, including previous and planned project permitting. Sections 401 and 404 of the CWA provide protections for wetland and tidal habitats occurring in the study area and which could be affected by maintenance dredging and placement activities. These habitats are described in Section 3.3.2.1.

Executive Order 11990: Protection of Wetlands

This EO 11990, signed in 1977, requires federal agencies to minimize destruction of wetlands when managing lands, administering federal programs, and undertaking construction. Agencies are also required to consider the effects of federal actions on the health and quality of wetlands. The EO is administered by USACE.

Executive Order 13112: Invasive Species

This EO 13112 addresses the introduction of invasive species and mandates controlling the spread of invasive species that have already been introduced. The EO required creation of the Invasive Species Council to deal with invasive species. EO 13112 revoked the preceding EO 11987 on Exotic Organisms. This EO is administered by the National Invasive Species Council.

3.3.1.2 State (California Endangered Species Act)

The California Endangered Species Act (CESA) states that all native species of fishes, amphibians, reptiles, birds, mammals, invertebrates, and plants, and their habitats, threatened with extinction and those experiencing a significant decline which, if not halted, would lead to a threatened or endangered designation, will be protected or preserved. CDFW will work with all interested persons, agencies, and organizations to protect and preserve such sensitive resources and their habitats.

CESA prohibits the take of any species of wildlife designated by the California Fish and Game Commission as endangered, threatened, or as candidate species. CDFW may authorize the take of any such species if certain conditions are met (California Fish and Game Code, Chapter 1.5, Sections 2050-2115.5 and accompanying regulations under California Code of Regulations, Title 14, Chapter 6, sections 783.0-787.9).

The programmatic BiOps issued by NMFS and USFWS for the LTMS program do not address incidental take of state-listed species. There has been no clear and explicit waiver of federal sovereignty with respect to CESA. Accordingly, as a federal agency, USACE is not required to seek incidental take authorization or other authorization under CESA. In issuing a WQC/WDR, however, the Regional Water Board must comply with CESA.

3.3.2 Environmental Setting

The project area covers the SF Bay (broken up into South Bay, and Central Bay), San Pablo Bay, Suisun Bay, as well as tributary rivers and the Pacific Ocean (Figure 1-2). This section is divided into two key sections: 1) general habitat descriptions based on project area location; and 2) key sensitive species, both aquatic and upland.

3.3.2.1 Habitat

The Estuary is tidally influenced, and receives fluvial inflow from key waterways, including the Delta, Napa River, Petaluma River, and Guadalupe River. There are multiple habitat types found within the Estuary ranging from subtidal to supratidal, including deepwater channels, shallow-water shoals, intertidal features such as mud flats, sand flats, beaches, and intertidal wetlands ranging from saltmarsh to freshwater wetlands.

Subtidal habitat, which has variable size mobile sediments (e.g., clay, silt, sand, gravel, and cobble), are strongly affected by tidal currents, which then directly influence the flora and fauna that occupy these habitats (e.g., sturgeon, striped bass, halibut, and some marine mammals). The clay/silt material, or mud, is the main deposit in the Estuary. Sediment distribution in SF, San Pablo, and Suisun bays is thought to have been significantly influenced by hydraulic mining in the Sierra Nevada during the Gold Rush in the mid- to-late 19th century. During this period, miners washed large amounts of clay and silt into Central Valley streams, which converted vast extents of open water to tidal marsh habitat (Atwater et al. 1979, Krone 1977).

Intertidal unvegetated habitats such as beaches, mud flats, and sand flats are intertidal areas with sparse vegetation and are generally exposed between the MLLW to mean tide level. Beaches are where sand flats extend above the mean tide level. Mud flats are more common than sand flats and beaches in the Estuary and capture suspended sediments as well as provide protection to upland shoreline and banks from wave energy. Beaches, mud flats, and sand flats provide habitat for numerous invertebrate species, are used by many different types of aquatic species for multiple life stages and are important foraging and roosting habitat for shorebirds during low tide conditions (USACE and Regional Water Board 2015). Pacific cordgrass (*Spartina foliosa*) is an important native species in the tidal marshes and mudflats, and contributes to the base of the food chain in the Bay and provides important habitat where aquatic and wildlife species hide from predators, forage, and nest.

Tidal marshes are found along the margins of the South Bay, San Pablo Bay, Suisun Marsh, Delta channels, and at the confluence of rivers to the above waters. These habitats provide conditions that allow for highly productive and diverse ecological communities. The dominant vegetation in saltwater tidal marshes includes saltgrass (*Distichlis spicata*) and pickleweed (*Salicornia virginica*), while freshwater tidal marshes are dominated by cattails (*Typha* sp.) and tules (*Schoenoplectus acutus*). Invasive *Spartina* changes the physical structure and plant communities with resulting degradation of biodiversity and habitat. Tidal marshes play a critical role in providing cover, forage, and nursery areas for many sportfish and special-status fishes, such as Chinook salmon (*Oncorhynchus tshawytscha*), steelhead (*O. mykiss*), delta smelt (*Hypomesus transpacificus*),) longfin smelt (*Spirinchus thaleichthys*), green sturgeon (*Acipenser medirosris*), and white sturgeon (*Acipenser transmontanus*). Tidal marshes also provide

important nesting, resting, foraging and escape cover habitat for terrestrial wildlife species. Special-status birds and mammals found in tidal marshes include Ridgway's rail (*Rallus longirostris obsoletus*), black rail (*Laterallus jamaicensis*), and salt marsh harvest mouse (*Reithrodontomys raviventris*) (USACE and Regional Water Board 2015).

The open bay habitat in SF Bay is subdivided into deep bay habitat and shallow bay habitat. Deep bay habitat includes areas deeper than 18 feet below MLLW and is used by fishes such as California halibut (*Paralichthys californicus*), sturgeon, waterbirds like surf scoters (*Melanitta perspicillata*), and brown pelicans (*Pelecanus occidentalis*); and marine mammals like Pacific harbor seals (*Phoca vitulina*) and California sea lions (*Zalophus californianus*). Shallow bay habitat lies between the MLLW and 18 feet below MLLW. Species such as Pacific herring (*Clupea pallasii*), northern anchovy (*Engraulis mordax*), crabs, and shrimp, and anadromous fish use the shallow bay habitat. This habitat is in the depth range of many diving birds, and therefore provides important avian foraging habitat. Marine mammals such as Pacific harbor seals also forage in this habitat type. Eelgrass (*Zostera marina*) grows in areas of shallow bay habitat. Eelgrass is important for species like Pacific herring, which deposit their eggs on the grass blades, and to California least tern (*Sternula antillarum browni*), which forage on small fish within the eelgrass (USACE and Regional Water Board 2015).

The San Francisco Harbor Main Ship Channel is located west of the Golden Gate Bridge and includes Pacific Ocean subtidal habitats in open coastal waters off the coast of San Francisco, with depths greater than 50 feet below MLLW. Subtidal habitat with depths from 20 to 50 feet below MLLW are located at the Ocean Beach Nearshore Placement Site (SF-17) and SF-8. The nearshore placement site is intended for beach nourishment and includes intertidal beach habitat. These habitats support a diverse range of marine life, including benthic invertebrates, plankton, fish, birds, and marine mammals. The SF-DODS is in the open ocean approximately 55 nautical miles west of San Francisco. Within this habitat, three biological communities exist. The shallow pelagic community, which includes sea birds, marine mammals, migratory fish, and pelagic invertebrates; the deepwater pelagic community, inhabited by fish and invertebrates adapted to deepwater conditions, along with some marine mammals that dive to great depths for foraging; and the continental slope benthic community, populated by fish and invertebrates specifically adapted to deep sea conditions (USACE and Regional Water Board 2015).

3.3.2.2 Special Status Species

Delta Smelt

Delta smelt were listed as threatened under the federal ESA on March 5, 1993 (58 Federal Register (FR) 12854), and designated critical habitat for the species was designated on December 19, 1994 (59 FR 65256). Delta smelt critical habitat includes all water and submerged land below ordinary high water and the entire water column bounded by and contained within Suisun Bay, Goodyear, Suisun, Cutoff, First Mallard, and Montezuma Sloughs, with the downstream boundary at the Carquinez Bridge.

A 12-month finding on a petition to reclassify the delta smelt as an endangered species was completed on April 7, 2010 (75 FR 17667). After reviewing all available scientific and commercial information, the USFWS determined that reclassifying the delta smelt from threatened to endangered was warranted but was precluded by other higher priority listing actions (5 FR 69222). The USFWS annually reviews the

status and uplisting recommendations for delta smelt during its Candidate Notice of Recovery process, and each year the delta smelt has been recommended for uplisting from threatened to endangered. Delta smelt were listed as threatened under CESA on December 9, 1993, and reclassified as endangered on January 20, 2010.

Delta smelt mainly occupy habitat in the north Delta, including Liberty Island and the adjacent reach of the Sacramento Deepwater Shipping Channel (Sommer and Mejia 2013), Cache Slough to its confluence with the Sacramento River, and the Sacramento River from that confluence downstream to Chipps Island, Honker Bay, and the eastern part of Montezuma Slough. These areas have a year-round presence of fresh to low-salinity water that is comparatively turbid and of a tolerable water temperature. The Napa River is the only location outside of the critical habitat boundaries that may be used often enough to be considered a seasonal habitat rather than a transient one (USFWS 2024).

Delta smelt relative abundance has dramatically declined since the 1970s. The CDFW Fall Midwater Trawl (FMWT) delta smelt annual catch at 100 index stations has been zero every year between 2018 and 2022. The Townet Survey and FMWT abundance indices collapsed in the early 2000s. During the past decade, the index has continued to decrease and the most recent values for three of the four indices, FMWT, the Townet Survey, and 20-millimeter (mm) survey, were zero. Environmental and biotic changes from human activities have caused the decline in delta smelt populations, including decades of habitat and food web changes and marginalization by non-native species that prey on or outcompete delta smelt. Climate change has affected habitat conditions and survival of delta smelt through increased water temperatures, salinity intrusion, decreased delta inflows, and extreme droughts (USFWS 2024).

Delta smelt spawn in freshwater to slightly brackish water habitats under tidal influence, and volitionally move ‘downstream’ into brackish water habitat. Most spawning occurs from February through May in various places from the Napa River and locations to the east including much of the Delta. Eggs hatch and larvae enter the planktonic stage primarily from March through May, and most individuals have metamorphosed into the juvenile life stage by June or early July. Most of the juvenile fish continue to rear in habitats from Suisun Bay and Marsh and locations east principally along the Sacramento River-Cache Slough corridor (Moyle et al. 2010). Suisun Bay and Marsh have fresh to low-salinity water year-round that is relatively turbid with temperatures that are tolerable to delta smelt. Delta smelt appear to have some affinity for surface water habitat (Bennett and Burau 2015; Mitchell et al. 2017), but delta smelt are not limited to surface waters (Feyrer et al. 2013).

Longfin Smelt

The longfin smelt (*Spirinchus thaleichthys*) Bay-Delta distinct population segment (DPS) was determined by the USFWS to be warranted for listing as a threatened or endangered species under the ESA on April 2, 2012, but the listing was precluded by higher priority listing actions. On October 7, 2022, USFWS published a proposed rule that would find the longfin smelt, Bay-Delta DPS as an endangered species under the ESA. Longfin smelt was federally listed as endangered on July 30, 2024, with an effective date of August 29, 2024. The longfin smelt was listed as a threatened species throughout its range in California by CDFW on June 26, 2009, under CESA.

Environmental Setting and Environmental Analysis

Longfin smelt populations occur along the Pacific Coast of North America, and the San Francisco Estuary represents the southernmost population. Longfin smelt generally occur in the Delta; in Suisun, San Pablo, and San Francisco bays; and in the Gulf of the Farallones, just outside SF Bay.

Longfin smelt are pelagic forage fish that have a facultatively anadromous life history, meaning migration to the ocean is not required to complete their life cycle (Moyle 2002). Some longfin smelt remain in the Estuary for their entire life cycle (Merz et al. 2013; Rosenfield and Baxter 2007), while an unknown portion make their way to the ocean sometime during the late spring or summer of their first year of life (age 0), and may remain there for 18 months or longer before returning to the Estuary and Delta to spawn (77 FR 197566). A larger portion of longfin smelt enter the coastal ocean during their second year of life (age-1) and remain there for 3 to 7 months until they re-enter the Delta to spawn in fall or early winter (Rosenfield and Baxter 2007). Most of these age-1 longfin smelt move to coastal waters in July and August, possibly to escape warm water temperatures or to obtain food (Moyle et al. 2010; Rosenfield and Baxter 2007).

Longfin smelt spawn in fresh or low-salinity water in the Delta (Grimaldo et al. 2017), as they reach adulthood in their second year (Moyle 2002). They migrate upstream to spawn during late fall through winter, with most spawning from December through April, peaking in January and February (California Department of Fish and Game [CDFG] 2009). Preferred spawning conditions, in which offspring survival is favorable, are dependent on the amount of freshwater outflow and the location of the low-salinity zone because the variation affects the location of salinities that are suitable for spawning.

Recent studies suggest hatching and early rearing occurs in a much broader region and higher salinity (2 to 12 ppt) than previously recognized (Grimaldo et al. 2017) and includes portions of South SF Bay (Lewis et al. 2020). Longfin smelt appear to spawn in the low-salinity zone where brackish and freshwaters meet (Grimaldo et al. 2017), and in tidal wetlands of South SF Bay and San Pablo Bay when hydrological conditions favor spawning in more seaward regions (Lewis et al. 2020).

Longfin smelt larvae are most abundant in the water column usually from January through April (Reclamation 2008). Larval longfin smelt rear in low-salinity to brackish water at salinities of 2 to 12 ppt (Grimaldo et al. 2017), in tidal wetlands of San Pablo Bay (Sonoma Creek, Napa River, and Petaluma River), and South SF Bay (Alviso Marsh and salt pond restoration areas) (Hobbs et al. 2015; Lewis et al. 2020).

Larval longfin smelt are concentrated in Suisun and San Pablo Bays in December through May (Robinson and Greenfield 2011). Juveniles gradually move seaward as they grow and as water temperatures increase in the late spring and early summer (Rosenfield and Baxter 2007; Tobias and Baxter 2023). Tobias and Baxter (2023) showed the probability of presence for longfin smelt in multiple locations in the Estuary for age-0, age-1 and age-2 fish. For age-0 longfin smelt in Suisun Bay, the probability of presence increases starting in March or April and continues to increase until they reach age 1+. The probability of presence of longfin smelt in Suisun Bay is lowest for age-1+ fish in August and September, and lowest for age-2+ fish in June through December. For San Pablo Bay, age-0 longfin smelt have the highest probability of presence in May and June, with the lowest probability of presence in September. Age-1 longfin smelt in San Pablo Bay are less likely present in July through October, while age-2 fish have the lowest probability of presence in June through December.

The probability of occurrence for longfin smelt in Central SF Bay increases for age-0 fish, with a peak in July, and begins to decrease as they approach age-1. The lowest probability of presence of age-1 longfin smelt in Central SF Bay is most likely July through September; for age-2+ fish, the lowest probability of occurrence is June through December. The probability of presence of age-0 longfin smelt in South SF Bay increases starting around October and continuing into January, then the age-1 longfin smelt probability of presence decreases until November as age-2+ fish increase in probability of presence through February. The probability of presence of age-2+ longfin smelt then decrease until May (Tobias and Baxter 2023).

Seasonal patterns in abundance and occurrence in the nearshore ocean suggest that the population is at least partially anadromous (Garwood 2017; Rosenfield and Baxter 2007), and the detection of longfin smelt within the Estuary throughout the year suggests that anadromy is one of several life history strategies or contingents in this population. Geochemical analysis of longfin smelt otoliths has provided further evidence of longfin smelt using several life history strategies (Lewis et al. 2019). Adults move upstream into the Delta to spawn typically in September through November, resulting in lower densities in the Estuary in the fall months.

Green Sturgeon

The southern DPS of North American green sturgeon (*Acipenser medirostris*) was listed by NMFS as threatened on April 7, 2006 (71 FR 17757), with critical habitat designated on October 9, 2009 (74 FR 52300). Critical habitat in marine waters includes areas within the 60-fathom isobath from Monterey Bay to the US-Canada border. Coastal bays and estuaries in California that have been designated as critical habitat include San Francisco, San Pablo, and Suisun Humboldt Bays. In freshwater, critical habitat includes the mainstem Sacramento River from the Sacramento I-Street Bridge upstream to Keswick Dam (including the Yolo and Sutter Bypass areas and the lower American River), the Feather River downstream of the Fish Barrier Dam, the Yuba River downstream of the Daguerre Point Dam, and the Delta. Green sturgeon are categorized as a California species of special concern.

Green sturgeon reach maturity around 14 to 16 years of age and can live to be 70 years old, returning to their natal rivers every three to five years for spawning (Van Eenennaam et al. 2005). Adult green sturgeon move through the Delta from February through April (Heublein 2006; Kelly et al. 2007). Following their initial spawning run upriver, adults split into two out-migration groups. The “early” out-migration group migrate immediately back downstream through the Delta during May through June, and the “late” out-migration group hold for a few weeks to months in the upper river before moving back downstream during November through January (Colborne et al. 2022; Heublein et al. 2009; Vogel 2008).

Adult and subadult green sturgeon frequently congregate in the Estuary during summer and fall (Lindley et al. 2008). Specifically, adults and subadults may reside for extended periods in the central Delta as well as in Suisun and San Pablo Bays, presumably for feeding, because bays and estuaries are preferred feeding habitat rich in benthic invertebrates (e.g., amphipods, bivalves, and insect larvae). Juveniles are believed to use the Delta for rearing for the first one to three years of their lives before moving out to the ocean and are likely to be found in the main channels of the Delta and the larger interconnecting sloughs and waterways, especially within the central Delta and Suisun Bay and Marsh.

White Sturgeon

White sturgeon (*Acipenser transmontanus*) was categorized as a California species of special concern, but have no federal special status. CDFW received a petition to list white sturgeon as threatened under CESA on November 29, 2023, and submitted their petition evaluation to the California Fish and Game Commission in March 2024 stating that there is sufficient scientific information to indicate that listing white sturgeon as threatened may be warranted. On June 19, 2024, the California Fish and Game Commission approved white sturgeon as a candidate species for listing under CESA, and found sufficient scientific evidence that the species may warrant listing. Candidate species for listing under CESA are granted full protections during the review process. Both non-spawning adults and juveniles can be found throughout the Delta year-round (California Department of Water Resources et al. 2013; Moyle 2002; Radtke 1966). When not undergoing spawning or ocean migrations, adults and subadults are usually most abundant in brackish portions of the Delta (Kohlhorst et al. 1991). Information on trends in adults and juveniles suggests that numbers are declining (Moyle 2002).

Salinity tolerance increases with increasing age and size (McEnroe and Cech 1985), allowing white sturgeon to access a broader range of habitat in the Estuary (Israel et al. 2009). During dry years, white sturgeon have been observed following brackish waters farther upstream, while the opposite occurs in wet years (Kohlhorst et al. 1991). Adult white sturgeon tend to concentrate in deeper areas and tidal channels with soft bottoms, especially during low tides, and typically move into intertidal or shallow subtidal areas to feed during high tides (Moyle 2002). These shallow-water habitats provide opportunities for feeding on benthic organisms, such as opossum shrimp, amphipods, and even invasive overbite clams, and small fish (Israel et al. 2009; Kogut 2008). White sturgeon also have been found in tidal habitats of medium-sized tributary streams to the Estuary such as Coyote Creek and the Guadalupe River in the South Bay and Napa and Petaluma Rivers and Sonoma Creek in the North Bay (Leidy 2007).

Central California Coast Coho Salmon

Central California Coast coho salmon (*Oncorhynchus kisutch*) are listed as endangered under the ESA and endangered under the CESA. They range from Baja California, Mexico, north to Alaska, and southwest to Japan (McGinnis 1984). Coho salmon have a simple 3-year anadromous life cycle, rearing in fresh water for up to 15 months before migrating to the ocean. Coho salmon typically spend two growing seasons in the ocean before returning to their natal streams to spawn. The Central California Coast coho salmon evolutionarily significant unit (ESU) occurs from Punta Gorda in Northern California south to, and including, the San Lorenzo River in central California (Weitkamp et al. 1995). Coho generally return to their natal streams between November and December. This species has been extirpated from tributaries of SF Bay; therefore, coho are rare in SF Bay.

Chinook Salmon

There are four distinct runs of Chinook salmon (*Oncorhynchus tshawytscha*) that migrate through the Estuary into the Delta and Central Valley Rivers.

- The Sacramento River winter-run Chinook salmon ESU was listed by NMFS as threatened under the ESA on August 14, 1989 (54 FR 32085) but was reclassified as endangered on January 4, 1994 (59 FR 440). Critical habitat was designated on June 16, 1993 (58 FR 33212). Winter-run Chinook salmon critical habitat includes the portion of the Sacramento River from Keswick Dam to Chipps Island, all waters westward from Chipps Island to the Carquinez Strait Bridge, and all waters of San Pablo Bay; all waters of the Bay north of the San Francisco-Oakland Bay Bridge have been designated as critical habitat for winter-run Chinook salmon. Winter-run Chinook salmon were listed as endangered under CESA on September 22, 1989.
- The Central Valley spring-run Chinook salmon ESU was listed by NMFS as threatened under the ESA on September 16, 1999 (64 FR 50394) and reaffirmed as threatened on June 28, 2005. Critical habitat was designated on September 2, 2005, and encompasses the lower Feather River; the Sacramento and Yuba rivers; Beegum, Battle, Clear, Cottonwood, Antelope, Mill, Deer, Butte, and Big Chico creeks; the north Delta (the central and south Delta were excluded); and Suisun, San Pablo, and north San Francisco bays (70 FR 52488). Spring-run Chinook salmon were listed as threatened under CESA on February 5, 1999.
- The Central Valley fall-/late-fall-run Chinook salmon ESU was determined by NMFS to comprise a single ESU. On March 9, 1998 (63 FR 11481), NMFS issued a proposed rule to list fall-run Chinook salmon as threatened, but determined the species did not warrant listing and identified it as a candidate species (64 FR 50393, September 16, 1999). It was then changed to a species of concern in 2004. CDFW also determined that Central Valley fall-/late fall-run Chinook salmon are a California species of special concern.

Adult Chinook salmon migrate upstream, including through the project area in most months of the year, with winter-run migrating mostly between November through June, spring-run migrating through mostly between January through August, fall-run from July through December, and late fall-run from October through December. Juvenile winter-run Chinook salmon migrate through the Delta and Estuary between October and May, while spring-run Chinook salmon migrate throughout the spring and into June. Fall-run and late fall-run Chinook salmon migrate through the Delta and Estuary from January through June as young-of-year, and a small number migrate as yearlings between November and April.

Central Valley Steelhead

The Central Valley steelhead DPS (originally identified as an ESU) was listed as threatened by NMFS (63 FR 13347, March 19, 1998). Resident rainbow trout were previously included as part of the protected fish, but in January 2006, NMFS directed that only the anadromous form should be listed as threatened, and the resident form did not warrant listing (71 FR 834, January 5, 2006). Critical habitat was designated to include the lower Feather River; Battle, Cottonwood, Antelope, Mill, Deer, Big Chico, and Butte creeks; Sacramento, Yuba, American, Cosumnes, Mokelumne, Calaveras, San Joaquin, Merced, Tuolumne, and Stanislaus rivers; and the Delta (70 FR 52488, September 2, 2005).

Adult migration timing in the Delta ranges from July until May, with peaks at both the beginning of the spawning season as migrants move to their natal streams (all well upstream from the project area), and at the end of the season, in May, as some post-spawn kelts emigrate back to the ocean (Moyle 2002). The Estuary is used as a short-term out-migration corridor for juvenile steelhead. Delta exit is monitored at the Chipps Island with most passage occurring between January and June (Reclamation 2008; Aasen 2011, 2012).

Central California Coast Steelhead

Central California Coast steelhead DPS (originally identified as an ESU) was federally listed as threatened on August 18, 1997. As with the Central Valley steelhead, both resident and anadromous forms were included in the initial ESU, but only the anadromous form was listed. Critical habitat is designated to include all river reaches and estuarine areas accessible to listed steelhead in coastal river basins from the Russian River to Aptos Creek, California (inclusive), and the drainages of San Francisco and San Pablo Bays. Also included are all waters of San Pablo Bay westward of the Carquinez Bridge and all waters of SF Bay from San Pablo Bay to the Golden Gate Bridge. Central California Coast steelhead is a CDFW species of concern.

Central California Coast steelhead adults typically migrate between December and April and spawn shortly after reaching their natal spawning habitat. In the project area, this includes tributaries of SF Bay, including the watersheds of the Petaluma and Napa rivers, and several tributaries of the South Bay. Eggs hatch into alevins after incubating for approximately 25 to 35 days depending on water temperature (Shapovalov and Taft 1954). Alevins remain in the gravel for two to three weeks until they emerge as fry. Smolts outmigrate to the ocean usually in the late winter and spring and may extend into the early summer.

Leatherback Turtle

The leatherback turtle (*Dermochelys coriacea*) was listed by NMFS as endangered on June 2, 1970 (35 FR 8491). Critical habitat was designated to include the coastal waters adjacent to Sandy Point, St. Croix, US Virgin Islands. In January 2012, additional critical habitat was designated to provide protection along the west coast of the US (77 FR 4170) and includes approximately 16,910 square miles along the California coast from Point Arena to Point Arguello, east of the 3,000-meter depth contour (including the SF-DODS). The Western Pacific population feeds along the California coastline and is estimated to be declining at a rate of 5.6 percent per year (Oceana 2021).

California Least Tern

The California least tern (*Sterna antillium*) is state and federally listed as endangered. This bird species feeds on small fish in shallow estuaries and lagoons and breeds in California from mid-May to August. California least terns are known to nest at the former Naval Air Station in Alameda and use the middle harbor of Oakland Harbor for foraging and roosting. They have been observed foraging along the shoreline of the Naval Air Station in Alameda and in Ballena Bay from May through August. In August, this species migrates from the SF Bay Area to overwinter in the southern United States (H.T. Harvey and Associates 2012; USACE and Regional Water Board 2015).

California least terns were first observed at MWRP in 2005 and since this time, Montezuma Wetlands, LLC, has been working with CDFW and USFWS to create nesting habitat for this species outside of the area that would be impacted by BUDM placement activities. This species has continued to nest at MWRP every year since it was first observed (EcoBridges Environmental 2023). Montezuma Wetlands, LLC, is responsible for coordinating with CDFW and USFWS on any potential impacts on California least terns at MWRP (USACE and Regional Water Board 2015).

Western Snowy Plover

The Pacific Coast population of the western snowy plover (*Charadrius alexandrinus nivosus*) is federally listed as threatened and is one of two subspecies of snowy plover in North America. The Pacific Coast population, which consists of approximately 2,000 individuals, breeds along the United States Pacific Coast from southern Washington to Baja California, Mexico. Habitat degradation caused by human disturbance, urban development, introduced beachgrass (*Ammophila* spp.), and expanding predator populations has resulted in a decline in active nesting areas and in the size of the breeding and wintering populations. This species is a colonial nester that inhabits sandy coastal beaches and spits, sparsely vegetated coastal dunes, salt pans or pond levees, beaches at creek or river mouths, and shores of large alkali lakes. The nesting season is March through the third week of July. This species returns to successful nesting sites each year. Western snowy plovers forage for invertebrates on wet sand areas of intertidal zones, in dry, sandy areas above high tide lines, on salt pans and along the edges of salt marshes and salt ponds (72 FR 54279; USACE and Regional Water Board 2015).

Ocean Beach provides suitable habitat for western snowy plovers and overwintering plovers have been monitored there by the National Park Service since 1994. Nesting of western snowy plovers has not been observed at Ocean Beach. Ocean Beach is not designated critical habitat for this species, but in 2008 the National Park Service established a Snowy Plover Protection Area at this location, which provides a protection zone for western snowy plovers overwintering there (SFPUC 2012).

Ridgway's Rail

The Ridgway's rail (*Rallus obsoletus*) is federally and state-listed as endangered. This species inhabits tidally influenced salt marsh habitat dominated by cordgrass or gumplant where they forage mainly on invertebrates during low tides. Their range previously extended along the California coast from Humboldt Bay to San Luis Obispo County, but due to habitat loss and degradation, they are currently only found around SF Bay. The breeding season extends from March to August and nesting occurs in the tallest vegetation (particularly cordgrass and marsh gumplant) along tidal sloughs. They are year-round residents of SF Bay, with juveniles dispersing from their natal sites in late summer and early fall (USACE and Regional Water Board 2015).

This species is known to occur in the tidal marsh habitat near the San Rafael Creek Inner Canal Channel. The USFWS considers all potential habitat to be occupied unless species-specific surveys of that year have confirmed absence. To minimize potential impacts, the USFWS BiOp on the LTMS program specifies that dredging activities shall not occur within 250 feet of potential Ridgway's rail habitat during the nesting season (February 1 through August 31) (USACE et al. 1998; USFWS 1999).

Salt Marsh Harvest Mouse

The salt marsh harvest mouse (*Reithrodontomys raviventris*) is federally and state endangered. This species is generally restricted to saline or subsaline marsh habitats around the Estuary and, with some exception, mixed saline or brackish areas in the Suisun Bay Area, as documented by the USFWS in 2013 and more recently in 2021. They are found predominantly in pickleweed and saltgrass but can also move into adjoining grasslands during high tides in the winter months. Habitat loss due to human actions is the greatest threat to the salt marsh harvest mouse. This includes habitat loss due to filling, diking, subsidence, changes in water salinity, non-native species invasions, SLR associated with global climate change and pollution (USFWS 2021).

The MWRP includes suitable salt marsh harvest mouse habitat. Trapping efforts conducted from 2000 to 2023 have confirmed the presence of this species (DiDonato 2023). Salt marsh harvest mouse may also be present at Cullinan Ranch because there is a source population at an adjacent restoration site (Guadalcanal Village). Pre-construction surveys did not document the presence of this species at Cullinan Ranch, however when restoration efforts have established suitable habitat and vegetation cover of at least 75 percent, salt marsh harvest mouse surveys will be conducted every year. It is anticipated that once suitable habitat is established, this species will migrate from Guadalcanal Village to Cullinan Ranch (Ducks Unlimited 2020).

3.3.2.3 Non-Special-Status Fauna

Fish

There are over 100 fish species, both native and non-native, found within and dependent on the Estuary. Many of these species are commercially and recreationally important fish species and could be impacted by dredging. Pacific herring (*Clupea pallasii*), northern anchovy (*Engraulis mordax*), Pacific sardine (*Sardinops sagax*), starry flounder (*Platichthys stellatus*), California halibut (*Paralichthys californicus*), jacksmelt (*Atherinopsis californiensis*), topsmelt (*Atherinops affinis*), and white croaker (*Genyonemus lineatus*) are found in the Estuary. The Estuary provides high-quality habitat for reproduction due to abundant food available for adults and larvae. Many of the fish species spawn in the Estuary in spring and summer, with juveniles then moving to the open bay or kelp beds.

Pacific herring, which are managed by CDFW through a California Pacific Herring Fishery Management Plan (CDFW 2019), enter the Estuary to spawn between December and March each year, broadcasting their eggs over kelp, rocks, or other hard structures. After hatching, this species spends the next five to nine months in the Estuary, which provides a safe environment for their early development. During fall and summer, Pacific herring leave the Estuary and school in the open ocean. Northern anchovies, the most abundant fish in the SF Bay, enter the Estuary to spawn in the spring when water temperatures and plankton production rises, and exit in the fall. Northern anchovy can spawn throughout the year, but peak spawning occurs in February and April and may coincide with peak plankton production, which in turn may provide food resources for the larvae (Syderman et al. 2020).

Plankton

The Estuary supports planktonic communities, made up of phytoplankton, zooplankton, and ichthyoplankton. Plankton abundance, growth and distribution are shown to be correlated to sunlight, turbidity, and freshwater inflow (Jassby et al. 2002; NMFS 2007). Zooplankton, commonly consisting of copepods, rotifers, larval bivalves, larval crustaceans, and polychaetes, are free-floating or weak swimmers that are distributed by tides, current and wind. Ichthyoplankton are eggs and larval fish. In the Estuary, these include but are not limited to Pacific herring (*Clupea pallasii*), northern anchovy (*Engraulis mordax*), and white sea bass (*Cynoscion nobilis*).

Benthos

Benthic communities in the Estuary are dominated by mollusks and crustaceans that inhabit the substrate and play an important role in maintaining both water and sediment quality. They are prey for fish and invertebrates, and for birds. Many benthic species, particularly mollusks, are often indicators of environmental stress due to their sensitivities to pollutants and contaminants, which accumulate in the substrates, thus resulting in prolonged exposures.

Benthic species are affected by physical factors such as salinity levels and sediment grain size as well as biological factors including competition and predation. Within the project area, there are marine benthic assemblages (offshore), estuarine benthic assemblages, and fresh/brackish assemblages (Delta). Peterson and Vayssieres (2010) found that benthic assemblages in the Estuary do not appear to be geographically static, but may shift spatially with salinity, influenced by hydrologic conditions, without strong fidelity to physical habitat attributes such as substrate composition or location in embayment versus channel habitat. Additionally, the invasion of Asian clam (*Corbula amurensis*) in the Estuary has directly and indirectly affected the benthos, causing significant changes in assemblage structure.

Estuarine (e.g., San Pablo and San Francisco bays) assemblages are dominated by mollusks consisting of ribbed mussel (*Geukensia demissa*), Baltic clam (*Baltic macoma*), overbite clam (*Potamocorbula amurensis*), California hornsnails (*Cerithideopsis californica*), and Bay mussels (*Mytilus* spp.), and crustaceans including California bay shrimp (*Crangon franciscorum*), Dungeness crab (*Metacarcinus magister*), red rock crab (*Cancer productus*), Pacific rock crab (*Cancer antennarius*), and the graceful rock crab (*Cancer gracilis*) (SFEP 1992).

3.3.2.4 Aquatic Vegetation

Eelgrass (*Zostera marina*) is a foundational species for SF Bay, supporting much of the biodiversity in the bay ecosystem. This native underwater flowering plant, or marine angiosperm, grows on muddy and sandy bottoms in the shallow subtidal areas of the Bay. It provides essential food and habitat for a variety of species. Eelgrass beds serve as nurseries for young fish and foraging areas for many species of fish, invertebrates, and birds. Pacific herring spawn on eelgrass, and other fish species such as salmonid and smelt use eelgrass habitat as juveniles before moving to the open ocean. Not only does eelgrass form the base of a highly productive marine food web, but it is also unique in producing food and oxygen, improving water quality by filtering polluted runoff, absorbing excess nutrients, and storing greenhouse gases such as carbon dioxide. By trapping sediment, stabilizing the ocean floor, and minimizing the force of wave energy, eelgrass beds also reduce coastal erosion. The largest eelgrass beds in the Estuary are found in shallow subtidal regions of San Pablo Bay and Richardson Bay, with smaller beds scattered mainly between Carquinez Strait and Hayward. Multiple eelgrass restoration sites have been established in the Estuary, including in Point San Pablo, Richardson Bay, San Rafael Shoreline, Corte Madera Bay, and in the vicinity of the Inner Richmond Harbor (Merkel & Associates and San Francisco State University 2023).

Eelgrass habitat is a high priority area for conservation and management. Eelgrass is protected under the CWA Section 404(b) (1) “Guidelines for Specification of Disposal Sites for Dredged or Fill Material,” Subpart E, “Potential Impacts on Special Aquatic Sites.” It has also been identified as EFH for various life stages of fish species managed by fishery management plans (FMP) under the Magnuson-Stevens Act, as established by NMFS. The California Eelgrass Mitigation Policy and Implementing Guidelines of October 2014, states a goal of no net loss of eelgrass habitat function in California and provides guidance for conducting surveys, impact assessment, and compensatory mitigation (NOAA Fisheries 2014).

While eelgrass is present near the Richmond Inner Harbor Channel and Oakland Inner Harbor, it does not occur within the channel boundaries. The Richmond Inner Harbor channels are protected by a training wall. Eelgrass grows adjacent to the channel along the training wall. USACE conducts eelgrass surveys within a 250’ buffer before and after maintenance dredging. Although a reduction in turion density (new shoots) has been observed along the channel margin near the training wall, survey crews have not found evidence that dredging caused eelgrass loss due to excessive sedimentation. Seasonal diebacks during winter months are common in eelgrass meadows. Results indicate that eelgrass is primarily affected by freshwater declines or red tides, rather than dredging in areas where sediment stays close to the channel (pers. Comm., Keith Merkel, Merkel & Associates, 2024).

Small patches of eelgrass were reported in the shallow areas of the Oakland Inner Harbor and Outer Harbor in 2021 (Port of Oakland and USACE 2023). Surveys comparing Oakland Harbor's pre- and post-eelgrass studies to a number of reference sites, the results showed an increase in the area of the eelgrass habitat and in the density of the existing beds (Merkel & Associates 2011, 2012; Tierra Data, Inc. 2024a, 2024b).

3.3.2.5 Essential Fish Habitat

EFH, designated through the Magnuson-Stevens Act, includes habitat necessary for the survival of commercially valuable fish species, federally managed under three FMP –FMPs: Pacific Groundfish FMP, Coastal Pelagic FMP, and the Pacific Coast Salmonid FMP. These three FMPs would be affected by the project activities.

The Pacific Groundfish FMP was approved and implemented in 1982, with 32 amendments since its inception. The goals of the FMP focus on conservation (i.e., prevent overfishing, rebuild overfished stocks, manage harvest levels, and prevent where practicable, net loss of habitat), economics (maximize economic value of groundfish resources), and utilization (achieve maximum biological yield, promote year-round availability of quality seafood, and promote recreational fishing opportunities), with multiple objectives for each goal. The Pacific Groundfish FMP actively manages 86 species, including starry flounder, dover sole, and multiple rockfish species (Pacific Fisheries Management Council [PFMC] 2023).

The Coastal Pelagic FMP was initially developed for the protection of northern anchovy in 1977, but through 13 additional amendments, expanded to protect habitat for fish species and invertebrates that are associated with open coastal waters. Fish managed under this plan include Pacific herring, northern anchovy, Pacific sardine, Pacific and jack mackerel, as well as invertebrates including squid and krill (PFMC 2024).

The Pacific Salmon FMP was first approved in 1977 and has been amended 23 times since. The FMP covers both wild and hatchery salmon species (Chinook, coho, sockeye, chum, and pink) off the coasts of California, Oregon, and Washington.

3.3.3 Methodology and Thresholds of Significance

Under NEPA, the analysis of potential impacts considered whether the project alternatives would have a substantial adverse effect on any species identified as a proposed, threatened, or endangered species under the ESA. The CEQ's NEPA Regulations, 40 C.F.R. § 1508.27(b)(9), generally equate whether an action significantly affects the quality of the human environment with "the degree to which the action may adversely affect an endangered or threatened species." Therefore, an alternative may result in a significant impact if it would directly or indirectly (e.g., through habitat modification) result in a substantial population decline of any proposed, threatened, or endangered species protected under the ESA. Furthermore, a project impact may be significant if it would result in the decline of a non-federally listed species such that populations would fall below self-sustaining levels. NEPA requires the consideration of the intensity or severity of an impact, including whether the action threatens a violation of federal, state, or local law or requirement imposed for the protection of the environment. 40 C.F.R. § 1508.27(b)(10). This consideration includes violations of CESA.

Under CEQA, the analysis of potential impacts of the Proposed Project considered whether the project alternatives would have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, proposed, or listed species under, or otherwise protected by, the ESA or CESA, or where they would otherwise meet the CEQA Guidelines' definition of "endangered or threatened" (14 California Code of Regulations 15380). In addition, Section 15065 of the CEQA

Guidelines requires a finding of a significant effect if a project has the potential to "substantially reduce the habitat of a fish or wildlife species," "cause a fish or wildlife population to drop below self-sustaining levels," "threaten to eliminate a plant or animal community," or "substantially reduce the number or restrict the range of an endangered, rare or threatened species."

3.3.4 Impacts and Mitigation Measures

While there are numerous species in the project area, the impact assessment focuses on the most at-risk species, typically those that are listed under the federal and/or state ESA, based on the type of impact.

3.3.4.1 Impact BI-1: Potential Effects on Fish and Benthic Invertebrate Survival Caused by Entrainment

No Action Alternative/No Project Alternative

All forms of dredging have the potential to incidentally remove organisms from the environment with the dredged material, a process referred to as entrainment. Organisms on or in the dredged material, such as snails, clams, or worms, may be entrained, in addition to organisms in the water column near the dredging apparatus. Fish that are smaller, are weaker swimmers, or are sometimes found near the bottom of the channel are more susceptible to dredging entrainment. Neither delta smelt nor longfin smelt are strong swimmers, and they are known to occur at times near the bottom of the water column (CDFG 2009). Based on entrainment data, longfin smelt are the most at-risk State and/or federally listed threatened or endangered species of being entrained during dredging activities.

In additional to occurring in the water column in areas that are dredged, longfin smelt occupy tidal wetland habitat. Recent fish surveys have detected significant numbers (e.g., more than 50) of age-1 and a single age-2 longfin smelt in wetlands restored by BUDM in San Pablo Bay. These surveys were conducted in November and December 2023 when longfin smelt would be expected to move into shallow-water habitats to spawn (Lewis et al. 2024). Though the project may impact longfin smelt due to entrainment, benefits to the species may also be realized when BUDM is incorporated to create and/or restore tidal wetland habitat.

Hopper Dredging: Hopper dredges are seagoing vessels designed to dredge and transport material from navigation channels to open-water placement areas. During active dredging, drag arms are lowered through the water column until they reach the channel bottom. The suction is then turned on, and the drag heads are slowly dragged across the channel bottom by the forward motion of the vessel. Sediment and water are suctioned through the bottom of the drag heads and additional water is suctioned through the doors on the top of the drag heads and deposited in the hopper bin in the vessel's midsection. When the hopper bin is full, the dredge raises the drag arms and moves to a designated placement area to empty the dredged material through large doors at the bottom of the dredge. Hopper dredges provide the ability to work in rough, open waters, the ability to move quickly between project sites under their own power, and the ability to maneuver so as not to interfere with or obstruct other vessel traffic during dredging operations. Hopper dredging also results in shorter dredging operation time and reduced sediment resuspension compared to mechanical dredging. Standard practices to avoid entrainment during hopper dredging are provided in Section 2.3.1.5.

Environmental Setting and Environmental Analysis

Rearing juvenile and adult longfin smelt have been collected most frequently from deepwater habitats as opposed to shoals during routine Bay study sampling (Rosenfield and Baxter 2007), and this information is useful to assess dredging impacts. By May of most years, young-of-the-year (age-0) longfin smelt begin to reach 40 mm fork length. At this size and regardless of Delta outflow, these approximately 40-mm age-0 longfin smelt are typically distributed throughout the Estuary because they are tolerant of a wide range of salinities from low salinity (and occasionally freshwater) to marine conditions in the Estuary. Distributions of older longfin smelt have only been described coarsely into densities across shoal and channel habitats (less than 7 meters and greater than or equal to 7 meters depth, respectively; Rosenfield and Baxter 2007). Density was almost always higher in the deeper channel habitats regardless of age class. As dredging tends to occur on the bottom or lower sides of the shipping channels, fish occupying the deeper channel habitats are expected to have greater exposure to dredging impacts.

Although longfin smelt are entrained from hydraulic dredging, the small overall percentage of SF Bay affected and short-term duration of hydraulic dredging are critical factors in limiting these impacts. The percent area of federal navigational channels compared to the preferred habitats of juvenile and adult longfin smelt is less than 8 percent, ranging from 2 to 8 percent by region. Often, when population data is limited, habitat is used as a surrogate for population. Therefore, theoretically, if both juveniles and adults are assumed to have uniform densities across the regional area with water depth greater than or equal to 23 feet, then less than 8 percent of these life stages would be exposed to dredging in these regions regardless of interannual variations of their abundance in the Estuary.

Note that these spatial impact estimates are very conservative due to following reasons:

- The federal navigational channels include the entire authorized channels, but typically only portions of some channels are dredged during each dredging episode. Historically, approximately 70 to 80 percent of Pinole Shoal, 40 to 50 percent of Richmond Outer Harbor, and around 80 percent of Richmond Inner Harbor have been dredged annually. Since 2017, Pinole Shoal and Richmond Outer Harbor have been dredged in alternating years.
- The hopper dredging operations are short-term and temporary because dredging operations for a given navigation channel would last only a few days to up to just over a month, depending on the dredging volume.
- Juvenile and adult longfin smelt occurring in habitats less than 23 feet deep or in locations other than near the navigation channels or placement sites would be exposed to dredging activities infrequently or not at all.
- Even if longfin smelt are occupying habitat where they may be exposed to dredging it is not certain they would be adversely affected or entrained. Even survey gear designed to monitor fish in the Delta can have a low (i.e., less than 1 percent [Duarte and Peterson 2021]) and variable (e.g., 18 to 57 percent [Huntsman et al. 2022]) capture probability for juvenile longfin smelt and other fishes (Duarte and Peterson 2021; Huntsman et al. 2022). As such, it is unlikely that 100 percent of longfin smelt that would be in a navigational channel would be entrained.

Fish are believed to be more susceptible to entrainment from hydraulic (i.e., hopper and cutterhead-pipeline) dredging than mechanical (i.e., clamshell) dredging (USACE and USEPA 2024). Under mechanical dredging, pressure waves caused as the dredge is dropped and lifted help push the fish away from the dredge, whereas hydraulic dredges pull the fish towards the dredge. Additionally, less water is removed during mechanical dredging. Demersal fish and crustaceans that live on the bottom are at higher risk of entrainment from both methods. Entrained fish likely would suffer direct injuries that may result in mortality. Green and white sturgeon are also at risk of entrainment, though research into how sturgeon are affected by dredging operations is limited (Balazik and Clarke 2024). Entrained crustaceans that are able to survive would be transported and released with dredged material, which could be in upland locations, or habitats that are less suitable to support the species.

Hopper dredge entrainment monitoring on USACE's dredge *Essayons* has been conducted over multiple years (Novotny et al. 2018; Novotny et al. 2019; Novotny et al. 2024), with ESA-listed species periodically captured in the entrainment monitoring (Table 3-14). Fish entrainment monitoring on the *Essayons* uses the vessel's existing sampling apparatus which diverts some of the dredge slurry from the dragheads through a sampling pipe equipped with a gate valve to control flow, and then into a basket with steel mesh walls that measures approximately 2 meters by 2 meters by 3 meters. The dredged material is then washed down with a hose and any fish are identified, counted, measured, and released if alive. Invertebrates also are identified and counted. Samples are collected during the beginning (i.e., priming phase), middle, and end (i.e., flushing phase) of the dredge period. Samples are limited to 10 minutes, but may be much shorter (e.g., 30 seconds) depending on the consistency of the dredged material (e.g., silt versus sand) and how quickly the mesh clogs, causing the basket to quickly fill to capacity. At least 80 percent of the hopper loads are monitored, but the proportion of material sampled compared to the entire hopper load is unknown. Additionally, there is a hopper observation area from which the contents of the hopper can be viewed. The water surface of the dredged material within the hopper can be reached with a long-handled net (more than 10 feet with a retrieval cord) once the hopper is full or nearly full. Any fish observed is netted from the hopper and data collected as described above.

Table 3-14. Monitoring Data Showing Recent Key Fish Species Entrained from the *Essayons* Hopper Dredge

Dredge Location	Monitor Year	Dredge Dates	Water Year Type	Species	Number Entrained[1]
Pinole Shoal	2010	6/15–6/21	Above Normal	No listed fish entrained	0
Pinole Shoal	2010	6/15–6/21	Above Normal	Northern anchovy	9
Pinole Shoal	2011	7/15–7/19	Wet	Longfin smelt	3
Richmond Long Wharf	2011	7/19–7/31, 8/11	Wet	Longfin smelt	11
Richmond Long Wharf	2011	7/19–7/31, 8/11	Wet	Northern anchovy	16
Richmond Southhampton	2011	7/27–7/31	Wet	Longfin smelt	1
Richmond Southhampton	2011	7/27–7/31	Wet	Spiny dogfish	1
Richmond Southhampton	2011	7/27–7/31	Wet	Rock sole	9
Richmond Southhampton	2011	7/27–7/31	Wet	California halibut	1

Dredge Location	Monitor Year	Dredge Dates	Water Year Type	Species	Number Entrained[1]
Suisun Bay	2011	8/1–8/10	Wet	Longfin smelt	3
Suisun Bay	2011	8/1–8/10	Wet	Delta smelt	3
Suisun Bay	2011	8/1–8/10	Wet	Northern anchovy	2
Richmond Long Wharf	2016	6/1–6/7	Dry	Longfin smelt	4
Richmond Long Wharf	2016	6/1–6/7	Dry	Northern anchovy	104
Richmond Long Wharf	2016	6/1–6/7	Dry	Brown rockfish	3
Richmond Long Wharf	2016	6/1–6/7	Dry	California halibut	2
Richmond Southhampton	2016	6/1, 6/7–6/15	Dry	Chinook salmon	1
Richmond Southhampton	2016	6/1, 6/7–6/15	Dry	Longfin smelt	8
Richmond Southhampton	2016	6/1, 6/7–6/15	Dry	Northern anchovy	55
Richmond Southhampton	2016	6/1, 6/7–6/15	Dry	Brown rockfish	1
Richmond Long Wharf	2016	10/3–10/7, 10/9–10/10	Dry	Northern anchovy	133
Pinole Shoal	2016	9/26–10/3, 10/8	Dry	Northern anchovy	269
Pinole Shoal	2016	9/26–10/3, 10/8	Dry	California halibut	8
Pinole Shoal	2017	6/1–6/21	Wet	Green sturgeon	1
Pinole Shoal	2017	6/1–6/21	Wet	Longfin smelt	56
Pinole Shoal	2017	6/1–6/21	Wet	Unidentified sturgeon[2]	1
Pinole Shoal	2017	6/1–6/21	Wet	Starry flounder	2
Pinole Shoal	2017	6/1–6/21	Wet	Northern anchovy	112
Pinole Shoal	2017	6/1–6/21	Wet	Brown rockfish	4
Pinole Shoal	2017	6/1–6/21	Wet	California halibut	2
Pinole Shoal	2017	6/1–6/21	Wet	Spiny dogfish	1
Richmond Outer Harbor	2018	6/6–6/17	Below Normal	No listed fish entrained	0
Richmond Outer Harbor	2018	6/6–6/17	Below Normal	Northern anchovy	300
Richmond Outer Harbor	2018	6/6–6/17	Below Normal	Brown rockfish	4
Richmond Outer Harbor	2018	10/1–10/19	Below Normal	Longfin smelt	30
Richmond Outer Harbor	2018	10/1–10/19	Below Normal	Northern anchovy	453
Richmond Outer Harbor	2018	10/1–10/19	Below Normal	Brown rockfish	19
Pinole Shoal	2019	7/31–8/7	Wet	Longfin smelt	1
Pinole Shoal	2019	7/31–8/7	Wet	Northern anchovy	229
No Monitoring Conducted	2020	–	–	–	0
No Monitoring Conducted	2021	–	–	–	0
No Monitoring Conducted	2022	–	–	–	0

Dredge Location	Monitor Year	Dredge Dates	Water Year Type	Species	Number Entrained[1]
Pinole Shoal	2023	7/22–7/31	Wet	Longfin smelt	41
Pinole Shoal	2023	7/22–7/31	Wet	Chinook salmon	1
Pinole Shoal	2023	7/22–7/31	Wet	Northern anchovy	514
Pinole Shoal	2023	7/22–7/31	Wet	Pacific herring	15
Pinole Shoal	2023	7/22–7/31	Wet	Starry flounder	3
Richmond Outer Harbor	2024	6/14–7/1	[3]	Longfin smelt	1
Richmond Outer Harbor	2024	6/14–7/1	[3]	Northern anchovy	12
Richmond Outer Harbor	2024	6/14–7/1	[3]	Pacific herring	1
Richmond Outer Harbor	2024	6/14–7/1	[3]	California halibut	1
Richmond Outer Harbor	2024	6/14–7/1	[3]	English sole	12
Richmond Outer Harbor	2024	6/14–7/1	[3]	Butter sole	1
Richmond Outer Harbor	2024	6/14–7/1	[3]	Spiny dogfish	2
Richmond Outer Harbor	2024	6/14–7/1	[3]	Rockfish (species unknown)	1
Richmond Southhampton	2024	7/1–7/3	[3]	Northern anchovy	5
Richmond Southhampton	2024	7/1–7/3	[3]	Brown rockfish	1
Richmond Southhampton	2024	7/1–7/3	[3]	Pacific sanddab	1

Sources: Novotny et al. 2018 ; Novotny et al. 2019 ; Novotny et al. 2024

1. The number of fish entrained were those counted from the subset of dredged material monitored.
2. White sturgeon noted in 2023 was likely part of a white sturgeon carcass and not a living fish.
3. Water year type for 2024 has not yet been classified

Northern anchovy, an important commercial species, are often entrained at higher numbers during dredging activities. For many entrainment monitoring samples, often for entire hopper loads, the count of special-status species collected by entrainment monitoring aboard the *Essayons* in SF Bay is zero. Resource agency sampling of fish populations in SF Bay generally yields only relative population indices useful for observing population trends within a species, and actual population estimates have high uncertainty (Newman 2008). No location-specific density estimates are available for these species specifically in the navigation channels. However, there are years of fish surveys collected by CDFW which show relative population abundances throughout the year across all segments of SF Bay (Tobias and Baxter 2024), which can be used to identify months of the year when hopper dredging is likely to have greater impacts. Results from *Essayons* monitoring are shown in Table 3-14.

The *Essayons* entrainment monitoring data was used in an alternative statistical model for longfin smelt to synthesize fish entrainment across time, space, and species (Lemasson et al. 2022). Longfin smelt were collected too infrequently to assess as a species, and some of the model results were driven by the typically much higher abundance of northern anchovy; this would likely apply to delta smelt as well. More fish, such as anchovy, were captured during flood tides and thus, higher salinity conditions. These results show that both ecological and operational elements can be reliable predictors of regional fish counts in estuaries, and entrainment risk is higher at the beginning and end of a dredging operation. This analysis found that standardizing effort by the area swept was more informative than using the volume of material dredged (Lemasson et al. 2022). Pelagic fish, such as longfin smelt and delta smelt, do not occur in or on

the dredge sediment, but rather above it, so sediment volume dredged may not be useful as a predictor of entrainment rates. Entrainment of small fish by the *Essayons* may be more likely to occur when the "doors" located on top dragheads are opened to improve flow through the intake pipes by increasing the water content of the dredge slurry.

As shown in Table 3-14 and described above, the number of juvenile and adult longfin smelt entrained in sampling efforts during hopper dredge operations is highly variable annually and appears to be partially dependent on the degree of Delta outflow as indicated by water year type. More longfin smelt entrained during a wet water year may occur due to higher egg, larval, and juvenile survival; hence, higher entrainment counts may not indicate a larger impact on the population compared to lower entrainment detected during drier years. Instead, the area swept by the dredge of habitats with greater densities of juvenile and adult longfin smelt (greater than or equal to 23 feet) in the federal navigational channels may be a better estimate of impacts on annual populations (Lemasson et al. 2022; Rosenfield and Baxter 2007).

There are six federally maintained channels that could potentially be dredged by a hopper dredge: San Francisco Harbor MSC, Richmond Inner Harbor, and Richmond Outer Harbor, Oakland Inner and Outer Harbor, San Pablo Bay, and San Bruno Channel (Table 3-15). If all these six channels were to be dredged by a hopper dredge, the approximate maximum duration of dredging operations by navigation channel would range from 2 to 37 days. Longfin smelt are less likely to be present in San Bruno Channel, which is only dredged infrequently. In the past, dredging by the *Essayons* has been constrained by the number of days it is available (approximately 20 days), and time of vessel availability may continue to be the main factor affecting the level of impact rather than volume dredged.

For longfin smelt, the entrainment impacts by hopper dredging were estimated by incorporating a time component (i.e., duration of dredging operations in days) into the areal comparison of preferred habitats versus federal navigational channels for each region. Often, when population data is limited, habitat is used as a surrogate for population. Table 3-15 provides the longfin smelt habitat area affected by hopper dredging and the duration of time in which the habitat area is affected. It is important to note that dredging activities are scheduled to avoid the most sensitive life stages (spawning and incubating eggs).

While San Pablo Bay has the largest percent of longfin smelt habitat area exposed to hopper dredging (8.2 percent) under the No Action Alternative and No Project Alternative, it is only affected for 7.7 percent of the year (28 days) when the maximum volumes are dredged, versus 2.1 percent (No Action Alternative) and 2.6 percent (No Project Alternative, every other year) of the year (8 and 10 days, respectively) when the average volumes per alternative are dredged (Table 3-15). Longfin smelt in Richmond Outer Harbor would have the greatest amount of time exposed to hopper dredging under the No Action Alternative and No Project Alternative, with longfin smelt exposed for 10 percent of the year (37 days) when the maximum volume is dredged. It is important to note that most of the dredging will occur in June through July.

Environmental Setting and Environmental Analysis

Tobias and Baxter (2023) described the predicted probability of occurrence of longfin smelt based on otter trawl data in the various regions of the Estuary during each month for each life stage (see Section 3.3.2.2). In June through July, the predicted probability of occurrence of age-0 longfin smelt in San Pablo Bay is around 0.2 to 0.21. In Central SF Bay it is approximately 0.24 to 0.3, and in South SF Bay it is 0 (See Figure 3 in Tobias and Baxter 2023). In June through July, the predicted probability of age-1 longfin smelt presence in San Pablo Bay is approximately 0.04 to 0.08, while in Central SF Bay it is approximately 0.06 to 0.09, and in South SF Bay it is around 0 (Tobias and Baxter 2023). In June through July, the predicted probability of age-2 longfin smelt presence in San Pablo Bay, and Central and South SF Bay is approximately 0 (Tobias and Baxter 2023).

Age-0 longfin smelt have the highest risk of entrainment during dredging operations in June and July due to their higher predicted probability of occurrence. Age-1 longfin smelt have substantially reduced probability of occurrence in June and July in all regions of the Estuary and would therefore be entrained in lower numbers. Age-2 fish are at minimal to no risk of entrainment in June and July. Because of the low predicted probability of presence of the three year-classes and the relatively low risk of exposure, there would not be a substantial risk to the longfin smelt population at any of the dredged navigational channels.

Because sturgeon are typically found at the bottoms of channels, they are at risk of entrainment. Since 2011, only one green sturgeon has been entrained in the Essayons hopper dredge, and a white sturgeon was detected, but may have already been dead when entrained in the hopper dredge (Table 3-14). While not every fish entrained can be observed due to the nature of the sediment, particularly if the sediment is a dense silty material and the amount of time monitoring can physically occur is limited, it is unlikely that many sturgeon were entrained. Swimming strength of sturgeon increases with increasing fish length, so smaller fish are less able to avoid hydraulic intakes than larger fish. However, the likelihood of entraining sturgeon is low overall as even juveniles (i.e., greater than 30 centimeters in length) (Moyle 2002) should be fairly strong swimmers and generally able to avoid being entrained by hopper dredging.

Table 3-15. Estimated Exposure Risk to Longfin Smelt from Hopper Dredging Based on Longfin Smelt Habitat in the San Francisco Estuary[1] Affected and Dredging Duration by Navigational Channel During Each Dredging Event

Alternative	Regional Area with Water Depth ≥ 23 feet at MSL (acres)	Maximum Area of Navigational Channel Dredged (acres)	Estimated Duration of Hopper Dredging (Days for maximum volume)	Estimated Duration of Hopper Dredging (Days vessel available)	Timing of Dredging	Estimated Percent of Longfin Smelt Habitat Exposed to Hopper Dredging	Estimated Percent Time Exposed of Longfin Smelt Exposed to Hopper Dredging (at maximum volume)	Estimated Percent Time Exposed of Longfin Smelt Exposed to Hopper Dredging (for days vessel available)
Navigation Channel: Richmond Outer Harbor — Central Bay Region								
NA	17,304	618	37	9.5	June–July	3.6%	10%	2.9%
NP	17,304	618	37	19[1]	June–July	3.6%	10%	3.4%
Alt 1	17,304	618	37	9.5	June–July	3.6%	10%	2.9%
Alt 2	17,304	618	37	11	June–July	3.6%	10%	2.9%
Alt 3	17,304	618	34	10	June–July	3.6%	9.3%	2.7%
Navigation Channel: Richmond Inner Harbor — Central Bay Region								
Alt 1	17,304	326	17	8	December–February	1.9%	4.6%	2.2%
Alt 2	17,304	326	32	15	December–February	1.9%	8.6%	4.1%
Alt 3	17,304	326	28	13	December–February	1.9%	7.6%	3.6%

Environmental Setting and Environmental Analysis

Alternative	Regional Area with Water Depth ≥ 23 feet at MSL (acres)	Maximum Area of Navigational Channel Dredged (acres)	Estimated Duration of Hopper Dredging (Days for maximum volume)	Estimated Duration of Hopper Dredging (Days vessel available)	Timing of Dredging	Estimated Percent of Longfin Smelt Habitat Exposed to Hopper Dredging	Estimated Percent Time Exposed of Longfin Smelt Exposed to Hopper Dredging (at maximum volume)	Estimated Percent Time Exposed of Longfin Smelt Exposed to Hopper Dredging (for days vessel available)
Navigation Channel: Oakland Harbor (Inner and Outer) — Central Bay Region								
Alt 2	14,841	1,050	19	12	December–February	7.1%	5.3%	3.2%
Navigation Channel: Pinole Shoal — San Pablo Bay Region								
NA, Alt 1	10,732	879	28	9.5	June–July	8.2%	7.7%	2.1%
NP, Alt 2	10,732	879	28	19[2]	June–July	8.2%	7.7%	2.6%
Alt 3	10,732	879	26	7	June–July	8.2%	7.1%	1.9%
Navigation channel: San Bruno Channel — South San Francisco Bay Region								
NA, NP, Alts 1–4	25,149	344	2[3]	2	June–July	1.4%	0.5%	0.5%

Source: Rosenfield and Baxter 2007
Notes:

[1] Assumes hopper dredging as a likely or alternate method within the Estuary, but does not include the river channels which have a lower likelihood of longfin smelt presence.
[2] Under the No Project Alternative, Pinole Shoal and Richmond Outer Harbor would be dredged every other year, therefore longfin smelt in Pinole Shoal and Richmond Outer Harbor would not experience impacts annually.
[3] The San Bruno Channel would be dredged infrequently.

Key: ≥ = greater than or equal to
Alt = Alternative
MSC = Main Ship Channel
MSL = mean sea level
NA = No Action Alternative
NP = No Project Alternative

Cutterhead-Pipeline Dredging: Cutterhead dredges have rotating blades or teeth to break up or loosen the bottom material so that it can be suctioned through the dredge and then pushed out through a discharge pipeline directly onto the placement site, which could be a wetland under construction. Consequently, entrained fish likely would suffer physical injury, suffocation, and stranding leading to mortality.

The USACE has used cutterhead-pipeline dredging for the Sacramento and Stockton Deepwater Ship Channel Maintenance Dredging projects, and fish entrainment monitoring for those projects has been conducted since 2006. In the initial years of monitoring, a portion of the dredged material was discharged via pipeline into a “sampling cell” created with an earthen berm. A regulated stream of the slurry was then directed through a small culvert into a cylindrical sampling net where the content could be examined for entrained fish. This method allowed only a small portion of the dredged material (i.e., less than 1 percent) to be sampled, so a portable screening device was developed and that could receive and effectively screen more dredged material directly from the cutterhead (i.e., from about 5 to 28 percent). The screening method for cutterhead-pipeline dredging has been used exclusively from 2009 to the present. No longfin smelt have been detected to date in the cutterhead entrainment monitoring for the Sacramento and Stockton Deepwater Ship Channel Maintenance Dredging project since 2014, and no delta smelt have been detected since 2016. No monitoring has been conducted for any cutterhead dredging in the LTMS program.

A study conducted on Atlantic sturgeon in Virginia assessed juvenile sturgeon survival near cutterhead dredging (Balazik and Clarke 2024). They found that juvenile Atlantic sturgeon were not deterred from the vicinity of the dredging (within 100 meters), had passed the dredge site a minimum of 122 times and had 100 percent survival.

Delta smelt may be more vulnerable to cutterhead dredge entrainment than longfin smelt due to behavioral or distributional (e.g., vertically in the water column) differences between the species, however delta smelt are more frequently found in water that is between 4 and 15 feet deep and where tidal velocities are lower (Bever et al. 2016; Moyle et al. 1992). Data collected in the Sacramento and Stockton Deepwater Ship Channel Maintenance Dredging suggest that the susceptibility of longfin smelt to entrainment by cutterhead dredging may be low (ICF 2019, 2020, 2021; Mari-Gold Environmental Consulting and Nova Aquatic Sciences 2010, 2012a, 2012b, 2013, 2015, 2016, 2017; SWCA Environmental Consultants 2007, 2008, 2009; Tenera Environmental 2015;). Under the No Action Alternative and No Project Alternative, cutterhead-pipeline dredging would be used in the Napa River and Petaluma River Channel. The Napa River may periodically support delta and longfin smelt. However, the USFWS work window established for the Napa River between August and January to protect delta smelt would also protect longfin smelt (CDFW 2024).

Clamshell Dredging: Fish entrained by mechanical dredging such as clamshell dredging are likely to suffer injury or suffocation during dredging, resulting in mortality. Stevens (1981) noted that a clamshell dredge bucket creates low-frequency vibrations through splashing as it enters the water and is preceded by a pressure wave as it sinks through the water column; these disturbances should promote active avoidance of the dredge by most fish. Mechanical dredging still may remove demersal fish and benthic organisms that live in or on the sediment.

Environmental Setting and Environmental Analysis

Very limited data exist regarding potential entrainment effects of clamshell dredging on small fish. Video monitoring by USACE of scows receiving clamshell dredged material from Suisun Bay has detected broken mollusk shells but no fish. Over 50 hours of footage has been reviewed; however, only the surface of the sediment and water could be observed. A pilot study conducted in a marina near Suisun Bay Channel where dredged material was sieved using a screen found that fish could be entrained by a mechanical clamshell dredge, but the only species entrained that was observed was the non-native, demersal yellowfin goby (WRA 2023). Overall, the likelihood of entrainment of the longfin smelt, delta smelt, green sturgeon, and white sturgeon by mechanical dredge is expected to be very low.

Under the No Action Alternative and No Project Alternative, clamshell dredging would be used at Oakland Inner and Outer Harbor, Redwood City (not including San Bruno Channel), Inner Richmond Harbor, Suisun Bay Channel, Petaluma Across the Flats, and San Rafael Creek. If alternate dredging methods are required at other locations, clamshell dredging could potentially also occur at the Napa River, San Bruno Channel, and Petaluma River Channel dredge sites.

Fish Species-Specific Effects: Special-status fish species that could occur in the project area that have the potential to be entrained by dredging activities include delta smelt, longfin smelt, green sturgeon, white sturgeon, and Chinook salmon. Commercially important species that have the potential to be entrained include Northern anchovy, Pacific herring, and Dungeness crab. Although other species, including benthic invertebrates, could be entrained, the number of individuals entrained is not expected to have an impact on their population because their population sizes are not restricted like the listed species, and implementation of the Standard Practices in Section 2.3.1.5 and measures that protect special-status fish species would also protect the commercially important species.

Delta smelt and longfin smelt have the potential to occur in the Suisun Bay year-round, so to avoid or minimize entrainment at the Suisun Bay Channel, only clamshell dredging will occur under the No Action Alternative and No Project Alternative, which complies with the USFWS delta smelt BiOp (USFWS 2024). To further reduce impacts on delta smelt and longfin smelt, dredging will only occur in Suisun Bay Channel between August 1 and November 30, per the USFWS BiOp work window, so eggs and larval delta smelt and longfin smelt would not be affected (USFWS 2024). Juvenile and adult delta smelt and longfin smelt are unlikely to be entrained by a mechanical clamshell bucket due to the pressure wave preceding it as it falls through the water column as described above. However, if a delta or longfin smelt were captured in a clamshell bucket as it was being lowered in the water column, they would have the opportunity to escape through the water vents incorporated into the top of the clamshell bucket. Therefore, less-than-significant impacts on delta smelt and longfin smelt would occur in sites where the species are present and clamshell dredging occurs.

Juvenile longfin smelt, green sturgeon, white sturgeon, and Chinook salmon may occur in the open waters within and adjacent to most of project area including navigation channel and disposal sites if timing and habitat conditions are suitable. As identified above, sites where clamshell dredging will occur, fish are at low risk of entrainment.

Environmental Setting and Environmental Analysis

At sites where hopper dredging and cutterhead-pipeline dredging will occur, entrainment risks are increased, but entrainment data shows that green and white sturgeon, Chinook salmon, and delta smelt are rarely entrained at the monitored hopper dredging sites. Longfin smelt entrainment is highly variable on an annual basis, partly depending on Delta outflow which affects their abundance and distribution.

Adult Pacific herring swim rapidly, mostly in the deeper channels to reach their shallow spawning habitat in December through March, and the juveniles rear until August through December before migrating to the ocean. Adult herring are at risk of entrainment particularly from hopper dredging, but the weakest life stages, eggs and larvae, are less likely to be in the Main Channel during dredging activities. As shown in the entrainment monitoring results at Richmond Outer Harbor and San Pablo Bay, Pacific herring have rarely been observed, although this may have been due to most dredging occurring during June and July (Table 3-14).

Demersal fish and invertebrate species (e.g., Pacific staghorn sculpin, Pacific sanddab, Dungeness crab), which are found on or near the bottom have an increased potential for entrainment during dredging; however, these are not special-status species, nor are they likely population limited. Entrainment is not expected to have a significant effect on their population or species survival.

Under the No Action Alternative, due to the low level of anticipated entrainment at channels where clamshell dredging would occur, negligible impacts on all fish species would be expected. Entrainment would occur from cutterhead dredging, but with likely minimal effects to listed fish species, so cutterhead dredging would result in less-than-significant impacts. Hopper dredging at Richmond Outer Harbor, San Pablo Bay would result in less-than-significant impacts to longfin smelt because there would be a small percentage of longfin smelt habitat affected (thus assuming a similarly low percentage of longfin smelt affected) over a relatively short period of time, and because Standard Practices (see Section 2.3.1.5) would be implemented. Other listed fish are entrained from hopper dredging at significantly lower rates than longfin smelt (Table 3-14), so impacts to other listed fish would be less than significant. Pacific herring are also entrained infrequently, so impacts would be less than significant under the No Action Alternative. Northern anchovy and other commercially important species are entrained at higher levels, but their populations do not appear to be substantially affected, and therefore the impacts would be less than significant under the No Action Alternative.

Under the No Project Alternative, impacts to fish and invertebrates would generally be less than under the No Action Alternative because Richmond Outer Harbor and San Pablo Bay are dredged less frequently (once every two years) under the No Project Alternative as opposed to every year under the No Action Alternative. However, under the No Project Alternative, impacts to longfin smelt would be significant because of their special status and their higher level of entrainment from more hopper dredging, but impacts to other listed species and commercially and recreationally important marine species are less than significant under the No Project Alternative as explained above.

Mitigation Measure BI-1: Compensatory Mitigation for Longfin Smelt

To compensate for hopper dredging at any in-Bay location, USACE shall annually purchase mitigation credits from an approved mitigation bank or in-lieu fee program or place an equivalent amount of sediment at a permitted upland tidal wetland beneficial use site that would provide habitat for longfin smelt.

Calculation of acres of compensatory mitigation required

The existing CDFW formula from the 2015 EA/EIR and subsequent two 401 WQC/WDRs is used to calculate the compensatory mitigation for entrainment effects of navigation and maintenance dredging using a hopper dredge such as the *Essayons* or a west coast hopper contract dredge on longfin smelt.

The acreage of mitigation required was calculated from an equation that was developed by resource agencies to determine mitigation requirements for other projects with entrainment impacts as a result of pumping water, including the State Water Project (USACE and Regional Water Board 2015) (see Section 2.3.3):

$$Acres\ mitigation\ required = \frac{800\ acres * Volume_{water\ \ pumped\ \ by\ hopper\ \ dredge}}{3.0\ million\ acre - feet}$$

Instead of determining the amount of mitigation required for each channel in advance, as was the past practice, the current approach will instead use the exact volume of water pumped into the hopper dredge for each particular channel in a given dredge year. All this information is recorded by the ship operators and will result in a more accurate assessment of impacts since the actual volume of water pumped varies across projects. In order to show an example of how this formula will work, the following text will use estimated pump hours to show how the mitigation calculation will be performed and give an estimate of the mitigation resulting from channels. In 2023 in Pinole Shoal the Essayons used the pumps for 105.73 hours at a pump rate of 60,000 gallons per minute to field a total pump volume of 380,640,000 gallons which equates to 1,168.14 acre-feet pumped in order to dredge 191,532 CY of sediment.

Calculation of volume of sediment directed to a tidal wetland restoration project

The previous Regional Water Board WQC/WDRs directed USACE to purchase mitigation credits at Liberty Island, a CDFW-approved bank for delta smelt and longfin smelt. However, Liberty Island no longer has available credits for purchase. In addition, there is currently no CDFW-approved tidal wetland mitigation bank in the SF Bay Area (pers. comm., Arn Arberg, CDFW, 2024). Should an appropriate mitigation bank come online during this EA/EIR period, USACE may fulfill its obligation for compensatory mitigation by purchasing mitigation credits at the acreage determined by pump volumes. The other option for compensatory mitigation is BUDM.

If mitigation credits are not available for purchase, or USACE determines purchasing credits is not the appropriate course of action, then USACE shall compensate for impacts to longfin smelt and their habitat by BUDM at an upland site that would provide habitat for longfin smelt within SF Bay. That sediment provided for BUDM shall be sediment that would have otherwise been disposed of in-Bay or at deep ocean disposal site SF-DODS. Increasing the amount of BUDM by USACE for tidal marsh restoration

through compensatory mitigation will increase the speed at which tidal marshes are restored in the region, thereby increasing the speed at which benefits to longfin smelt are realized. Tidal wetland habitat has been shown to support high numbers of longfin smelt at early life stages (Lewis et al. 2024). The volume of sediment for this method of mitigation shall be calculated through the steps described below.

The next steps of the calculation involved using the cost of tidal wetland mitigation credits and the monetary value of sediment that can be beneficially used to create wetland habitat. To convert acres of wetland creation to a dollar value, the cost of the mitigation was determined to be an average of $1.3 million per acre and relied on three independent data points: 1) the cost of the last available credits at Liberty Island, which were $175,000 per acre; 2) the cost of a recent project at Ravenswood Bay Trail that purchased 0.05 acres at a cost of $75,000 ($1.5 million per acre); and 3) a current purchase price quote of $230,000 for 0.1 acre ($ 2.3 million per acre) at the San Francisco Bay Wetland Mitigation Bank located in Redwood City, California (pers. comm., Max Keech, August 2024).

With the cost of the mitigation established, the volume of material USACE would need to redirect to a beneficial use site was determined based on the incremental cost between a wetland beneficial use site and the proposed Federal Standard Base Plan placement site for each channel in which hopper dredging is proposed. Note that the Federal Standard Base Plan placement site for Oakland Inner & Outer Harbor is split between an upland beneficial use site and an in-Bay placement site (SF-11). The portion of the channel that would be hopper dredged would be placed at SF-11; thus, SF-11 is listed as that channel's Federal Standard Base Plan placement site. This cost per CY varies depending on the exact channel from which the BUDM will occur, and will be determined on a channel-by-channel basis moving forward. This calculation is also consistent with the methodology needed to determine which alternatives meet the Federal Standard Base Plan. A multiplier of 2 was used to account for the likely distance of the impact sites from the beneficial use site(s), temporal losses in aquatic resource functions, and the likelihood of success of the restoration activities at the beneficial use site(s). under § 230.93(f)(2) of the State Supplemental Dredge and Fill Guidelines when the impacts are considered permanent, and the mitigation is offsite and will take a relatively long time (over 10 years) to fully develop ecosystem functions and values. This multiplier is consistent with Regional Water Board compensatory mitigation requirements for dredge and fill impacts under § 230.93(f)(2) of the State Supplemental Dredge and Fill Guidelines when the impacts when the mitigation is offsite and will take a relatively long time (over 10 years) to fully develop ecosystem functions and values. These steps are combined to show the example calculations in Table 3-16. The volume of required BUDM would be:

$$Volume\ BUDM = \frac{acres\ mitigation\ required\ \times\ \$1{,}325{,}000\ \text{per acre}}{Cost_{Increment}\ \ per\ cubic\ yard} \times 2$$

Actual volumes will depend on total pump time of the *Essayons* to be provided after the dredging is completed.

Table 3-16. Example of Conversion of Estimated Pump Hours to Acres of Mitigation Using the CDFW Formula 1 and Conversions from Estimated Mitigation Acres Volume of Beneficial Use of Dredged Material

Channel	Estimated Pump Volume (acre-feet)	Average Proposed Annual Volume (CY)	Approximate Acres of Compensatory Mitigation Required[1]	Approximate Volume of Required Beneficial Use (CY)[2]
Oakland Inner or Outer Harbor (portion of channel)	1,281	210,000	0.34	35,000
Richmond Inner Harbor	1,829	300,000	0.49	45,000
Richmond Outer Harbor	1,281	210,000	0.34	30,000
Pinole Shoal	915	150,000	0.24	20,000

[1] CDFW formula is 3.0 million acre-feet / 800 acres = volume of water pumped in acre-feet / X acres of mitigation.
[2] The required volume of beneficial use is calculated based on an incremental cost of recent mitigation for each channel

Key: CY = cubic yards

- **NEPA Determination:** No Action Alternative impacts on fish caused by entrainment would be considered less than significant through the implementation of the LTMS windows and other Standard Practices intended to reduce the potential for entrainment.
- **CEQA Determination:** No Project Alternative impacts on fish caused by entrainment would be considered less than significant through the implementation of the LTMS windows and other Standard Practices intended to reduce the potential for entrainment, except with respect to longfin smelt. The No Project Alternative impacts caused by entrainment are considered significant due to impacts to longfin smelt, a CESA-listed species. Impacts are reduced to less than significant with implementation of Standard Practices listed in Section 2.3.1.5 and Mitigation Measure BI-1. For the No Project Alternative, compensatory mitigation is necessary to reduce impacts as specified in Mitigation Measure BI-1. Compensatory mitigation in accordance with Mitigation Measure BI-1 is necessary to mitigate for continued impacts to longfin smelt in a similar manner to what was required under CEQA baseline conditions (see USACE and Regional Water Board 2015 and Provision 10 of Reissued Waste Discharge Requirements and Water Quality Certification for U.S. Army Corps of Engineers, San Francisco District, San Francisco Bay Federal Channel Maintenance Dredging Program, Order No. R2-2020-0011).

Alternative 1

Under Alternative 1 (refer to Section 2.3.3), the likely dredge method at all locations would be the same as the No Action Alternative and No Project Alternative. Because the frequency of dredging under Alternative 1 is the same as the No Action Alternative, entrainment impacts to fish would be the same if the likely dredging methods are employed at all sites. However, compared to the No Project Alternative, impacts to fish under Alternative 1 would be greater at Richmond Outer Harbor and San Pablo Bay because dredging is done annually, versus dredging every two years under the No Project Alternative.

Environmental Setting and Environmental Analysis

Increased BUDM to create tidal wetland habitat is expected to provide increased rearing habitat and food for juvenile fish of many species, including longfin smelt.

If alternate dredging methods (see Table 2-9) are used at Richmond Inner Harbor and Petaluma Across the Flats, there could be a change from clamshell dredging (likely method), which has a low risk of entrainment, to either hopper or cutterhead-pipeline dredging (alternate method), both of which have higher risks of entrainment. Dredging activity would apply the appropriate work windows identified in Table 2-2. If the alternate dredging methods are implemented at these sites, there would be an increase in entrainment under Alternative 1 compared to both the No Action Alternative and No Project Alternative.

The likely dredge method at Richmond Outer Harbor, San Pablo Bay, and San Bruno is hopper dredging, and the alternate dredge method is clamshell dredging (see Table 2-9). Additionally, at the Napa River and Petaluma River Channel dredge locations, the likely dredge method is cutterhead, but the alternate method is clamshell dredging, which has a lower entrainment risk. At these sites, if the alternate dredge method is applied, there would be a reduced impact to fish, particularly longfin smelt, caused by reduced entrainment from dredging.

The exposure risk (area of habitat and time exposed to dredging) of longfin smelt to entrainment from hopper dredging would be similar or the same under Alternative 1 compared to the No Action Alternative and No Project Alternative at Richmond Outer Harbor, Pinole Shoal, and San Bruno Channel when the maximum and average volumes are dredged. Richmond Inner Harbor does not have hopper dredging under the No Action Alternative and No Project Alternative, but under Alternative 1 hopper dredging could be applied as an alternate dredge method, so there would be an increase in entrainment risk to longfin smelt under this alternative. However, the risk would involve 1.9 percent of the habitat for 4.6 percent of the year if maximum volumes are dredged, or 2.2 percent of the year if average volumes are dredged (Table 3-15). The remaining sites are similar between the No Action Alternative and No Project Alternative and Alternative 2 (Table 3-15). It is important to note that dredging will occur in June and July at Richmond Outer Harbor and Pinole Shoal, and sometimes between December and February in Richmond Inner Harbor, depending on when the dredging vessel is available.

As described under the No Action Alternative and No Project Alternative, there is a low predicted probability of presence of the three year-classes, and a relatively low risk of exposure, in the Richmond Outer Harbor and Pinole Shoal in June and July. Richmond Inner Harbor would be dredged between December and February. The predicted probability of occurrence of age-1 longfin smelt would range between 0.19 and 0.22, and for age-2 longfin smelt between 0.1 and 0.11 (See Figure 3 in Tobias and Baxter 2023). Therefore, there would not be a significant risk to the longfin smelt population at these locations under Alternative 1.

Alternative 1 incorporates BUDM to restore tidal wetlands as a minimization measure for longfin smelt entrainment impacts as part of the alternative as well as additional BUDM consistent with the objectives of the project. Increasing BUDM for tidal wetland restoration is expected to provide increased rearing habitat and food for juvenile fish of many species, including longfin smelt. A recent survey by US Geological Survey (USGS)-contracted fish biologists found that longfin smelt were commonly

encountered at tidal wetland sites in the northern portion of SF Bay; these wetland habitats were restored via BUDM (Lewis et al. 2024). In particular, their paper states that,

> *Longfin Smelt was consistently among the most abundant fish species observed in restored habitats. Furthermore, Longfin Smelt catches were highest inside versus outside of restored habitats at all three North Bay sites, possibly indicating a preference or attraction to restored wetlands. Thus, restored tidal wetlands, including those utilizing dredge, appear to provide shallow-water aquatic habitats that are heavily utilized by Longfin Smelt. Longfin Smelt were also commonly captured in open-water shoal habitats adjacent to restored wetlands, suggesting that the species uses a variety of shallow water habitats that are tidally linked with restored wetlands.* (Lewis et al. 2024: page 4)

Additional research is underway by USGS to document the food availability for longfin smelt and other estuarine species at these restored tidal wetlands. Increasing the amount of BUDM by USACE for tidal marsh restoration through this project will increase the speed at which tidal marshes are restored in the region, thereby increasing the speed at which benefits to the species are realized.

- **NEPA Determination**: Under Alternative 1, impacts from entrainment would be considered less than significant to all fish species with implementation of Standard Practices listed in Section 2.3.1.5. With the inclusion of BUDM to restore tidal wetlands in the alternative, any impacts would be further reduced.
- **CEQA Determination**: Under Alternative 1, impacts from entrainment would be considered less than significant to all fish species with implementation of the Standard Practices listed in Section 2.3.1.5, which include the required conservation measures in the NMFS and USFWS BiOps for all special status species except longfin smelt. Entrainment impacts to longfin smelt under Alternative 1 would also be less than significant with inclusion of BUDM to restore tidal wetlands, which is included in the alternative as a minimization measure.

Alternative 2

Under Alternative 2 (refer to Section 2.3.4), the likely method of dredging would be the same as the No Action Alternative and No Project Alternative at all dredge sites except for Richmond Inner Harbor, which changes to hopper dredging, and for Oakland Inner and Outer Harbor, which keep clamshell dredging but include hopper dredging for a portion of the channel. The increased use of hopper dredging at a specific channel achieves more BUDM. As the increased hopper dredging would be directly tied to increased BUDM to create tidal wetland habitat, the project is expected to provide increased rearing habitat and food for juvenile fish of many species, including longfin smelt (see Section 2.3.4).

If the alternate dredging method (See Table 2-11) is used at Petaluma Across the Flats, it would involve a change from clamshell dredging (likely method), which has a low risk of entrainment, to either hopper or cutterhead-pipeline dredging (alternate method), both of which have higher risks of entrainment. Dredging activity would apply the appropriate work windows identified in Table 2-3. If the alternate dredging methods are implemented at these sites, there would be a potential increase in entrainment under Alternative 2 compared to both the No Action Alternative and No Project Alternative.

Environmental Setting and Environmental Analysis

The likely dredge method at Richmond Outer Harbor, San Pablo Bay, and San Bruno is hopper dredging, but the alternate dredge method is clamshell dredging (Table 2-11). Additionally, at the Napa River and Petaluma River Channel dredge locations, the likely dredge method is cutterhead, but the alternate is clamshell dredging, which, again, has a lower entrainment risk. At these sites, if the alternate dredge method is applied, there would be a reduced impact to fish, particularly longfin smelt, caused by reduced entrainment from dredging.

The exposure risk of longfin smelt to entrainment from hopper dredging would be the same or similar under Alternative 2 at all sites except Richmond Inner Harbor and Oakland Harbor compared to the No Action Alternative and No Project Alternative (Table 3-15). Under the No Action Alternative and No Project Alternative, Richmond Inner Harbor would use clamshell dredging, but under Alternative 2, hopper dredging would be implemented. As a result, there would be an increase in entrainment risk to longfin smelt under Alternative 2, but the risk would involve 1.9 percent of the habitat for 8.6 percent of the year if maximum volumes are dredged, or 4.1 percent of the year if average volumes are dredged (Table 3-15). Similarly, Oakland Inner and Outer Harbor under the No Action Alternative and No Project Alternative would not undergo hopper dredging, but would have hopper dredging under Alternative 2, which would expose 7.1 percent of longfin smelt habitat 5.3 percent of the time when maximum volume is dredged, and 3.2 percent of the time when average volumes are dredged (Table 3-15). It is important to note that most of the dredging will occur in June through July except for the Richmond Inner Harbor and Oakland Inner and Outer Harbor which will be dredged in the December through February, depending on when the dredging vessel is available.

Oakland Inner and Outer Harbor would be dredged during the same general time frame as the Richmond Inner Harbor, so they have the same general predicted probability of occurrence. As described under Alternative 1, because of the low predicted probability of presence of the three year-classes and the relatively low risk of exposure, there would not be a significant risk to the longfin smelt population at all sites under Alternative 2.

Alternative 2 includes BUDM to restore tidal wetlands as a minimization measure for longfin smelt entrainment impacts as part of the alternative, as well as additional BUDM consistent with the objectives of the project. Increasing BUDM for tidal wetland restoration is expected to provide increased rearing habitat and food for juvenile fish of several species, including longfin smelt (see detailed discussion of impacts under Alternative 1 above). Increasing the amount of BUDM by USACE for tidal marsh restoration through this project will increase the speed at which tidal marshes are restored in the region, thereby increasing the speed at which benefits to the species are realized.

- **NEPA Determination**: Under Alternative 2, impacts from entrainment would be considered less than significant to all fish species with implementation of Standard Practices listed in Section 2.3.1.5. With the inclusion of BUDM to restore tidal wetlands in the alternative, any impacts would be further reduced.
- **CEQA Determination**: Under Alternative 1, impacts from entrainment would be considered less than significant to all fish species with implementation of the Standard Practices listed in Section 2.3.1.5, which include the required conservation measures in the NMFS and USFWS BiOps for all special status species except longfin smelt. Entrainment impacts to longfin smelt under Alternative 2 would also be less than significant with inclusion of BUDM to restore tidal wetlands, which is included in the alternative as a minimization measure.

Alternative 3

Under Alternative 3 (refer to Section 2.3.5), the likely method of dredging would be the same as the No Action Alternative and No Project Alternative at all dredge sites except for Richmond Inner Harbor, which adds hopper dredging, and at Richmond Outer Harbor and San Pablo Bay, which add a small portion of the sites as clamshell dredging. The use of hopper dredging achieves BUDM. As the hopper dredging at Richmond Inner Harbor would be directly tied to BUDM to create tidal wetlands, this project is expected to provide increased rearing habitat and food for juvenile fish of many species, including longfin smelt (see Section 2.3.5).

If the alternate dredging method (see Table 2-13) is used at Oakland Inner and Outer Harbor, Richmond Inner and Outer Harbor, Redwood City, Petaluma Across the Flats, and San Rafael Creek, there could be a change from clamshell dredging (likely method), which has a low risk of entrainment, to cutterhead-pipeline dredging (alternate method) which has higher risks of entrainment. Dredging activity would apply the appropriate work windows identified in Table 2-3. If the alternate dredging method is implemented at these sites, there would be a potential increase in entrainment under Alternative 3 compared to both the No Action Alternative and No Project Alternative.

The likely dredge method at Richmond Inner Harbor, Richmond Outer Harbor, San Pablo Bay, and San Bruno is or will include hopper dredging, but the alternate dredge method is clamshell dredging (Table 2-13). Additionally, at the Napa River and Petaluma River Channel dredge locations, the likely dredge method is cutterhead, but the alternate is clamshell dredging, which has a lower entrainment risk. At these sites, if the alternate dredge method is applied under Alternative 3, there would be a reduced impact to fish, particularly longfin smelt, caused by reduced entrainment from dredging.

The exposure risk of longfin smelt to entrainment from hopper dredging would be the same or similar under Alternative 3 at all sites except Richmond Inner Harbor compared to the No Action Alternative and No Project Alternative (Table 3-15). Under the No Action Alternative and No Project Alternative, Richmond Inner Harbor would use clamshell dredging, however under Alternative 3, both clamshell and hopper dredging would be implemented. As a result, there would be an increase in entrainment risk to longfin smelt under Alternative 3; however, the risk would involve 1.9 percent of the habitat for 7.6 percent of the year if maximum volumes are dredged or 3.6 percent of the year if average volumes are dredged (Table 3-15).). It is important to note that most of the dredging will occur in June through July except for

the Richmond Inner Harbor which will be dredged in the December through February, depending on when the dredging vessel is available.

As described under the No Action Alternative and No Project Alternative, because of the low predicted probability of the presence of the three year-classes and the relatively low risk of exposure, there would not be a significant risk to the longfin smelt population at all sites under Alternative 3 except for Richmond Inner Harbor which will be dredged in the December through February. The predicted probability of occurrence for age-1 longfin smelt based on otter trawl data in Central SF Bay during this time would be around 0.23 in November to approximately 0.2 in January (Tobias and Baxter 2023). The predicted probability of occurrence for age-2 longfin smelt based on otter trawl data in the Central SF Bay during this time would be around 0.1 in November to approximately 0.12 in January (Tobias and Baxter 2023).

Alternative 3 includes BUDM to restore tidal wetlands as a minimization measure for longfin smelt entrainment impacts from dredging, as well as providing additional benefits from BUDM consistent with the objectives of the project. Increasing BUDM for tidal wetland restoration is expected to provide increased rearing habitat and food for juvenile fish of many species, including longfin smelt (see the discussion of impacts under Alternative 1 above). Increasing the amount of BUDM by USACE for tidal marsh restoration through this project will increase the speed at which tidal marshes are restored in the region, thereby increasing the speed at which benefits to the species are realized.

- **NEPA Determination**: Under Alternative 3, impacts from entrainment would be considered less than significant to all fish species with implementation of Standard Practices listed in Section 2.3.1.5. With the inclusion of BUDM to restore tidal wetlands in the alternative, any impacts would be further reduced.
- **CEQA Determination**: Under Alternative 3, impacts from entrainment would be considered less than significant to all fish species with implementation of the Standard Practices listed in Section 2.3.1.5, which include the required conservation measures in the NMFS and USFWS BiOps for all special status species except longfin smelt. Entrainment impacts to longfin smelt under Alternative 3 would also be less than significant with inclusion of BUDM to restore tidal wetlands, which is included in the alternative as a minimization measure for entrainment impacts to longfin smelt.

Alternative 4

Under Alternative 4, the likely method of dredging at most sites would be mechanical dredging, as compared to the No Action Alternative and No Project Alternative, which would result in an overall decrease in fish entrainment. Those sites at which hydraulic dredging would occur, whether as the likely or alternate dredge method, would be in the MSC, Petaluma River Channel and Petaluma Across the Flats, and San Bruno, where the risk to the more sensitive fish species such as longfin smelt are lower. Alternative 4 includes BUDM, which will offset longfin smelt entrainment impacts from dredging, as well as providing additional benefits from BUDM consistent with the objectives of the project. Increasing BUDM for tidal wetland restoration is expected to provide increased rearing habitat and food for juvenile fish of many species, including longfin smelt (see the discussion of impacts under Alternative 1 above).

The exposure risk of longfin smelt to entrainment from hopper dredging would be lower under Alternative 4 compared to the No Action Alternative and No Project Alternative (Table 3-15).

- **NEPA Determination**: Under Alternative 4, impacts from entrainment would be considered less than significant.
- **CEQA Determination**: Under Alternative 4, impacts from entrainment would be considered less than significant. With the inclusion of BUDM to restore tidal wetlands in the alternative, any impacts would be further reduced.

3.3.4.2 Impact BI-2: Potential Effects of Increased Turbidity Caused by Maintenance Dredging and Dredged Material Placement on Special-Status Species, and Commercially Valuable Marine Species

No Action Alternative/No Project Alternative, Alternatives 1 Through 4

Prolonged exposure to high levels of suspended sediment and turbidity resulting from dredging and placement of dredged material could create a loss of visual capability in fish in aquatic habitats within the study area. This in turn could lead to reduced feeding capabilities and growth rates, a thickening of gills, potential loss of respiratory function, clogging and abrasion of gills, and increased stress levels, reducing the tolerance of fish to disease and toxicants (Newcombe and Jensen 1996; Waters 1995; Wilber and Clark 2001). Prolonged exposure to suspended sediments has been shown to affect fish behavior, including avoidance responses, territoriality, feeding, and homing behavior. It can cause the movement and redistribution of fish populations. Marine mammal foraging activities may be affected through reduced visibility or the relocation of prey.

A turbid environment may provide some advantages to small fish, which may be able to feed effectively in turbid conditions because the distances over which they react to prey are very short (e.g., a scale of millimeters) (Pangle et al. 2012; Utne-Palm 2002). In contrast, larger species, often predatory ones, often hunt primarily using eyesight. These fish would experience more difficulties in foraging effectively for prey species in highly turbid water. Most juvenile and adult fish are motile enough to avoid areas of unsuitably high turbidity plumes caused by dredging, although eggs and larvae may experience greater impacts. Avoidance of adverse habitat conditions by fish is the most common result of increases in turbidity and sedimentation. Fish will not occupy areas unsuitable for survival unless they have no other option.

Organisms that are associated with muddy bottoms are more tolerant of higher suspended sediment; tolerance of higher suspended sediment decreases with increasing water temperatures or decreasing dissolved oxygen (Hirsch et al. 1978). Hirsch et al. (1978) found that the aquatic organisms they assessed in a dredging study were resistant to the effects of suspended sediment and dredging-induced turbidity. However, some life stages are more sensitive to suspended sediments than others. Pacific herring and northern anchovy eggs could be affected if spawning (November through April for herring, May and June for anchovy) occurred in the area just before or during maintenance dredging activities. Eggs and larval fish are more sensitive to suspended sediments (Kjelland et al. 2015).

During dredging operations, the use of the dredge equipment on the dredged material resuspends sediment into the water column. Hydraulic dredges (i.e., hopper and cutterhead-pipeline) typically results

in lower levels of disturbance and resuspension of sediments at a dredging site compared to mechanical (i.e., clamshell) dredges. The placement of dredged material in the aquatic environment also creates a turbidity plume as the dredged material travels downward. USACE studies show that turbidity plumes at placement sites last only 20 minutes, and plume duration is even less during placement of sandy material because its coarse sediments settle out of the water column more quickly than finer sediments (USACE 2003; USACE et al. 1998). Dredging would result in localized and temporary increases in turbidity at both the dredge locations and placement sites.

Table 3-17 shows the maximum volumes dredged for all alternatives for each likely dredging method. Clamshell dredging is the main dredging method used by volume of material dredged under the No Action Alternative, No Project Alternative, Alternative 1, Alternative 3, and Alternative 4; hopper dredging is used for a slightly higher volume of material dredged than clamshell dredging under Alternative 2. As described earlier, clamshell dredging would have higher levels of resuspended sediments and turbidity than hydraulic dredging.

Table 3-17. Maximum Volume Dredged in Cubic Yards for Each Likely Dredging Method

Dredge Method	No Action	No Project	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Clamshell	3,630,000	3,630,000	3,630,000	2,655,000	3,165,000	4,920,000
Cutterhead	375,000	375,000	375,000	375,000	375,000	375,000
Hopper	1,935,000	1,935,000	1,935,000	2,910,000	2,400,000	645,000

Under the No Action Alternative and No Project Alternative, a maximum annual volume of 1,124,000 CY of material would be placed at in-Bay sites (SF-9, SF-10, SF-11, and SF-16), 421,500 CY at the ocean beneficial use site (SF-17), 281,000 CY at in-water ocean sites, 1,545,500 CY at the SF-DODS, and no material placed at the upland beneficial use sites. Increased suspended sediment and turbidity would occur during the in-Bay and ocean material placement.

Under Alternative 1, compared to the No Action Alternative and No Project Alternative, dredging activities would be similar. There would be an increase in the maximum in-Bay sediment material placement of up to 409,500 CY spread throughout the four in-Bay placement sites. There would be no change in the volume of material placed in the in-ocean sites, and the sponsor-provided upland sites, and a decrease in SF-DODS material placement by up to 409,500 CY. Under Alternative 1, there would be an increase of 546,000 CY of material placed at the upland beneficial use sites. Dredging and material placement under Alternative 1 would result in short-term and localized increases in turbidity at both the dredge locations and placement sites; the effects of turbidity to aquatic species would be similar to the No Action Alternative and No Project Alternative.

Compared to the No Action Alternative and No Project Alternative, there would be an increase in the maximum in-Bay sediment material placement of up to 546,000 CY spread throughout the four in-Bay disposal sites for Alternative 2. There would be no change in the volume of material placed in the upland (sponsor-provided) sites, in-ocean sites, and ocean beneficial use sites., and a decrease in SF-DODS material placement by up to 1,228,500 CY. Under Alternative 2, there would be up to 819,000 CY of

sediment material placed at the upland beneficial use sites. Dredging and material placement under Alternative 2 would result in short-term, and localized increases in turbidity at both the dredge locations and placement sites and the effects of turbidity to aquatic species would be similar to the No Action Alternative and No Project Alternative.

Under Alternative 3, compared to the No Action Alternative and No Project Alternative, there would be an increase in-Bay sediment material placement of up to 136,500 CY spread throughout the four in-Bay placement sites. There would be no change in the volume of material placed in the upland sponsor-provided sites, in-ocean sites, ocean beneficial use sites, and SF-DODS placement would decrease by up to 1,228,500 CY. Under Alternative 3, there would be a maximum of 1,228,500 CY of sediment placed at the upland beneficial use sites. Dredging and material placement would result in short-term and localized increases in turbidity at both the dredge locations and placement sites that are similar to the No Action Alternative and No Project Alternative; therefore, the effects of turbidity to aquatic species would be similar to the No Action Alternative and No Project Alternative. The effects of turbidity on aquatic species would be similar to the No Action Alternative and No Project Alternative.

Under Alternative 4, compared to the No Action Alternative and No Project Alternative, there would be a substantial decrease in in-Bay sediment material placement of up to 819,000 CY spread throughout the four in-Bay placement sites. There would be no change in the volume of material placed in the upland sponsor-provided sites, in-ocean sites, ocean beneficial use sites, and SF-DODS placement would decrease by up to 1,228,500 CY. Under Alternative 4, there would be up to 2,047,500 CY of material placed at upland beneficial use sites and up to 409,500 CY placed at potential future nearshore strategic placement sites.

There would be increased potential for BUDM placement (e.g., upland direct placement, nearshore strategic placement, elevation augmentation/marsh spraying, and/or water column seeding) under Alternative 4. In general, sediment placed from scows settles rapidly, and any temporary increases in turbidity would be dispersed from the placement area by the broader open water in the Bay (USACE and Regional Water Board 2023). BUDM placement under this alternative could directly result in beneficial effects to water quality by augmenting the local supply of sediment available to support accretion in mudflats and tidal wetlands, which in turn may provide long-term, localized water quality benefits such as filtration functions and associated decrease in turbidity.

Dredging and material placement under all alternatives would result in short-term and localized increases in turbidity at both the dredge locations and placement sites. Temporary sediment plumes caused by in-water material placement could reduce food availability and foraging success for fish and marine mammals in close proximity to the placement sites. However, these species will likely avoid the plumes (USACE et al. 1998) and forage in unaffected areas near the placement sites. Therefore, any temporary reduction in food supply and foraging success would be minor, and there would be no significant long-term effects to pelagic-based food resources because of the rapid recovery predicted in these communities, the small area affected, and the short time frame in which they would be affected.

Total suspended solids levels in the Estuary vary from 10 to more than 100 milligrams per liter (SFEI 2011). In general, higher total suspended solids result in more turbid water. The Estuary and Delta are naturally turbid because wind, waves, and tides cause the resuspension of sediments. Increased sediment concentrations reduce ultraviolet light penetration which decreases aquatic biological productivity. The impact of turbidity on phytoplankton productivity due to decreased light transmission would depend largely on the difference between background turbidity and increased turbidity from dredged material when dredging takes place. Increased turbidity effects from dredging are short-term, minor, and greatly diminished with distance from the activity. In SF Bay, turbidity plumes would be quickly diluted to near or within background particulate concentrations.

No significant long-term effects to pelagic-based food resources are expected because of the rapid recovery expected in these communities and the small area affected relative to the overall volume of pelagic feeding habitat available in Suisun Bay, San Pablo Bay, and SF Bay. The Regional Water Board has implemented the SF Bay Regional Monitoring Program (RMP) for trace substances since 1992. The SF Bay Regional Monitoring Program with the goal of monitoring water and sediment quality to provide the scientific foundation for managing and improving the health of the SF Bay aquatic ecosystem. USACE is a participant in the RMP and contributes to the program by funding USGS to monitor suspended sediments at an array of locations in the Bay.

Habitat as well as individual fish could be impacted by changes in suspended sediment. Increased turbidity and activity during dredging may disturb marine mammal foraging activities by decreasing visibility or causing the relocation of mobile prey from the area affected by the sediment plume. However, marine mammals would not be substantially affected by dredging operations because of the increased turbidity and dredging disturbance would be short term, and because they forage over large areas of SF Bay and the Pacific Ocean.

Leatherback turtle presence in the study area is rare, even though they have designated critical habitat along the Pacific Coast. Thus, impacts on leatherback turtle and their critical habitat are not anticipated.

- **NEPA Determination**: Under all alternatives, impacts from turbidity on aquatic species would be considered less than significant.
- **CEQA Determination**: Under all alternatives, impacts from turbidity on aquatic species would be considered less than significant.

3.3.4.3 Impact BI-3: Potential Effects on Fish and Marine Mammals Caused by Noise from Dredging Activities

No Action Alternative/No Project Alternative

Mechanical and hydraulic dredges produce a complex combination of repetitive sounds that may be intense enough to cause adverse effects on aquatic organisms though the intensity, periodicity, and spectra of emitted sounds differ among the dredge types and the substrate being dredged. Clamshell dredges have a repetitive sequence of sounds generated by the winches, bucket impact with the substrate, the closing and opening the bucket, and sounds associated with dumping the dredged material into the barge. The most intense sound impacts are produced during the bucket's impact with the

substrate, with peak sound pressure levels (SPL) of 124 decibels (dB) measured 150 meters from the bucket strike location (Dickerson et al. 2001; Reine et al. 2002). Underwater noise is also generated by hydraulic dredging equipment, including rotating cutter heads, pumps, propellers, suction pipes, and the drag head contacting the channel bottom. Noise produced by hopper dredges fluctuates; the most intense sounds are produced during loading or unloading. While underway, continuous noise from hopper dredges operating in a variety of environments has been measured to range from 125 to 150 dB (Reine et al. 2012). A hydraulic cutterhead dredge can produce continuous noise in the range of 150 to 170 dB when measured 10 meters from the cutterhead (California Department of Water Resources 2013), with noise levels varying with dredge size and sediment type. This is comparable to underwater noise levels of 160 to 180 dB root mean square (RMS) produced by small boats and ships (Marine Aggregate Levy Sustainability Fund 2009).

The scientific knowledge of the effects of dredge-generated noise and sound waves on fishes is limited and varies depending on the species. Effects may include behavioral changes, neurological stress, and temporary shifts in hearing thresholds. Injury to fish from peak noise (e.g., rupture of swim bladder) is not expected to occur, but behavioral effects (e.g., changes in feeding behavior, fleeing, startle responses) could occur. All fish, listed or otherwise, would experience the same effects. In comparison, commercial shipping vessels can produce continuous noise in the range of 180 to 189 dB (Reine and Dickerson 2014). Although dredging could produce underwater noise, it is comparable to that produced by commercial shipping vessels, which are common in the study area. Juvenile and adult fish likely would avoid areas of noise and disturbance from dredging operations.

For marine mammals, NMFS criteria define exposure to underwater noises from impulse sounds at or above 160 dB RMS and continuous sounds at or above 120 dB as constituting harassment to marine mammals. NMFS has also determined that noises with SPLs above 180 dB RMS can cause injury to cetaceans (whales, dolphins, and porpoises), and SPLs above 190 dB RMS can cause injury to pinnipeds (seals and sea lions). Although noise from dredging (up to 170 dB for cutterhead) can exceed 120 dB level for continuous sounds constituting harassment of marine mammals, it is within the range of ambient noise resulting from commercial shipping and recreational boating within the study area.

- **NEPA Determination**: Under the No Action Alternative, impacts on fish and marine mammals from noise would be considered less than significant.
- **CEQA Determination**: Under the No Project Alternative, impacts on fish and marine mammals from noise would be considered less than significant.

Alternatives 1 through 4

Impacts on fish and marine mammals caused by noise would be similar under Alternatives 1 through 4 to the impacts under the No Action Alternative and No Project Alternative.

- **NEPA Determination**: Under Alternatives 1 through 4, impacts on fish and marine mammals from noise under Alternatives 1 through 4 would be less than significant.
- **CEQA Determination**: Under Alternatives 1 through 4, impacts on fish and marine mammals from noise under Alternatives 1 through 4 would be less than significant.

3.3.4.4 Impact BI-4: Potential Effects of Maintenance Dredging and Material Placement on Benthic Habitat

No Action Alternative/No Project Alternative

Dredging would directly impact benthic communities through physical disruption and direct removal of benthic organisms. Benthic habitat within the federal channels is highly disturbed because of regular maintenance dredging and the propeller wash of ship traffic. Material that is dredged on an annual basis is typically new material that has redistributed to the dredge sites between dredging operations. Organisms in or immediately adjacent to the dredged channels and placement sites may be lost because of smothering or burial from sediments resuspended in the water column during the dredging.

Critical habitat for delta smelt, green sturgeon, Chinook salmon and leatherback turtle and EFH for commercially valuable fish species overlaps with some or all of the estuarine/marine portions of the project areas. Benthic habitat can be an important part of critical habitat for some species by providing foraging areas, especially for Chinook salmon and green sturgeon. Because delta smelt feed in the water column, benthic habitat provides less of a function. Similarly, leatherback turtles forage in open waters and do not rely on benthic habitat. The loss of benthic invertebrates during dredging activities may decrease the forage value of critical habitat at the dredge location.

Following sediment-disturbing activities such as dredging or the placement of dredged material, disturbed areas are usually recolonized quickly by benthic organisms (Newell et al. 1998). The species that recolonize first are usually characterized by rapid growth and reproduction rates. Marine benthic invertebrates often colonize disturbed sedimentary habitats via pelagic larvae that settle from the water column. Crustaceans, such as the amphipods that are abundant in SF Bay, brood young to much more advanced stages than pelagic larvae, releasing what are essentially miniature adults into the sediment, and can rapidly colonize adjacent disturbed areas. Recovery may be slower in deepwater channels; therefore, there is potential for some loss of habitat and forage to organisms that use deepwater channels. This potential is minimal because the federal deep-draft navigation channels are in a constant state of disturbance by deep-draft vessels that travel through the channels at a maximum of 15 knots under their own power. The benthos of these highly used channels, which are dredged annually, is in a constant state of disruption. The potential for habitat loss in channels that are dredged less frequently would be slightly greater, but still small due to disruption of benthos from frequent vessel traffic.

Studies have indicated that even relatively large areas disturbed by dredging activities are usually recolonized by benthic invertebrates within one month to one year, with original levels of biomass and abundance developing within a few months to between one and three years (Newell et al. 1998). Following dredging, disturbed areas are recolonized, beginning with mobile and opportunistic species (Lenihan and Oliver 1995; Oliver et al. 1977). These species, characterized by rapid growth and reproduction, may or may not be the same species that were present in the area prior to the disturbance. SF Bay holds more nonindigenous benthic invertebrate species than any other aquatic ecosystem in North America (Cohen and Carlton 1995). The introduced species range from approximately 20 to 80 percent of all species present (Lee et al. 1999), depending on the area of SF Bay; recolonization would likely include nonindigenous species already present in the area.

Environmental Setting and Environmental Analysis

During in-water placement in SF Bay, benthic organisms would suffer burial followed by prolonged exposure to anaerobic conditions after the dumping has ceased. This would result in mortality of most of the organisms in the burial footprint; however, this would be a short-term effect because benthic habitat is quickly recolonized. The existing benthic communities at the in-Bay placement sites have, over the years, reached an equilibrium that adjusts to the periodic placement of dredged material. Similarly, placement of dredged material (i.e., sand) at SF-17, SF-8, and along beach and intertidal habitat of Ocean Beach would cause temporary disturbance to benthic organisms; however, both the nearshore and the shore environment along the coast of Ocean Beach are dynamic and high-energy environments that experience rapid sediment flux. Organisms that inhabit sandy intertidal and subtidal habitat have adaptations for surviving in areas of high sediment flux. Although placement operations would cause burial of the less mobile benthic community, the impact of those operations will be episodic and short term. Studies on impacts of beach nourishment activities on the invertebrate community have shown that recovery of the benthic community at the beach and intertidal habitat generally takes place on the order of a few weeks to months (USACE 2013c). Disturbance to benthic communities would occur in areas that have been previously dredged. USACE would continue to implement Standard Practices intended to minimize the impacts of dredging and placement on the marine environment, which would further minimize limited-duration impacts. Because of this, and evidence that benthic communities recovery quickly, impacts are anticipated to be less than significant under all alternatives.

Under the No Action Alternative and No Project Alternative, there would be less-than-significant impacts on the aquatic communities resulting from the disturbance to benthic habitat resulting from dredging operations and substrate materials placement.

- **NEPA Determination**: Under the No Action Alternative, impacts caused by a loss of benthic habitat would be less than significant.
- **CEQA Determination**: Under the No Project Alternative, impacts caused by a loss of benthic habitat would be less than significant.

Alternatives 1 Through 4

Impacts on fish and benthic invertebrates caused by a loss of benthic habitat would be similar under Alternatives 1 through 4 as would occur under the No Action Alternative and No Project Alternative. As described above for the No Action Alternative/No Project Alternative, studies indicate that even relatively large areas disturbed by dredging activities are usually recolonized by benthic invertebrates within one month to one year, with original levels of biomass and abundance developing within a few months to between one and three years (Newell et al. 1998). Additionally, while placement operations under Alternatives 1 through 4 may cause short-term, episodic burial of the less mobile benthic community, benthic habitats are quickly recolonized.

- **NEPA Determination**: Under Alternatives 1 through 4, impacts caused by a loss of benthic habitat under would be less than significant.
- **CEQA Determination**: Under Alternatives 1 through 4, impacts caused by a loss of benthic habitat under Alternatives 1 through 4 would be less than significant.

3.3.4.5 Impact BI-5: Potential Effects Caused by Upland Beneficial Use of Dredged Material Placement

No Action Alternative/No Project Alternative

Under the No Action Alternative and No Project Alternative, there would be no upland BUDM placement unless dredging occurs outside the approved work window or BUDM was used as mitigation for entrainment impacts to longfin smelt under Mitigation Measure BI-1. With the null or limited extent of BUDM upland placement under the No Action Alternative/No Project Alternative, the time required to complete wetland restoration actions in SF Bay (estimated to be 2 to 25 years faster depending on initial sediment volumes added to reach vegetation establishment elevation [Dougherty et al. 2024]) may be delayed due to sediment needs. Accordingly, the beneficial effects on wetland habitats and species from upland BUDM placement contributed by USACE (the largest dredger in the Bay by volume) would not occur under the No Action Alternative and No Project Alternative.

- **NEPA Determination**: Under the No Action Alternative, impacts caused by BUDM placement would be less than significant.
- **CEQA Determination**: Under the No Project Alternative, impacts caused by BUDM placement would be less than significant.

Alternatives 1 Through 4

Alternatives 1 through 4 will contribute substantial dredged material that may be placed at upland beneficial use sites for wetland restoration in SF Bay, San Pablo Bay, and Suisun Bay. This is expected to occur at Cullinan Ranch and Montezuma Wetlands in the immediate future, while other sites come online. Wetlands are well known to be highly productive, and beneficial use/wetland restoration actions are expected to contribute to food resources used by special-status species including longfin smelt, delta smelt, Chinook salmon, and California least tern and to provide refugia from predators. Additionally, these locations may be important for spawning and rearing for Delta species. For example, longfin smelt have been detected by University of California-researchers either through eDNA or physical trawl sampling at restored wetland sites: Hamilton Wetlands, Sonoma Baylands, and Tolay Creek (Bowen et al. 2024). Although the amount of increased food production or number of additional fish and invertebrates, particularly prey species, that may result from USACE's contribution of sediment to beneficial use sites is difficult to estimate, those benefits are certain to result from substantially increasing the scale and pace of Bay tidal marsh restorations in response to SLR. Restoring large and small-scale wetlands will provide flood and climate resiliency to special-status fish and bird populations through consistent availability of high-quality habitat in the future. Restoration of tidal salt marsh habitat will also create additional habitat for salt marsh harvest mouse and Ridgway's rail.

Climate change is expected to significantly increase water temperatures in the Estuary. Temperature changes are projected to be most prominent in Suisun Bay, where the number of days above 22 degrees Celsius (the upper limit for all post-larval life stages) could more than double, forcing age-0 longfin smelt to trade Estuary rearing time for ocean rearing time if they can do so successfully, and forcing delta smelt farther upstream to less suitable rearing habitat. There is high uncertainty about future spawning opportunity for longfin smelt and delta smelt; future conditions could range from unhelpful

from a species conservation perspective to potentially catastrophic. As a cold water species at the southernmost portion of its range, the longfin smelt Delta DPS is likely already avoiding water temperatures above its physiological tolerance during the summer months. Further increases in water temperature could mean extended summer-like conditions in which Suisun Bay and the Delta would be inhospitable for the species.

The effects of SLR on the Estuary will result in salt- and freshwater marsh losses and salinity intrusion. Many of the marshes currently used by longfin smelt and delta smelt could be inundated and lost by the end of the century, potentially resulting in lower suitability of remaining open-water habitats. The salinity intrusion, if not sufficiently abated by increasing reservoir releases and export reductions (thereby extending already stretched water supplies), would likely shift X2 (i.e., the location in the Delta where the tidally averaged salinity is 2 ppt) eastward. The upstream shift in X2 could lengthen the spawning migration of adult longfin smelt, and the salinity increase could render San Pablo Bay and Suisun Bay more frequently inhospitable to longfin smelt larvae as well as delta smelt juveniles and adults, substantially reducing suitable habitat.

The individual beneficial use sites have accounted for many benefits of wetland restoration through their respective ESA consultations, however, the consideration of climate resiliency benefits of wetland restorations to species was likely not included. The beneficial effects on wetland habitats and species from BUDM placement contributed by USACE are expected to accrue not only from the reduction in time required to complete a restoration action (estimated to be 2 to 25 years faster depending on initial sediment volumes added to get to vegetation establishment elevation [Dougherty et al. 2024]), but also because the inherent value of intact and resilient wetland habitat may be expected to increase in the future due to climate change.

- **NEPA Determination**: Under Alternatives 1 through 4, impacts caused by BUDM placement would be beneficial.
- **CEQA Determination**: Under Alternatives 1 through 4, impacts caused by BUDM placement under would be less than significant.

3.3.4.6 Impact BI-6: Potential Effects Caused by the Resuspension of Contaminated Sediments

No Action Alternative/No Project Alternative

Dredging disturbs aquatic habitats and fish and benthic organisms by resuspending bottom sediments, which recirculates any toxic metals, hydrocarbons, pesticides, pathogens, and nutrients that may be present into the water column. Toxic metals and organics, pathogens, and viruses, absorbed or adsorbed to fine-grained particulates that are in the sediment may become biologically available to organisms either in the water column or the food chain. Most contaminants, however, are not easily released during short-term resuspension because they are tightly bound in the sediments. Dredged sediment from locations such as San Pablo Bay and Suisun Bay Channel typically have a high sand content and do not bind well with contaminants, particularly metals, and therefore do not contain high levels of contaminants.

Environmental Setting and Environmental Analysis

Sediments are regularly tested, and all dredging is conducted in compliance with water quality standards. USACE will avoid, when possible, areas identified as having sediment that is not suitable for unconfined aquatic disposal;(NUAD); if future testing identifies NUAD material that needs to be dredged, it will be placed at upland sites. Sediment bioaccumulation testing will be regularly conducted during dredging activities.

Under the No Action Alternative, annual dredging activities at the majority of the dredging sites are not expected to increase contaminant concentrations above baseline conditions. Similarly, under the No Project Alternative, annual or biennial dredging at most dredging sites are not expected to increase contaminant concentrations above baseline conditions. The Petaluma Across the Flats dredging site will be dredged every three years, and would likely have similar effects as if dredged annually or biennially as described above.

The Napa River and Petaluma River dredging sites, which are farther upstream, are dredged at six- or four-year intervals, respectively. These have a slower rate of sediment deposition, hence the need for a lower frequency of dredging, and therefore would likely have similar effects as if dredged annually or biennially as described above.

The San Bruno dredging site, while only dredged every 23 years, has a very small volume (30,000 CY) removed, and would only disturb a small portion of Estuary.

In the 2011 EFH conservation measures for the LTMS program that were agreed upon by NMFS, USACE and USEPA (USACE and USEPA 2011), agreed to collect and analyze residual samples, that is, a 6-inch layer below the permitted overdraft of the sediment surface that is exposed once dredging is complete. If the residual layer contamination exceeds the overlying sediment and thus exceeds trigger values, there will be consideration taken for potential management actions to address the residual contamination on a case-by-case basis.

Any potential short-term resuspension of contaminated sediments would have short-term effects and be localized on aquatic species in contact with the resuspended contaminated sediments. USACE would implement BMPs and comply with water quality protection measures included as conditions to the WQC issued by the Regional Water Board and would continue to implement BMPs to minimize the potential for water quality degradation that could impact aquatic organisms. Thus, impacts on aquatic species would be less than significant.

- **NEPA Determination**: Under the No Action Alternative, impacts caused by a resuspension of contaminated sediments would be less than significant.
- **CEQA Determination**: Under the No Project Alternative, impacts caused by a resuspension of contaminated sediments would be less than significant.

Alternatives 1 Through 4

Under Alternatives 1 through 4, impacts on aquatic fauna caused by a resuspension of contaminated sediments would be similar to those under the No Action Alternative and No Project Alternative.

- **NEPA Determination**: Under Alternatives 1 through 4, impacts caused by a resuspension of contaminated sediments would be less than significant.
- **CEQA Determination**: Under Alternatives 1 through 4, impacts caused by a resuspension of contaminated sediments would be less than significant.

3.3.4.7 Impact BI-7: Potential Interference of Migratory Passage for Fish, Seabirds, and Marine Mammals

No Action Alternative/No Project Alternative, Alternatives 1 Through 4

There would be no structures such as breakwaters proposed; therefore, there would be no permanent interference with the movement of resident or migratory fish, seabirds, or marine mammals under the No Action Alternative or the No Project Alternative. Additionally, the footprint of each dredging operation and material placement operation is small (affecting a fraction of the channel width) with localized impacts, and the area actively dredged at any one time is very small compared to the total amount of habitat available. Migratory passage for fish, seabirds, and marine mammals could be affected by changes in noise or turbidity, but as described in Impacts B2 and B3, these impacts would be less than significant. Therefore, impacts on migratory passage of aquatic species would be minimal.

- **NEPA Determination**: Under all alternatives, impacts on migratory passage of fish, seabirds, and marine mammals would be considered less than significant.
- **CEQA Determination**: Under all alternatives, impacts on migratory passage of fish, seabirds, and marine mammals would be considered less than significant.

3.3.4.8 Impact BI-8: Potential Effects of Dredging Activities on Roosting, Nesting, and Foraging Avian Species

No Action Alternative/No Project Alternative

Dredging and transportation and placement of dredged material may temporarily disturb foraging and resting avian species, thereby increasing energetic output due to increased flight times and startle response. However, the navigation channels that will be used for the Proposed Project are in areas of existing high human activity. Noise resulting from dredging and the transportation and placement of dredged material would not be expected to exceed ambient conditions, and the disruption from these activities would not likely exceed the existing human disturbance to which birds in these areas are accustomed (USACE and Regional Water Board 2015).

As discussed in Section 3.3.4.2, increased turbidity from dredging and placement of dredged material can result in reduced visibility and could potentially affect foraging success of waterbirds and shorebirds. This disturbance, however, is temporary and localized. USACE studies show that turbidity plumes at placement sites persist for approximately 20 minutes. During the placement of sandy material, the

duration of these plumes is even shorter due to the rapid settling of coarse sediments (USACE 2003; USACE et al. 1998). Therefore, birds are not expected to be adversely affected by dredging and placement activities because spikes in turbidity will be temporary and localized, and noise and disturbance from these activities are not expected to exceed existing conditions. Work window restrictions are implemented to further reduce the potential to impact listed species described below.

California Least Tern

Dredging activities occur in areas where ambient noise levels are already elevated due to vessel activity. California least terns that occur in locations where dredging is required to facilitate shipping traffic already experience elevated levels of anthropogenic noise and disturbance. Noise produced from dredging activities is not expected to exceed ambient conditions and is not expected to substantially impact California least terns (H.T. Harvey and Associates 2012). The 1999 USFWS LTMS delta smelt BiOp identifies turbidity as potentially negatively affecting California least tern foraging success by decreasing visual detection of fish species (USFWS 1999). However, given the short duration of turbidity plumes generated by dredging, the overall impact may not be significant (H.T. Harvey and Associates 2012). The work windows for portions of SF Bay are intended to minimize potential impacts from turbidity effects on foraging success during the California least tern nesting season when prey species are at critical life states (USACE et al. 1998). The work window for California least terns from within 1 mile of the coastline from the Berkeley Marina south to San Lorenzo Creek is August 1 through March 15 each year. If USACE should need to dredge outside the work window for California least tern in any year covered by this Draft EA/EIR, USACE would initiate additional consultation with USFWS to obtain written authorization to work outside the window.

Western Snowy Plover

Noise produced from dredging activities is not expected to exceed ambient conditions and is not expected to substantially impact western snowy plover. Nearshore or upland disposal of dredged material could result in the loss of habitat. Consultation with the USFWS will be required for any placement activities that will result in the loss of suitable western snowy plover habitat, including mudflat foraging habitat (USACE et al. 1998). The Snowy Plover Protection Area on Ocean Beach provides a protection zone for western snowy plovers overwintering there. Beach nourishment in this area would be designed so that it would not interfere with the Snowy Plover Protection Area. Any placement activities at Ocean Beach (SF-17) would be limited to a narrow corridor along the eastern edge of the Snowy Plover Protection Area. Based on historical monitoring and habitat preferences, it was determined that use of this travel corridor would minimize disturbance to western snowy plovers (SFPUC 2012).

Ridgway's Rail

Ridgway's rails are highly sensitive to noise disturbance during the nesting season. This species is known to occur in the salt marsh habitat near the San Leandro Marina and nearby along the Estudillo Canal . They are also known to be present in tidal marsh habitat near the San Rafael Creek Inner Canal Channel. The USFWS considers all potential habitat to be occupied unless species-specific surveys from that year have confirmed absence. To minimize potential impacts, the USFWS BiOp on the LTMS program

specifies that dredging activities shall not occur within 250 feet of potential Ridgeway's rail habitat during the nesting season (February 1 through August 31) (USACE et al. 1998; USFWS 1999).

- **NEPA Determination**: Under the No Action Alternative, impacts on avian roosting, nesting, and foraging caused by dredging activities would be less than significant.
- **CEQA Determination**: Under the No Project Alternative, impacts on avian roosting, nesting, and foraging caused by dredging activities would be less than significant.

Alternatives 1 Through 4

Under Alternatives 1 through 4, impacts on avian roosting, nesting, and foraging caused by dredging activities would be similar as those under the No Action Alternative and No Project Alternative.

- **NEPA Determination**: Under Alternatives 1 through 4, impacts on avian roosting, nesting, and foraging caused by dredging activities would be less than significant.
- **CEQA Determination**: Under Alternatives 1 through 4, impacts on avian roosting, nesting, and foraging caused by dredging activities would be less than significant.

3.3.4.9 Impact BI-9: Potential Disturbance of Essential Fish Habitat and "Special Aquatic Sites" Including Eelgrass Beds and Mudflats

No Action Alternative/No Project Alternative, Alternatives 1 and 4

Under one or more FMPs, the entire project area in the Pacific Ocean or Estuary is classified as EFH. The LTMS program's environmental protectiveness is improved by several conservation measures included in the programmatic EFH agreement that was finalized in 2011. For USACE maintenance dredging in SF Bay conducted in compliance with the guidelines specified by the official programmatic federal EFH consultations for the LTMS, no additional EFH consultation is necessary.

Eelgrass beds and mudflats are regarded as special aquatic areas and are subject to jurisdiction by Section 66605 of the McAteer-Petris Act, State Policy for Water Quality Control: State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State (State Procedures) (State Water Resources Control Board 2021), and Section 404 of the CWA. Eelgrass beds and estuaries are also considered "habitat areas of particular concern," a subset of EFH (see Section 3.3.2.4).

Eelgrass provides essential food and habitat for a variety of species. It also serves as nursery habitat for young fish and foraging areas for many species of fish, invertebrates, and birds. Eelgrass is protected under the CWA Section 404(b) (1) "Guidelines for Specification of Disposal Sites for Dredged or Fill Material," Subpart E, "Potential Impacts on Special Aquatic Sites" and has been identified as EFH for various life stages of fish species managed by FMPs under the Magnuson-Stevens Act, as established by NMFS. While eelgrass is present near the Richmond Inner Harbor Channel and Oakland Inner Harbor, it does not occur within the dredging channel boundaries.

Eelgrass in areas next to or downstream from dredging operations may be indirectly impacted by turbidity and increased sedimentation. Dredging-related turbidity plumes may temporarily impede light transmission into the water column. Since light penetration in the water column is essential to eelgrass

growth and survival, variations in water quality and turbidity can readily impact them. The viability of eelgrass in beds next to dredging activities may also be impacted by sediment that settles on eelgrass blades. However, turbidity effects from dredging are anticipated to be confined and transient, as described in Impact BI-2. Eelgrass surveys before and after dredging suggest that yearly maintenance dredging operations in Oakland Harbor and Richmond Harbor did not appear to be having a negative impact on eelgrass habitat (see Section 3.3.2.4).

Mudflats offer shallow-water habitat for young fish and are vital foraging places for shorebird species. Activities related to placement and dredging for maintenance would not result in the loss of mudflat land. There would be no disturbance to sensitive ecosystems (such marshes and mud flats) that are close to federal navigation channels.

Dredged material placement at SF-DODS would not affect the Gulf of Farallones National Marine Sanctuary; the barge route is south of the sanctuary limit to prevent spillage of scow material in this unique aquatic habitat.

- **NEPA Determination.** The potential impact on EFH or special aquatic sites, including eelgrass beds and mudflats, under the No Action Alternative, No Project Alternative, and Alternatives 1 and 4 would be less than significant.
- **CEQA Determination.** The potential impact on EFH or special aquatic sites, including eelgrass beds and mudflats, under the No Project Alternative, and Alternatives 1 and 4 would be less than significant.

Alternatives 2 and 3

Under Alternatives 2 and 3, hopper dredging would be conducted at Richmond Inner Harbor and Oakland Inner Harbor. Hopper dredging would result in reduced levels of sedimentation than mechanical dredging, and thus result in reduced impacts compared to the No Action Alternative and No Project Alternative. There would be less-than-significant impacts to EFH or special aquatic sites, including eelgrass beds and mudflats.

- **NEPA Determination:** The potential impact on EFH or special aquatic sites, including eelgrass beds and mudflats, under Alternatives 2 and 3 would be less than significant.
- **CEQA Determination:** The potential impact on EFH or special aquatic sites, including eelgrass beds and mudflats, under Alternatives 2 and 3 would be less than significant.

3.3.4.10 Impact BI-10: Potential Effects of Dredging Resulting in the Increase Spread of Invasive Non-Native Species

No Action Alternative/No Project Alternative, Alternatives 1 Through 4

Under the No Action Alternative and No Project Alternative, dredging vessels would be transported from other locations outside the project area, resulting in the potential to transfer non-native species into the Estuary. Ballast water of vessels can carry larval non-native species, and if the ballast water is released into the Estuary, the non-native larval species have the potential to be released and establish in the SF Bay ecosystem. The USCG requires ships carrying ballast water to implement a ballast water

management and reporting program, and, without jeopardizing the safety of the crew, exchange the ballast water with mid-ocean water or use an approved form of ballast water treatment before releasing ballast water in any US port. Dredge equipment would comply with these regulations, as appropriate.

Beneficial use and upland placement site operators are responsible for managing the placement of dredged material in accordance with the requirements of their permits and other regulatory requirements and approvals, including measures to minimize the spread of invasive non-native species.

Because of the regulatory requirements and measures in place, the project would not be expected to cause a substantial spread of invasive non-native species.

- **NEPA Determination:** Under all alternatives, impacts caused by the introduction of invasive non-native species would be considered less than significant.
- **CEQA Determination:** Under all alternatives, impacts caused by the introduction of invasive non-native species under would be considered less than significant.

3.3.4.11 Impact BI-11: Potential for Dredging, Transport, and Placement Activities to Result in Cumulative Impacts on Biological Resources

No Action Alternative/No Project Alternative, Alternatives 1 Through 4

All alternatives would create short-term impacts, if implemented, and have potential to incur cumulative impacts with other regional projects (see Table 3-2) to biological resources in the project area. Cumulative biological resources impacts could include increases in fish entrainment of delta smelt, longfin smelt, Chinook salmon, green and white sturgeon, Pacific herring, and northern anchovy. Dredging projects could include negative impacts on foraging and could cause avoidance of habitat due to turbidity. It could also cause behavioral shifts and neurological stress related to noise. Disturbance of benthic habitat and resuspension of contaminated sediments could also negatively impact aquatic species. Minimal impacts could occur to migratory passage of fish, seabird, and mammals. Other regional projects described in Table 3-2, including local dredging projects, would also have similar impacts on biological resources and could result in cumulative impacts. Impacts from the project alternatives would be minimized by compliance with existing regulations and permit requirements from NMFS, USFWS, the Regional Water Board, and BCDC. The quantity of dredging projects by non-federal dredgers is small compared to the volumes dredged and disposed for this project, such that their relative impact on biological resources would also be small compared to project alternatives. Additionally, these other regional projects would be compliant with permitting processes and requirements as required by law and with the necessary measures to mitigate water quality biological resource impacts. The combined cumulative biological impacts of the alternatives and the other projects would not be significant.

With Standard Practices, impacts to delta smelt are avoided, and, therefore, the alternatives will not result in cumulatively considerable impacts on delta smelt for the reasons discussed in Section 3.3.4.1 and is not discussed further.

The probability of longfin smelt population declines resulting from dredging is not anticipated. Entrainment would not result in cumulatively considerable significant impacts to longfin smelt populations. With the continued BUDM placement as mitigation for entrainment impacts from the No Project Alternative and incorporation of BUDM to restore tidal wetlands as a minimization measure for entrainment impacts from the other alternatives, as well as providing more BUDM than is necessary consistent with the objectives of the project, USACE would be contributing to its fair share of measures to alleviate cumulative impacts from entrainment to longfin smelt.

- **NEPA Determination:** Project alternatives would not contribute to cumulatively considerable impacts on biological resources.
- **CEQA Determination:** Project alternatives would not contribute to cumulatively considerable impacts on biological resources.

3.4 Cultural and Tribal Resources

This section describes existing conditions for cultural and tribal resources, including applicable plans and policies, and evaluates the potential impacts on these resources from implementation of the alternatives. Although the project alternatives neither propose demolition of existing structures nor introduce elements that could affect the historic setting of the built environment, the maritime landscape includes coastal, nearshore, and shore infrastructure. This analysis, therefore, considers the potential effects of project implementation to archaeological, tribal, and built environment resources.

3.4.1 Regulatory Setting

The following sections describe the regulatory framework applicable to potential cultural and tribal resources impacts from the alternatives.

3.4.1.1 Federal

Federal regulations applicable to cultural and tribal resources are discussed in the following sections

National Historic Preservation Act

National Historic Preservation Act (NHPA), as amended (54 U.S.C. § 100101 et. seq.) declares the federal policy to protect historic sites and values, in cooperation with other tribal nations, states, and local governments. Subsequent amendments designated the State Historic Preservation Officer as the individual responsible for administering state-level programs.

Submerged Lands Act

The Submerged Lands Act (43 U.S.C. §§ 1301 et seq.) established state jurisdiction over offshore lands within 3 miles of shore. In compliance with this act, the CSLC will receive a copy of this EA/EIR and will have the opportunity to comment on its potential impacts on submerged lands.

Abandoned Shipwreck Act

Administered by the State Historic Preservation Officers, the Abandoned Shipwreck Act (43 U.S.C. §§ 2101–2106) is a federal legislative act that affirms the authority of state governments to manage abandoned shipwrecks on state submerged lands.

3.4.1.2 State

State regulations applicable to cultural and tribal resources are discussed in the following sections.

California Native American Graves and Repatriation Act

PRC Section 5097.9 of the California Native American Graves and Repatriation Act of 2001 details procedures to be followed whenever Native American remains are discovered. It states that no public agency or private party using or occupying public property, or operating on public property, under a public license, permit, grant, lease, or contract made on or after July 1, 1977, shall interfere with the free expression or exercise of Native American religion as provided in the United States Constitution and the California Constitution. It further states that no such agency or party shall cause severe or irreparable damage to any Native American sanctified cemetery, place of worship, religious or ceremonial site, or sacred shrine on public property, except on a clear and convincing showing that the public interest and necessity so require. This document recognizes the potential for inadvertent discovery of such resources and proposes mitigation for the treatment of human remains and associated or unassociated funerary objects discovered during any soil-disturbing activity.

Human Remains, Criminal Penalties, California Public Resources Code, Section 7051

PRC Section 7051 states that it is a public offense to remove any part of any human remains from any place where it has been interred, or from any place where it is deposited while awaiting interment or cremation, with intent to sell it or to dissect it, without authority of law, or written permission of the person or persons having the right to control the remains under Section 7100, or with malice or wantonness. This document recognizes the potential for inadvertent discovery of human remains and proposes mitigation for the treatment of human remains discovered during any soil-disturbing activity.

3.4.1.3 Tribal

The following regulations pertain to tribal considerations:

EO 13175, Consultation and Coordination with Indian Tribal Governments

This EO requires regular meaningful consultation and collaboration with tribal officials in the development of tribal policies that have tribal implications, to strengthen the United States's government-to-government relationships with Indian tribes, and to reduce the imposition of unfunded mandates upon Indian tribes.

Native American Graves Protection and Repatriation Act

The Native American Graves Protection and Repatriation Act (33 U.S.C. § 3001 et. seq.) applies on federal and tribal lands. It provides a process for museums and federal agencies to return certain Native American cultural items to lineal descendants and culturally affiliated Indian tribes and Native Hawaiian organizations.

National Historic Preservation Act

Section 106 of the NHPA (16 U.S.C. § 470 or 36 C.F.R. § 800) requires federal agencies to consult with Indian tribes regarding historic properties that may be culturally or religiously significant to the tribe. Consultation should occur early in the planning process and continue throughout the compliance process.

3.4.2 Environmental Setting

Management planning constitutes an undertaking with the potential to affect historic properties that must be preceded by Section 106 compliance. Development of the RDMMP constitutes such an undertaking. This section provides a general historic context for the region and a detailed description of the cultural resources currently identified in each of the Area of Potential Effects (APE) locations. The APE is defined by USACE as all locations considered in the RDMMP, including future placement sites and all federal navigation channels. While the APE encompasses individual current and future placement sites, these will be permitted and subject to individual Section 106 reviews when and if they are selected for future use. Accordingly, this Draft EA/EIR provides environmental setting descriptions for the existing placement sites within the APE. The 2015 EA/EIR provides a detailed description of the historic context for the region (USACE and Regional Water Board 2015), and the discussed analysis will provide the basis for USACE complying with Section 106 of the NHPA for all federal dredging-related activities.

The SF Bay region has experienced considerable landscape and environmental change over the last 20,000 years. As the vast ice sheets that covered the northern part of what is now North American began to melt 20,000 years ago, sea levels rose and began transforming the Bay Area. The broad inland grassland with riparian habitats that stretched near to the modern day Farallon Islands had transformed into a smaller version of the SF Bay by 8,000 years ago (Atwater et al. 1977). Inundation by SLR continued at a slower pace until about 5,000 years ago, creating extensive tidal marsh deposits and the Estuary that are defining features of the region today. This transformation impacts archaeological visibility as some of the earliest evidence for human occupation in the region may have been inundated during the terminal Pleistocene/Early Holocene boundary (circa 11,000 to 8,000 years ago). Nonetheless, there is evidence for human occupation of the region as early as 11,700 years ago through to the present, where the Ohlone, Coast Miwok, Bay Miwok, Plains Miwok, and Patwin communities continue to live today. This deep time Native American presence in the region began an extensive and enduring maritime history, which defines this region. Alongside Native American sites lie the remains of a bustling Euroamerican colonial ocean-based commerce, with watercraft, lighthouses, wharfs, and other evidence of the historic and modern maritime economy.

Environmental Setting and Environmental Analysis

This extensive history of human use of the region has left a historic record rich in cultural resources both on the land and on the continental shelf. As such, the cultural resources that are of interest for the current project include not only archaeological sites both on the shorelines or submerged beneath the Bay and open ocean, but also evidence from the region's rich historic maritime history and its associated watercraft and onshore and nearshore infrastructure. Of particular interest are the hundreds of shipwrecks recorded in the region, as well as those that have not yet been identified.

In consideration of the unique history of the Bay Area and nature of the current federal dredging program, the background cultural resources investigation focused on identifying previously recorded cultural sites in and around the navigation channels and placement locations, as well as specific consideration of known shipwrecks and marine hazards. This included review of environmental documents from previous dredging projects, archaeological literature and survey reports, and information on shipwrecks. An updated records search received from the Northwest Information Center on May 24, 2024, was considered along with additional documentation including the Office of Historic Preservation Archaeological Determinations of Eligibility, Built Environment Resources Directory, California Inventory of Historic Resources 1976, CALTRANS Bridge Survey (August 2013), General Land Office and Rancho Plat maps, historic maps, NOAA Office of Coastal Survey Wrecks and Obstructions Database (CSWO), and the CSLC Shipwreck Database.

Per the CSLC, the coordinates provided from their Shipwreck Database may be general and do not account for shipwrecks that have been moved or salvaged. Locational data are based on information gathered from books, newspapers, and other sources and are estimated locations (unless noted) that should be considered with additional information. Using the CSLC Shipwreck Database in concert with the CSWO can be a useful combination as the CSWO does provide exact coordinates of reported shipwrecks and other obstructions. The CSWO, however, combines two different data sets, 1) NOAA's Automated Wreck and Obstruction Information System (AWOIS) Database and 2) NOAA's electronic navigational charts (ENC). The AWOIS provides locational and historical records data, but is not a comprehensive record. The ENC is more comprehensive than AWOIS, but does not provide historic data and records. Rather, the ENC is focused on providing locational data for marine hazards, which may or may not be of historic age.

The background research resulted in identification of previously recorded archaeological resources and shipwrecks within 0.5 mile of the APEs and built environment resources within 650 feet of the APEs (see Figure 1-2). There are 363 previously recorded cultural resources and 65 historic-age shipwrecks (per the CSLC) noted within the designated search areas. Within the APEs, there are 33 previously recorded cultural resources, including 13 historic properties, 17 cultural resources not eligible for national, state, or local historical registers, and 3 cultural resources that have not yet been evaluated or need to be reevaluated. Per the CSLC, there are 15 historic-age shipwrecks with coordinates within the APEs; the CSWO reports 10 shipwrecks and 4 obstructions within the APEs. There is likely overlap between the reported shipwrecks. This will be discussed below in the breakdown of each dredge and placement location.

3.4.2.1 Navigation Channels

Oakland Harbor

Within the Oakland Harbor APE, there are nine previously recorded cultural resources. Seven of these are historic properties, one has been determined not eligible for the National Register of Historic Places (NRHP), and one needs to be reevaluated (Table 3-18). There are 30 archaeological resources within 0.5 mile of the APE and 80 built environment resources within 200 meters of the APE. The CSLC indicates seven historic-aged shipwrecks within Oakland Harbor: *Golden Gate* (sunk 1929), *Alven Besse* (sunk 1929), *Star of Vancouver* (sunk 1938), *James Rolph Jr* (Schooner, sunk 1929), *Edwin May* (bark, sunk 1929), *Simla* (bark, sunk 1930), *Ruth* (sunk 1924), and *Herald* (sidewheel steamboat, sunk 1912). The CSWO indicates 18 shipwrecks (8 co-located in ENC and AWOIS) and 3 obstructions within the APE.

Additionally, the CSLC lists seven historic-aged shipwrecks within 0.5 mile of the Oakland Harbor APE: *San Jose* (steam screw, sunk 1919), *Friedeberg* (sunk 1881), *Helen P Drew* (fish reduction ship, sunk 1950), *Great Western* (sunk 1882), *Whitesboro* (steam schooner, date of sinking unavailable), *Trilby* (sternwheel steamboat, sunk 1911), and *Ranger* (steamship, sunk 1854).

Table 3-18. Previously Recorded Cultural Resources within the Oakland Harbor APE

P-Number	Resource Name	Location	Eligibility Status (criteria)	Resource Type	Age
P-01-003116	Fruitvale Avenue Railroad Bridge	Oakland Harbor	2S2 (C)	Structure	Historic
P-01-003158	High Street Bridge (#33C-0027)	Oakland Harbor	2S2 (C)	Structure	Historic
P-01-003190	Park Street Bridge (#33C-0027)	Oakland Harbor	2S2 (C)	Structure	Historic
P-01-003218	Todd Shipyard, Alameda	Oakland Harbor	7N	Building, Structure, District	Historic
P-01-003708	Posey Tube, Bridge No. 33-106R	Oakland Harbor	3S	Building, Structure, Element of district	Historic
P-01-010809	BART Transbay Tube	Oakland Harbor	3S	Structure	Historic
P-01-011463	Cryer & Sons Boatyard	Oakland Harbor	5S3	Building, Structure	Historic
P-01-012023	Bridge 33C0147	Oakland Harbor	3S	Structure	Historic
P-01-012346	Tunnel 33-0106L	Oakland Harbor	6Z	Structure	Historic

Key: BART = Bay Area Rapid Transit

There have been 52 cultural resources investigations that have intersected the Oakland Harbor APE. None of these have covered the entire APE. Two investigations have covered significant portions of the APE:

- S-002152 (2023) Cultural Resources Investigation of Operating Projects, Oakland Inner Harbor
- S-025526 (1999) Historic Property Survey Report/Finding of Effect, 50-Foot Channel Navigation Improvements Project, Oakland Harbor, Alameda County

Redwood City Harbor

Within the Redwood City Harbor APE there are no previously recorded cultural resources. There is one recorded object adjacent to the APE, the R/V *Polaris*. This science vessel was listed on the NRHP, but was retired and sold in 2016. The CSLC and CSWO indicate three shipwrecks within 0.5 mile of the APE: *City of Glendale* (fishing schooner, sunk 1921), *Morgan Shell*, and *Manana*.

There have been 17 cultural resources investigations that have intersected the Redwood City Harbor APE. None of these have covered the entire APE and the majority of the APE has no recorded cultural resources investigations. Many of the investigations address regional cultural history considerations that are academic in nature and are not in response to regulatory requirements.

Richmond Harbor

Richmond Outer Harbor

There are no previously recorded cultural resources within the Richmond Outer Harbor APE. There is one recorded shipwreck just outside of the 0.5-mile buffer. A side-scan sonar survey recorded the buried hull of a ship, estimated to date to the late 19th or early 20th century based on building techniques. The CSLC indicates five shipwrecks within 0.5 mile of the APE: *Alton* (oil screw, sunk 1904), *Centennial* (steamship, sunk 1886), *Anna R Forbes* (schooner, sunk 1867), *W Whipple* (sloop, sunk 1880), and *Buenos Dias* (lumber schooner, sunk 1867). The CSWO indicates one shipwreck and one obstruction within 0.5-mile of the APE.

There have been 12 cultural resources investigations that have intersected the Richmond Outer Harbor APE. None of these have covered the entire APE and the majority of the APE has no recorded cultural resources investigations. Many of the investigations address regional cultural history considerations that are academic in nature and are not in response to regulatory requirements. One survey that does intersect the APE is a marine archaeology survey, but it covers only a small portion of the APE: S-018902 (Sullivan and Allan 1996) Report on a Marine Archaeological Survey of the Proposed Southampton Shoal Ship Channel Extension Terminal and Dredge Area.

Richmond Inner Harbor

There are no previously recorded cultural resources within the Richmond Inner Harbor APE. There are 12 archaeological sites within 0.5 mile of the APE and 17 built environment resources within 200 meters of the APE. The CSLC indicates four shipwrecks within 0.5 mile of the APE: *Adele Hobson* (motor vessel,

sunk 1934), *Associated Oil #8* (barge, sunk 1952), *Alpha* (schooner, sunk 1869), and *Ellen Burke* (scow schooner, sunk 1860). The CSWO indicates one shipwreck within 0.5-mile of the APE.

There have been 17 cultural resources investigations that have intersected the Richmond Inner Harbor APE. None of these have covered the entire APE and the majority of the APE has no recorded cultural resources investigations. Many of the investigations address regional cultural history considerations that are academic in nature and are not in response to regulatory requirements.

San Francisco Mainship Channel Bar

Within the San Francisco Mainship Channel Bar APE there are no previously recorded cultural resources. There are no archaeological sites within 0.5 mile of the APE or built environment resources within 200 meters of the APE. The CSLC indicates one shipwreck within 0.5 mile of the APE: USS *Benevolence* (hospital ship, sunk 1950). The CSWO indicates two shipwrecks, one of which is the USS *Benevolence*, within 0.5 mile of the APE.

There is one investigation that covers the entire San Francisco Mainship Channel Bar APE: S-044172 (2013) Gulf of the Farallones/Monterey Bay National Marine Sanctuaries San Francisco-Pacifica Exclusionary Area (Donut Hole) Expansion (Schwemmer 2013). This undertaking was focused on expanding the northern boundary of the Monterrey Bay National Marine Sanctuary. The resulting letter report focused only on maritime history and a marine survey was not conducted. The APE has not been surveyed.

San Pablo (Pinole Shoal Channel)

There are no previously recorded cultural resources within the Pinole Shoal Channel APE. There is one recorded shipwreck located approximately 330 feet beyond the western extent of the APE. The debris field forming the wreckage of the schooner *Sagamore*, which sunk in 1864, was identified in a side-scan sonar and magnetometer survey. The CSLC indicates three shipwrecks within 0.5 mile of the APE: *Victor H Kelly* (tanker, sunk 1952), *Harry* (sunk 1904), and *Monarch* (tug, sunk 1915). CSWO indicates four shipwrecks and five obstructions within 0.5 mile of the APE.

There has been one cultural resources investigation that intersects the Pinole Shoal Channel APE. The majority of the APE has not been subject to a cultural resources investigation. The one survey that does intersect the APE is a marine archaeology survey, but covers only a small portion of the APE: S-018901 (no date) Nautical Archaeological Survey (Sullivan and Allen 1996).

Suisun Bay Channel

There is one previously recorded cultural resource within the Suisun Bay Channel APE; it is split into two records (Table 3-19). The Union Pacific Railroad's Martinez-Benicia Bridge crosses into Solano and Contra Costa counties. Each segment is recorded in its respective county. Both segments were found not eligible for the NRHP per the 2013 CalTrans Bridge inventory. There are five archaeological resources within 0.5 mile of the APE and two built environment resources within 200 meters of the APE. The CSLC indicates six historic-aged shipwrecks within Suisun Bay Channel APE: *Camanche* (steamboat, sunk

1853), *Quinault Victory* (victory ship, sunk 1944), *E A Bryan* (victory ship, sunk 1944), *Sophie McLean* (sternwheel steamboat, sunk 1864), *Lizzie Theresa* (steamship, sunk 1920), and *Swastika* (oil screw, sunk 1933). The *Sophie McLean* location is recorded 40 meters north of the APE. The CSWO indicates 16 shipwrecks (9 co-located in ENC and AWOIS) and 8 obstructions within 0.5 mile of the APE.

Table 3-19. Previously Recorded Cultural Resources within the Suisun Bay Channel APE

P-Number	Resource Name	Location	Eligibility Status	Resource Type	Age
P-07-000859	SP RR Bridge, Martinez-Benicia Bridge	Suisun Bay Channel	6Z	Structure	Historic
P-48-000445	Southern Pacific Railroad Bridge Martinez-Benicia	Suisun Bay Channel	6Z	Structure	Historic

There have been six cultural resources investigations that have intersected the Suisun Bay Channel APE. None of these have covered the entire APE and the majority of the APE has no recorded cultural resources investigations.

There has been one marine archaeology cultural resources investigation that intersects the APE, though it only covers a small portion of it: S-018901 (no date) Nautical Archaeological Survey.

Napa River Channel

There are three previously recorded cultural resources within the Napa River Channel APE. All three resources have been determined not eligible for the NRHP (Table 3-20). There are 30 archaeological resources within 0.5 mile of the APE and 20 built environment resources within 200 meters of the APE. The CSLC indicates two historic-aged shipwrecks within Napa Channel: *Valiant* (sunk 1911) and *Rough and Ready* (steamship, sunk 1880). The CSWO also indicates two shipwrecks within 0.5 mile of the APE: one wooden-hulled ship and one 1942 destroyer ship.

Table 3-20. Previously Recorded Cultural Resources within the Napa River Channel APE

P-Number	Resource Name	Location	Eligibility Status (Criteria)	Resource Type	Age
P-28-001020	Bridge 21-75/Maxwell Bridge	Napa River Channel	6Y	Structure	Historic
P-28-001869	Vaca-Lakeville #1	Napa River Channel	6Z	Structure	Historic
P-28-001880	Bridge 21C-12	Napa River Channel	6Z	Structure	Historic

There have been 35 cultural resources investigations that have intersected the Napa River Channel APE. None of these have covered the entire APE and the majority of the APE has no recorded cultural resources investigations.

Petaluma River Channel

There are five previously recorded cultural resources within the Petaluma River Channel APE. Three of these are historic properties and two have been determined not eligible for the NRHP (Table 3-21). There are 38 archaeological sites within 0.5 mile of the APE and 17 built environment resources within 200 meters of the APE. The CSLC indicates two historic-aged shipwrecks within the Petaluma River Channel APE: *Gold* (sidewheel steamboat, sunk 1920) and *Agnes Jones* (Scow schooner, sunk 1889). The CSWO indicates two shipwrecks (co-located in ENC and AWOIS) and six obstructions within the APE.

Table 3-21. Previously Recorded Cultural Resources within the Petaluma River Channel APE

P-Number	Resource Name	Location	Eligibility Status (Criteria)	Resource Type	Age
P-21-002911	Mira Monte Marina	Petaluma River Channel	6Z	Building, Structure, Site	Historic
P-21-002939	Black Point Northwestern Pacific Railroad Bridge	Petaluma River Channel	3S (A&C)	Structure	Historic
P-49-002834	Northwestern Pacific Railroad	Petaluma River Channel	2S2 (A)	Building, Structure, Object, Element of district	Historic
P-49-003288	Bridge 20-0154 (L and R)	Petaluma River Channel	6Z	Structure	Historic
P-49-005165	Haystack Landing Railroad Bridge	Petaluma River Channel	2S2 (A&C)	Structure	Historic

There have been 58 cultural resources investigations that have intersected the Petaluma River Channel APE. None of these have covered the entire APE and the majority of the APE has no recorded cultural resources investigations.

San Rafael Creek

There are no previously recorded cultural resources within the San Rafael Creek APE. There are 19 archaeological sites within 0.5 mile of the APE and three built environment resources within 200 meters of the APE. The CSLC indicates three shipwrecks within 0.5 mile of the APE: *Novato* (hay scow, sunk 1884), *Annie* (sunk 1920), and *Maryland* (steamship, sunk 1913). CSWO indicates one shipwreck within 0.5 mile of the APE.

There have been 24 cultural resources investigations that have intersected the San Rafael Creek APE. None of these have covered the entire APE. Many of the investigations address regional cultural history considerations that are academic in nature and are not in response to regulatory requirements. One investigation covers the onshore creek portion of the APE: S-009125 (Bramlette 1987) Preliminary Cultural Resources Assessment for Planned Modification and Maintenance of San Rafael Creek in the Town of San Rafael, Marin County, California.

One additional report appears to include a marine survey that crosses the offshore portion of the APE: S-028138 (no date). A Cultural Resources Evaluation of the Loch Lomond Yacht Harbor, San Rafael, Marin County, California (Pesnichak no date).

3.4.2.2 Placement Areas

The following sections describe cultural resource records for placement areas that have been previously permitted.

Existing Beneficial Use Sites

Upland Direct Placement Sites

Cullinan Ranch Restoration Project

There are no previously recorded cultural resources within the Cullinan Ranch APE. A ranch complex and a levee associated with ranch activities were identified and evaluated as not eligible for listing on the NRHP (Ducks Unlimited 2008).

Several archaeological surveys have been conducted near the APE: two along the Highway 37 corridor and three following the powerline corridor located to the north of the site. No recorded archaeological sites were identified near Cullinan Ranch as a result of these previous studies (Ducks Unlimited 2008).

Montezuma Wetlands Restoration Project

Based on research conducted in 1998, two known cultural resources are located within the APE: a prehistoric archaeological site (CA-SOL-34) and the Molea Railroad Station (CA-SOL-209H). A field survey conducted in 1992 detected 13 historic sites consisting of a variety of artifacts such as pump houses, the rail depot and tracks, machinery, water pipe, glass, ceramics, cans, bottles and remnants of a structure with a hay baler and thrasher (USACE 1998).

Nearshore Strategic Placement Site, SF-17 (Ocean Beach Nearshore Placement Site)

There are no previously recorded cultural resources within the SF-17 APE. There is one recorded shipwreck (SS *Neptune*, schooner, sunk 1900) within 0.5 mile of the APE, the remains of which are located onshore at the base of a cliff at Fort Funston. There are no previously recorded built environment resources within 200 meters of the APE. The CSLC indicates five shipwrecks within the APE: *King Philip* (clipper, sunk 1878), *Maggie* (steamship, sunk 1904), *Reporter* (three-masted schooner, sunk 1902), *James A Garfield* (three-masted schooner, sunk 1904), and *Trifolicum* (sunk 1914). The CSLC indicates an additional three shipwrecks within 0.5 mile of the APE: *William Frederick* (two-masted schooner, sunk 1887), *Republic* (fishing smack, sunk 1879), and *Sunlight* (oil screw, sunk 1937). There are no built environment resources within 200 meters of the APE. The CSWO indicates no shipwrecks and one obstruction within 0.5 mile of the APE.

There are no cultural resources investigations that intersect the SF-17 APE. The APE has not been surveyed for cultural resources. There is one geological master's thesis focused on the infilling of SF Bay that discusses the general region where the SF-17 APE is located (Dow 1973).

Transitional Placement Sites

SF-8, San Francisco Bar Channel Placement Site

There are no previously recorded cultural resources within the SF-8 APE. There are no archaeological sites within 0.5 mile of the APE and no built environment resources within 200 meters of the APE. The CSLC indicates five shipwrecks within 0.5 mile of the APE: *Laura May* (schooner, sunk 1873), *Lina Simpson* (sloop, sunk 1972), *Albert Harris* (pilot schooner, sunk 1850), *Minnie G Atkins* (schooner, sunk 1873), *Relief* (pilot boat, sunk 1863). The CSWO indicates no shipwrecks or obstructions within 0.5 mile of the APE.

There are no cultural resources investigations that intersect the SF-8 APE. The APE has not been surveyed for cultural resources.

In-Bay Placement Sites

SF-9, Carquinez Strait Placement Site

There are no archaeological sites or built environment resources within the SF-9 APE. There are no archaeological sites within 0.5 mile of the APE and no built environment resources within 200 meters of the APE. The CSLC and CSWO indicate no shipwrecks or obstructions within 0.5 mile of the APE.

There have been 10 cultural resources investigations that have intersected the SF-9 APE. These all of address regional cultural history considerations and are academic in nature and are not in response to regulatory requirements. The APE has not been surveyed.

SF-10, San Pablo Bay Placement Site

There are no previously recorded cultural resources within SF-10 APE. There is one recorded shipwreck within 0.5 mile of the APE. The debris field forming the wreckage of the schooner *Sagamore*, which sank in 1864, was identified in a side-scan sonar and magnetometer survey. The CSLC and CSWO indicate no shipwrecks or obstructions within 0.5 mile of the APE.

There have been 15 cultural resources investigations that have intersected the SF-10 APE. These are all broad investigations; many of the investigations address regional cultural history considerations that are academic in nature and are not in response to regulatory requirements. The APE has not been surveyed.

SF-11, Alcatraz Placement Site

There are no previously recorded cultural resources within the SF-11 APE. There is one historic district within 0.5 mile of the APE (Alcatraz Island) and no built environment resources within 200 meters of the APE. The CSLC indicates three shipwrecks within 0.5 mile of the APE: *McPherson* (steam screw, sunk 1869), *Thomas Burnett* (sunk 1850), and *Bialchi* (tugboat, sunk 1947). The CSWO indicates no shipwrecks or obstructions within 0.5 mile of the APE.

There have been 12 cultural resources investigations that have intersected the SF-11 APE. These all address regional cultural history considerations and are academic in nature and not in response to regulatory requirements. The APE has not been surveyed.

SF-16, Suisun Bay Placement Site

There are no previously recorded cultural resources within the SF-16 APE. There are no archaeological sites within 0.5 mile of the APE and no built environment resources within 200 meters of the APE. The CSLC and CSWO indicate one shipwreck, *Camanche* (steamboat, sunk 1853) and no obstructions within 0.5 mile of the APE.

There has been one marine archaeology cultural resources investigation that intersects the SF-16 APE, but it covers only a small portion of the APE: S-018901 (no date) Nautical Archaeological Survey (Sullivan and Allen 1996). The majority of the APE has not been surveyed.

Upland (Sponsor-Provided) Sites

For the two existing upland (sponsor-provided) sites, Shollenberger Park and Imola Avenue:

- The Imola Avenue Upland Placement site is located within the Napa River Channel APE. Refer to Section 3.4.2.1, Napa River Channel, for a description of the cultural resources present within the APE.
- The Shollenberger Park (Petaluma River) Upland Placement site is located within the Petaluma River Channel APE. Refer to Section 3.4.2.1, Petaluma River Channel, for a description of the cultural resources present within the APE.

Deep Ocean Disposal, SF-DODS

There are no previously recorded cultural resources within the SF-DODs APE. There are no archaeological sites within 0.5 mile of the APE and no built environment resources within 200 meters of the APE. The CSLC and CSWO indicate no shipwrecks or obstructions within 0.5 mile of the APE.

There are no cultural resources investigations that intersect the SF-DODS APE. The APE has not been surveyed.

Possible Future Beneficial Use Placement Sites

All future beneficial use placement sites would require analysis by USACE under NEPA and an appropriate state entity under CEQA before they would be permitted for use as restoration sites. Environmental review of these sites is not included as part of this document.

3.4.2.3 Tribal Coordination

In compliance with USACE Tribal Consultation Policy and AB 52, in March 2024, USACE and the Regional Water Board reached out to the following tribes (via email and for AB52 USPS Certified Mail) and requested their comments on the project. To date, the Regional Water Board has had one meeting

with the Federated Indians of Graton Rancheria. No other tribal interest has been expressed to date. The Confederated Villages of Lisjan and the Amah Mutsun Tribal Band also provided comments. Tribal consultation is ongoing.

USACE coordinated with the NAHC in March 2024 for this large-scale undertaking, and received a list of tribal contacts in Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma Counties. The Sacred Lands File was completed, and the results were positive. The list of tribes consulted, a summary of tribal consultation, and a copy of correspondence is provided in Appendix E.

3.4.3 Methodology and Thresholds of Significance

The NHPA and its implementing regulations for Section 106 (36 C.F.R. Part 800) require USACE to make a reasonable and good-faith effort to identify historic properties that may be affected by the proposed maintenance dredging and the disposal of the dredged sediment. Historic properties are a subset of cultural resources that are listed on or determined eligible for the NRHP. To be eligible for the NRHP, properties must be 50 years old (unless they have special significance) and have national, state, or local significance in American history, architecture, archaeology, engineering, or culture. They also must possess integrity of location, design, setting, materials, workmanship, feeling, and association, and meet at least one of four criteria for evaluation (36 C.F.R. § 60.4):

- Criterion A: be associated with events that have made a significant contribution to the broad patterns of our history
- Criterion B: be associated with the lives of persons significant in our past
- Criterion C: have distinctive characteristics of type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction
- Criterion D: have yielded, or may be likely to yield, information important in prehistory or history

These criteria are used to determine what properties should be considered for protection from destruction or impairment resulting from project-related activities (36 C.F.R. § 60.2).

On a state level, CEQA evaluation criteria are similar to Section 106 and require agencies to consider impacts on historical resources, a subset of cultural resources that meet the criteria for eligibility to the California Register of Historical Resources (CRHR). To be eligible for the CRHR, a historic property must meet at least one of these criteria; they are set forth in CEQA Section 15064.5:

- Criterion 1. Is associated with events that have made a significant contribution to the broad patterns of California’s history and cultural heritage
- Criterion 2. Is associated with lives of persons important in our past
- Criterion 3. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values
- Criterion 4. Has yielded, or may be likely to yield, information important in prehistory or history.

Environmental Setting and Environmental Analysis

CEQA also considers if a cultural resource is an "unique archaeological resource," defined as an artifact, object, or site that meets one of these requirements:

- Contains information needed to answer important scientific questions, and there is a demonstrable public interest in that information
- Has a special and particular quality, such as being the oldest of its type or the best available example of its type
- Is directly associated with a scientifically recognized important prehistoric or historic event or person (PRC 21083.2)

Eligibility requirements for the NRHP and the CRHR are similar, and historic properties—cultural resources listed on or eligible for the NRHP—are also eligible for listing on the CRHR.

Impact analysis for cultural resources focuses on assessing whether the implementation of an alternative would have the potential to affect cultural resources that are eligible for listing in the NRHP or CRHR or have traditional significance for tribes.

Impact analysis for historic properties focuses on, but is not limited to, guidelines and standards set forth in the implementing regulations (36 C.F.R. 800) of NHPA Section 106. Under Section 106, the proponent of the action is responsible for determining whether any historic properties are located in the area, assessing whether the proposed undertaking would adversely affect the resources, and notifying the State Historic Preservation Officer (SHPO) of any adverse effects. An adverse effect is any action that may directly or indirectly change the characteristics that make the historic property eligible for listing in the NRHP.

Impact analysis for historical resources under CEQA are similar and assess a project's impacts on the historic integrity of a historical resource, and whether the project impacts would materially impair the historical significance of the resource such that it would cause a substantial adverse change in the significance of a historical resource (Cal. Code Regs 15064.5[b]).

Impacts on cultural resources consider both direct and indirect impacts. Impacts could occur through the following:

- Physically altering, damaging, or destroying all or part of a resource
- Altering characteristics of the surrounding environment that contribute to the resource's significance
- Introducing visual or audible elements that are out of character with the property or alter its setting
- Neglecting the resource to the extent that it deteriorates or is destroyed

Section 15064.5 of CEQA also assigns special importance to human remains and specifies procedures to be used when Native American remains are discovered. These procedures are detailed under California PRC Section 5097.98.

Therefore, an analysis of impacts on cultural resources considers whether the project would:

- Result in a substantial adverse change in the significance of a historical resource (NRHP- and/or CRHR-listed, or eligible to be listed), or a unique archaeological resource as defined under PRC Section 21083.2; or
- Result in disturbance of any human remains, including those interred outside of formal cemeteries as considered under PRC Section 5097.9; or
- Result in impacts on Native American Sacred Sites or Religious Ceremonies pursuant to 61 FR 26771-26772 (1996) and 42 U.S.C. Chapter 21 Subchapter 1 § (1996); or
- Result in cumulative impacts on cultural resources.

3.4.4 Impacts and Mitigation Measures

The SF Bay Area represents a key location for local, national, and international marine shipping commerce, national security needs, and recreation. To support these activities and needs, a key congressional mandate of USACE is maintenance of federal navigation channels to authorized depths. These federal channels in and around the Bay Area are located in inland waterways (rivers, creeks), inner and outer harbor locations, and offshore shipping channels. The dredging process includes removing the sediment from these channels and transporting said sediment to an authorized placement site, located in upland, bay, and ocean settings. Consideration of potential effects is limited to the federal navigation channels and placement sites.

Sea level rise that has occurred in the SF Bay region since the Last Glacial Maximum is approximately 130 meters. The coastline for this region was near to the edge of the continental shelf, just offshore of the Farallon Islands. Approximately 11,700 years ago, what is now SF Bay and its related waterways were dry land characterized by steppe biota and river valleys. Archaeological evidence shows the first human presence on this landscape at this time. Human habitation has persisted in this region ever since, including thousands of years of Native American settlement as well as evidence of Euroamerican historic-era maritime commerce with associated coastal infrastructure and drowned watercraft. Some of the cultural sites created by the people living in this region at the end of the Pleistocene and into the Holocene would be on landscapes that are now submerged or incorporated into coastal or wetland habitats. Remnants of historic ocean-based exploration and economies, including shipwrecks, may be found on submerged landscapes. While the character and preservation of these landscapes have been altered, intact remnants of formerly terrestrial landscapes that can contain preserved cultural resources are present under the marine sediment that was transported to the region with SLR and/or historic anthropogenic infilling. Constant shifting of the submerged landscape though natural (oceanographic or tectonic movement) or anthropogenic activities may expose previously buried cultural resources and/or human remains, exposing them to impacts from project activities. Additionally, archaeological sites and built environment remnants of maritime infrastructure located near to the shorelines of inland waterways, harbors, and open ocean may erode into the water and be transported into navigation channels and placement sites. While this material is no longer considered in primary context, individual cultural items and/or human remains may be subject to the Native American Grave Protection and Repatriation Act and its 2024 updated regulations (43 C.F.R. Part 10). They may also be considered a unique archaeological resource or tribal cultural resource under CEQA.

The placement locations for the dredged material are located throughout the SF Bay Area. As the placement of dredged material does not disturb native soil, placement activities would not result in impacts on historical resources, unique archaeological resources, or human remains. Only placement sites that have undergone appropriate environmental review will be used. Future placement sites would not be used until environmental review is completed, including evaluation and mitigation of impacts on cultural resources.

All previously recorded historic properties identified in the navigation channels are built environment resources that will not be impacted by project activities.

3.4.4.1 Impact CT-1: Substantial Adverse Change to a Historical Resource or Disturb Unique Archaeological Resources

No Action Alternative/No Project Alternative, Alternatives 1 through 4

The dredging proposed with the No Action Alternative/No Project Alternative and Alternatives 1 through 4 will occur in previously dredged and maintained federal navigation channels. The maintenance operation removes sediment that has infilled each channel since the last dredging episode. The Dredging Guidance Letter (DGL), published by USACE in March 1989, established the approach to identify submerged cultural resources in previously dredged federal channels. This DGL indicates that remote sensing surveys (e.g., magnetometer, side-scan sonar, subbottom profiler) are not required within the boundaries of previously dredged channels unless there is “reason to believe” cultural resources may exist in previously dredged channels.

Although historical dredging has occurred in the navigation channels, there is the potential that cultural resources could be inadvertently uncovered by project activities. Such inadvertently discovered resources could represent historical resources or unique archaeological resources, and their disturbance could adversely change their condition. As such, the inadvertent discovery of cultural materials represents a potential project impact. Implementation of Mitigation Measures CT1-1, Cultural Resources Monitoring Program and CT1-2, Inadvertent Archaeological Discovery, would reduce potential impacts on historical resources by identifying the cultural resources at the time of disturbance and implementing procedures to be followed by USACE in the event cultural resources are inadvertently exposed during project activities.

Mitigation Measure CT1-1: Cultural Resources Monitoring Program

Projects that occur on submerged landscapes present unique challenges to recognition of potential inadvertent discoveries. The landscape where sediments are removed is not available for immediate inspection and, depending on the dredging method, sediment removed from the submerged landscape is not available for inspection of potential cultural resources. Considering these challenges, a monitoring program that focuses on opportunistic monitoring of identified sensitive locations can reduce potential impacts on historical resources and shall be implemented. The details of the opportunistic monitoring program that complies with the requirements herein shall be developed by an archaeologist meeting the minimum professional qualifications standards (PQS) set forth by the Secretary of the Interior (codified in 36 C.F.R Part 61; 48 FR 44739), including a background in maritime (underwater) archaeology. USACE

is currently consulting with the SHPO and tribes per 36 CFR Part 800. This section will be updated to reflect the outcome of the consultation, to include all agreed-to monitoring requirements.

Identification of sensitive locations may differ for various regions, but shall be based on an archaeological sensitivity analysis that includes all of the following:

- Mapped geologic formations and soils
- Density of surrounding buried archaeological deposits
- Potential for remnant Native American fish capture technologies (fish weirs and platforms)
- Density of identified shipwrecks in the APE and vicinity
- Native American consultation

Opportunistic monitoring shall include monitoring of the sediment as it is dredged from the submerged landscape and/or when it is placed at the placement locations. The archaeological monitor shall inspect the material dredged for the presence or absence of cultural material. If cultural material is discovered during monitoring or other project activities, all work shall be halted in the vicinity of the discovery until a qualified archaeologist can assess the significance of the discovery. Archaeological monitors shall have a BS or BA degree in anthropology, archaeology, or a related field, and at least one year's experience monitoring in California. Archaeological monitors shall have a BS or BA degree in anthropology, archaeology, or a related field, at least one year's experience monitoring in California, and work under the direction of a SOI-qualified archaeologist.

Mitigation Measure CT1-2: Inadvertent Archaeological Discovery

If any cultural material, or an unusual amount of bone, shell, or non-native stone, is encountered during dredging, work would be immediately stopped in the area of the find until a qualified archaeologist can be retained to evaluate the find (36 C.F.R. 800.11.1 and 14 California Code of Regulations [CCR] 15064.5[f]). The archaeologist will determine the potential scientific/historical/cultural significance and will make a recommendation to USACE as to what action or additional measures, if any, are warranted. Examples of such cultural materials might include ground stone tools such as mortars, bowls, pestles, and manos; chipped stone tools such as projectile points or choppers; historical artifacts such as bottles or ceramics; artifacts related to the Euroamerican maritime economy such as watercraft pieces, anchors, and the like, or resource-gathering items such as fish weir stakes.

Additional measures may include additional submerged study, such as geophysical survey or diver investigation, to further evaluate the context of the find and make recommendations to USACE. Typical measures include development and implementation of a detailed archaeological resources management plan to recover the scientifically consequential information from archaeological resources. Treatment for most archaeological resources consists of (but is not necessarily limited to) sample excavation, artifact collection, site documentation, and historical research, with the aim to target the recovery of important scientific data.

- **NEPA Determination:** Under all alternatives, the inadvertent discovery of cultural resources during project activities represents a potential impact; however, implementation of Mitigation Measures CT1-1 and CT1-2 would reduce the potential for impacts on historical resources to a less-than-significant level.
- **CEQA Determination:** Under all alternatives, the inadvertent discovery of cultural resources during project activities represents a potential significant impact; however, implementation of Mitigation Measures CT1-1 and CT1-2 would reduce the potential for impacts on historical resources to a less-than-significant level.

3.4.4.2 Impact CT-2: Potential to Disturb Human Remains, Including Those Interred Outside of Formal Cemeteries

No Action Alternative/No Project Alternative, Alternatives 1 through 4

There are no known cemeteries, formal or otherwise, or other evidence of human internment in the federal navigation channels or existing placement sites. Furthermore, USACE would not use the future placement sites identified in Section 1.5.2.2 until appropriate environmental review and permitting are completed. Although unlikely, given the repeated dredging and dredged material placement activities that have historically occurred at the federal navigation channels and existing placement sites, there remains the potential that previously unidentified human remains could be inadvertently uncovered with project implementation. Such disturbance of human remains represents a potential project impact. Implementation of Mitigation Measures CT1-1, Cultural Resources Monitoring Program and CT2-1, Treatment of Human Remains, would reduce potential impacts by identifying the procedures to be followed by the applicant in the event human remains are inadvertently exposed during project implementation.

Mitigation Measure CT2-1: Treatment of Human Remains

If human remains of Native American origin are discovered during ground-disturbing activities, it is necessary to comply with state laws relating to the disposition of Native American burials that fall within the jurisdiction of the California NAHC (PRC Section 5097). In the event the discovery is composed entirely of human skeletal remains, or if it includes human skeletal remains, dredging activities shall immediately cease and USACE's project representative shall contact the local coroner (county in which discovery is made) to evaluate the remains, and follow the procedures and protocols set forth in Section 15064.5 (e)(1) of the CEQA Guidelines.

If the coroner determines that the remains are Native American, USACE will contact the NAHC, who will appoint a most likely descendant (MLD), in accordance with Health and Safety Code Section 7050.5, subdivision (c), and PRC 5097.98 (as amended by AB 2641). In accordance with PRC 5097.98, USACE shall ensure that, according to generally accepted cultural or archaeological standards or practices, the immediate vicinity of the Native American human remains is not damaged or disturbed by further development activity until USACE has discussed and conferred, as prescribed in this section (PRC 5097.98), with the MLD regarding their recommendations, if applicable, taking into account the possibility of multiple human remains. All human remains will be treated with dignity and respect at all times. USACE and the MLD will make all reasonable efforts to develop an agreement for the treatment of human

remains and associated or unassociated funerary objects (CEQA Guidelines Sec. 15064.5[d]). This agreement should take into consideration the appropriate recordation, analysis, custodianship, curation, and final disposition of the human remains and associated or unassociated funerary objects. PRC allows 48 hours to reach agreement on these matters. If the MLD and the other parties do not agree on the reburial method, the project will follow Section 5097.98(b) of the PRC, which states, "the landowner or his or her authorized representative will re-inter the human remains and items associated with Native American burials with appropriate dignity on the property in a location not subject to further subsurface disturbance."

- **NEPA Determination**: Under all alternatives, the inadvertent disturbance of human remains represents a potential impact; however, implementation of Mitigation Measures CT1-1 and CT2-1 would reduce the potential for impacts on human remains to a less-than-significant level.
- **CEQA Determination**: Under all alternatives, the inadvertent disturbance of human remains represents a potential impact; however, implementation of Mitigation Measures CT1-1 and CT2-1 would reduce the potential for impacts on human remains to a less-than-significant level.

3.4.4.3 Impact CT-3: Potential Impacts on Native American Sacred Sites or Religious Ceremonies

Waterways, including rivers and creeks and the wildlife they contain, were and are essential elements to Native American lifeways and continue to be important to contemporary Native American spiritual and ceremonial practices. Dredging may indirectly impact the availability of certain wildlife and cause visual or noise considerations during ceremonies. These considerations are pursuant to EO 13007 (61 FR 26771-26772 (1996) and the American Indian Religious Freedom Act (42 U.S.C. Chapter 21 Subchapter 1 § 1996 (1978).

- **NEPA Determination:** Under all alternatives, impacts on sacred sites and/or religious ceremonies would be identified during tribal consultation and USACE would implement recommended best practices. Impacts would be reduced to a less-than-significant level.
- **CEQA Determination:** Under all alternatives, impacts on sacred sites and/or religious ceremonies would be identified during tribal consultation and USACE would implement recommended best practices. Impacts would be reduced to a less-than-significant level.

3.4.4.4 Impact CT-4: Potential for Dredging, Transport, and Placement Activities to Result in Cumulative Impacts on Historical Resources

Under all alternatives, with the implementation of mitigation measures CT1-1, CT1-2, and CT2-1, project activities would not result in impacts on known historical resources or Native American sacred sites and/or ceremonies and therefore would not contribute to any cumulative impact on these resources.

If previously undiscovered cultural resources are inadvertently exposed during construction activities, an adverse effect to cultural resources may occur. With proper evaluation and management of these resources according to mitigation measures, no adverse cumulative impact on historical resources, human remains, or Native American sacred sites and ceremonies is expected to occur.

Impacts to historical resources tend to be site specific because they occur on a project level as a result of a project's ground-disturbing activities and, as such, are assessed on a project-by-project basis. The reasonably foreseeable actions in Table 3-2 include several projects that would involve dredging and dredged material placement that could result in the same type of impacts on historical resources as the Proposed Project. As with the current project, these projects could impact undiscovered cultural resources inadvertently exposed during dredging activities and effects to cultural resources may occur. However, the related projects represent ongoing efforts that are subject to federal, state, and local regulations designed to address cultural resource impacts potentially arising from dredging, transport, and/or placement activities. The exception to this type of project is the Brooklyn Basin Marina Expansion Project, which requires, among other activities, in-water work for a marina expansion in the Port of Oakland. The in-water area has been previously disturbed with various dredging and other construction activities, and the potential to encounter historical resources is low. Nonetheless, the 2005 EIR and the 2022 Final Supplemental EIR has mitigation measures that would address impacts to unanticipated discoveries for the in-water portion of the project to less-than-significant (Port of Oakland 2022). Additionally, the current and related projects have mitigation measures for work stoppage if cultural resources are encountered. At a minimum, any ground disturbance associated with the projects listed in Table 3-2 that include dredging would also proceed in adherence with federal, state, and local regulations designed to address cultural resource impacts. In the unlikely event that impacts were to occur with all of these projects, they could combine to form a significant cumulative impact to cultural resources. However, Mitigation Measures CT1-1, CT1-2, and CT2-1, or similar measures, would reduce impacts to less than significant.

- **NEPA Determination**: Project alternatives would not contribute to cumulatively considerable impacts on historical resources.
- **CEQA Determination**: Project alternatives would not contribute to cumulatively considerable impacts on historical resources.

3.5 Geology, Soils, and Sediment Quality

This section evaluates the project alternatives' potential effects related to erosion and sediment quality. Sediment-related impacts on water quality (e.g., turbidity, contaminant suspension) from dredging and placement activities are discussed in Section 3.7, Hydrology and Water Quality. Potential impacts associated with sediment quality on fisheries and other aquatic species are addressed in Section 3.3 Biological Resources.

3.5.1 Regulatory Setting

The following sections describe the regulatory framework applicable to potential Geology, soils, and sediment quality impacts from the alternatives.

3.5.1.1 Federal

Federal regulations applicable to potential Geology, soils, and sediment quality impacts from project alternatives are discussed below.

Clean Water Act

See sections 1.2.1.1 and 1.6.1.3 for discussion of the CWA, including previous and planned project permitting. Specific to geology, soils, and sediment quality, current guidance for implementing inland aquatic dredged material placement pursuant to CWA Section 404 is provided in Evaluation of Dredged Material Proposed for Disposal in Waters of the US – Testing Manual for Discharge in Inland and Near Coastal Water – Testing Manual (USACE and USEPA 1998), referred to as the ITM (see Section 1.2.2.2 for more discussion of sediment testing requirements) and Section 3.5.2.2 for characterization of sediments in the study area.

Operation and Maintenance of Army Corps of Engineers Civil Works Projects Involving the Discharge of Dredged or Fill Material into Waters of the US or Ocean Waters, 33 C.F.R. pt. 335-338

Section 1.6.1.1 describes the Operation and Maintenance of Army Corps of Engineers Civil Works Projects Involving the Discharge of Dredged or Fill Material into Waters of the US or Ocean Waters, 33 C.F.R. pt. 335-338. This regulation is relevant to Geology, Soils, and Sediment Quality, because it addresses requirements to manage the discharge of dredging materials into waters of the United States in accordance with other regulations, including CWA Section 404 and the CZMA.

Coastal Zone Management Act

The federal CZMA (16 U.S.C. § 1456), established in 1972, provides for management of the nation's coastal resources through a state and federal partnership. Under the federal consistency provisions of the CZMA, federal projects need to be consistent with the state's coastal zone management program and policies to the maximum extent practicable. This determination is made by the lead federal agency, and concurrence is requested from the state or local agency responsible for implementing the CZMA. For SF Bay, BCDC is the state's coastal zone management agency responsible for issuing concurrence with consistency determinations under the CZMA. The SF Bay Plan is BCDC's policy document specifying goals, objectives, and policies for BCDC jurisdictional areas. For portions of the study area outside of SF Bay, concurrence with consistency determinations is issued by the California Coastal Commission (CCC). USACE requests consistency determination concurrence from BCDC and/or CCCCCC prior to commencing dredging activities. In June 2019, USACE completed a consistency determination for the federal navigation maintenance dredging program in SF Bay for coverage under the CZMA from 2020 to 2024. Following public review of the Draft EA/EIR, USACE will submit a CZMA federal consistency determinations to BCDC and CCC.

Marine Protection, Resources, and Sanctuaries Act

The MPRSA (33 U.S.C. §§ 1401 et. seq), also known as the Ocean Dumping Act, was signed into law in 1972. This law regulates transportation of material from the United States, by federal agencies or US-flagged vessels for ocean disposal. The purpose of the act is to prevent degradation or endangerment of "human health, welfare, or amenities, or the marine environment, ecological systems, or economic potentialities." Section 102 of the MPRSA authorizes USEPA to establish criteria for evaluating all dredged material proposed for ocean dumping. USACE is identified under Section 103 of MPRSA as the

federal agency that determines whether to issue a permit authorizing ocean disposal of dredged materials based on USEPA's ocean-dumping criteria. Although USACE does not issue permits to itself, USACE and USEPA apply these standards to USACE projects.

3.5.1.2 State

State regulations applicable to potential Geology, soils, and sediment quality impacts from project alternatives are discussed below.

California Environmental Quality Act

CEQA and the CEQA Guidelines (PRC § 21000 et. seq.) require an analysis of the project's potential impacts on geology and soils, including fault rupture, ground shaking, ground failure (e.g., liquefaction), expansive soils, soil stability, unique paleontological resources, or unique geological features.

McAteer-Petris Act

See sections 1.2.1.1 and 1.6.2.2. for discussion of the McAteer-Petris Act and Bay Plan. These regulatory requirements guide dredging and sediment placement in SF Bay.

3.5.1.3 Dredged Material Management Office

As discussed in Section 1.2.2.1, the DMMO cooperatively reviews sediment quality sampling plans, analyzes the results of sediment quality sampling, and makes suitability determinations for material proposed for placement in SF Bay, ocean placement, and beneficial use. The DMMO promotes use of beneficial use sites in support of the LTMS goals of beneficial reuse of at least 40 percent of material dredged in the SF Bay region, no more than 40 percent placement at the SF-DODS, and no more than 20 percent placement at in-Bay sites.

Section 1.2.2.2 describes the DMMO testing requirements, which apply the most current version of the Guidelines for Implementing the ITM in the SF Bay Region (USACE 2001) when determining the dredged material testing that will be required for dredging projects proposing placement and/or disposal at designated sites in waters of the United States in SF Bay. These local guidelines supplement the more detailed information in the ITM and are not intended to be used on their own.

Although the DMMO provides initial review of permit applications and suitability recommendations, applicants must obtain separate approval from the appropriate DMMO member agencies (such as a CWA Act Section 401 WQC from the Regional Water Board); each agency issues permit conditions and specific requirements associated with how the project is to be performed. In February 2004, the 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 maintenance dredging projects. The Master SAP describes the way material should be collected, shipped, stored, handled, and tested for certain physical, chemical, and biological analyses. An updated Master SAP was approved by the DMMO in 2022.

3.5.2 Environmental Setting

3.5.2.1 Regional Geologic Setting

The topography of the SF Bay Area is shaped by geological structures, featuring north- to northwest-trending mountain ranges and valleys typical of the Coast Ranges geomorphic province. These ranges consist mainly of late Mesozoic (200 to 70 million years old) and Cenozoic (less than 70 million years old) sedimentary layers, with the northern Coast Ranges dominated by the Franciscan assemblage. SF Bay itself is a topographic depression created through faulting and warping, underlain by a down-dropped block known as the Bay block (Olson and Zoback 1998). This depression enables the San Joaquin and Sacramento rivers to flow into the ocean. The Bay stretches about 55 miles in length and is 3 to 5 miles wide, segmented into Suisun, San Pablo, Central, and South San Francisco bays.

Geologically, the Bay Area includes three main provinces: the Salinian block, the Franciscan complex, and the Great Valley sequence. The Salinian block, located west of the San Andreas Fault, is composed of granitic plutonic rocks similar to those of the Sierra Nevada, thought to be displaced sections of the Sierra Nevada Batholith. East of the San Andreas Fault, between it and the Hayward Fault, lies the Mesozoic Franciscan complex, consisting of oceanic crust fragments that accreted to North America through subduction and collision. This complex includes deep marine sandstone and shale, as well as chert and limestone. East of the Hayward Fault is the Great Valley sequence, composed mainly of Cretaceous and Tertiary marine sedimentary rocks.

The depression that forms SF Bay has been filled with sediments, sourced from erosion of surrounding hills and later marine deposits. For instance, "Bay Mud"—a marine clay-silt deposit—is widespread, lying several feet beneath newer mud layers. An ancient sand deposit, known as Merritt Sand, is found near the surface in areas like Oakland and Alameda. Natural peat deposits also underlie more recent sediments in parts of San Pablo Bay, Suisun Bay, and the Delta. The thickness of these historic sediment layers varies but can reach several hundred feet. The upper few feet typically consist of newer marine and riverine sediments. Sediments in the Estuary fall into three categories: sandy bottoms in channels, shell debris from oyster beds in the South Bay, and widespread Bay Mud in shallow waters. Coarser sediments, such as fine sand or gravel, dominate areas with strong currents, like the deeper channels of SF Bay and the Delta’s main rivers. In contrast, Bay Mud accumulates in areas with slower currents, such as the shallow edges of the subembayments (USACE et al. 1998).

The Estuary formed less than 10,000 years ago as global temperatures rose and sea levels increased. About 10,000 years ago, marine water returned to SF Bay, and by around 4,000 years ago, sea levels had reached their current elevation. This transition to estuarine conditions shifted sedimentation in the Bay from alluvial sands and silts to darker estuarine clays and silts, commonly known as Bay Mud, with sandier sediments becoming restricted to the channels.

Since around 1850, human activities have significantly altered SF Bay, affecting circulation and sedimentation patterns. From 1856 to 1900, hydraulic mining in the Sierra Nevada foothills deposited several feet of sediment across the Bay. In the 1800s, levee and dike construction modified drainage and seasonal flooding patterns in the Delta. Additionally, the placement of fill along the Bay’s edges has significantly changed the shoreline profile over time.

Environmental Setting and Environmental Analysis

Most of the surficial sediments in SF Bay have been deposited since the onset of industrialization in California, and may have been exposed to pollutants from human activity. These industrial age sediments are sometimes encountered during maintenance dredging. Recent sand deposits—whether from rivers in San Pablo and Suisun bays and the lower Sacramento River, or from sandbars formed by strong currents in Central SF Bay and the San Francisco Bar—may also be exposed to pollutants but generally do not accumulate high levels of contamination. Monitoring programs in the Bay have shown that industrialized areas around its edges tend to have higher average contaminant levels than the central basins (USACE et al. 1998).

Older deposits, formed before European settlement, whether of terrestrial or marine origin, tend to be hard-packed, low in moisture, low in organic carbon (except for peat deposits), and contain low levels of chemicals like heavy metals and organic compounds. These natural concentrations reflect the sediment type and are typically not disturbed during maintenance dredging (USACE et al. 1998).

Based on a query conducted by the California Department of Conservation at the request of the Regional Water Board, records indicate there are 36 known oil or gas wells located within the study area. Of the 36 wells, 20 are classified as “Not Abandoned to Current Division Requirements as Prescribed by Law and Not Projected to Be Built Over or Have Future Access Impeded by this project.” Sixteen wells are classified as “Abandoned to Current Division Requirements as Prescribed by Law and Not Projected to Be Built Over or Have Future Access Impeded by this project” (see Scoping Comments, Appendix F). These oil or gas wells have not been encountered during dredging and/or dredged material placement activities to date, and therefore are not further discussed or evaluated in this Draft EA/EIR.

3.5.2.2 Sediments in the Federal Navigation Channels

Sediment dredged from most of the federal navigation channels is typically characterized as Bay Mud, the exceptions being the San Francisco Harbor MSC, Suisun Bay Channel and New York Slough, and portions of Pinole Shoal Channel, which have historically been greater than 80 percent sand; the Southampton Shoal segment of the Richmond Outer Harbor is all sand. Sediments in all remaining channels (Richmond Harbor, San Rafael Creek, Oakland Harbor, Napa River, Petaluma River, Redwood City Harbor, and remaining portions of Pinole Shoal) contain less than 80 percent sand..

Contaminant concentrations in SF Bay are monitored by the SFEI via the RMP, which includes dischargers and dredgers. Contaminants may be introduced into the water column via adherence to suspended sediments, including smaller sediments such as silt, clay, and organic matter, although they are not often water soluble (USACE et al. 1998). As of 2022, the RMP sampling schedule includes the following (SFEI 2022, 2023):

- Continuous: Suspended sediment monitoring, and nutrient monitoring at 13 sites
- Monthly: Nutrients monitoring, including nitrogen, phosphorus, dissolved oxygen, and chlorophyll
- Every two years: Water quality monitoring
- Every five years: Sediment monitoring

The RMP is a coordinated and comprehensive long-term monitoring program with the goal of monitoring water and sediment quality to provide the scientific foundation for managing and improving the health of the SF Bay aquatic ecosystem. USACE is a participant in the RMP and contributes to the program by funding USGS in order to comply with a requirement in the Regional Water Board WDR/WQC (Regional Water Board 2020). The purpose of the monitoring is to measure suspended sediments at an array of locations in the Bay.

DMMO requirements for sediment testing conducted prior to each maintenance dredging episode are based on a tiered structure; they depend on the placement sites being considered and on past testing results. The DMMO tiered testing process is described in Section 1.2.2.2. Table 3-22 presents the DMMO-approved five-year sediment testing schedule through 2028 for the federal navigation channels in and around SF Bay. The schedule only includes channels that are dredged annually, not those dredged at less-frequent intervals. Assuming future sediment testing results are consistent with historic results, it is expected that the schedule represented in Table 3-22 would continue through the 2034 planning horizon for this project.

Recent sampling results are summarized for each of the federal navigation projects below. Results are reported with respect to whether they were determined to be suitable for deposition at the placement site(s) being considered that year.

The summary for each federal navigation project below only presents the most recent results for the baseline evaluation period (2015 through 2024) based on analysis conducted for placement sites USACE was considering for the year reported. Table 1-1 in Chapter 1 provides a review of the type of dredge equipment commonly used, the dredging cycle (i.e., frequency of dredging), the last fiscal year the project was dredged, and the historic dredged material placement site for each navigation project, which includes additional sites for which dredged material from each navigation project has been found suitable for placement.

Oakland Harbor

The Tier I evaluation for the Oakland Inner and Outer Harbors channels in 2024 indicated that dredged material from these channels was suitable for placement at in-Bay placement sites, SF-DODS, and for placement at beneficial use sites as cover material, including Cullinan Ranch. Based on the 2022 sediment testing, dredged material from Oakland Harbor ranges from 70 to 90 percent sand with some areas containing as low as 15 percent sands content. The remainder of the sediment is composed of silts and clays.

Table 3-22. 2025–2030 Annual Sampling and Testing Schedule for Federal Navigation Channels Maintained by USACE

Channel	2025	2026	2027	2028	2029	2030
Oakland: Inner and Outer Harbor[1]	Tier I (No testing)	Tier I (No testing)	Tier III, MET (5-year cycle)	Tier I (No testing)	Tier I (No testing)	Tier I (No testing)
Redwood City[1]	Tier I (No testing)	Tier III, MET (3-year cycle, depending on dredging cycle)	Tier I (No testing)	Tier I (No testing)	Tier III, MET (3-year cycle, depending on dredging cycle)	Tier I (No testing)
Richmond Inner Harbor[1]	Tier III, MET (3-year cycle)	Tier I (No testing)	Tier I (No testing)	Tier III, MET (3-year cycle)	Tier I (No testing)	Tier I (No testing)
Richmond Outer Harbor[1]	Tier I (No testing, if planned to be dredged)	Tier I (No testing, if planned to be dredged)	Tier III, MET	Tier I (No testing, if planned to be dredged)	Tier I (No testing, if planned to be dredged)	Tier I (No testing, if planned to be dredged)
San Francisco Harbor: Main Ship Channel	Tier I (No testing)	Confirmatory Grain-Size Analysis (8-year cycle)	Tier I (No testing)	Tier I (No testing)	Tier I (No testing)	Tier I (No testing)
San Pablo Bay (Pinole Shoal) and Mare Island Strait*	Grain-Size Verification/ Tier III, MET (3-year cycle)	Tier I (No testing, if planned to be dredged)	Tier I (No testing, if planned to be dredged)	Tier I (No testing, if planned to be dredged)	Grain-Size Verification/ Tier III, MET (3-year cycle)	Tier I (No testing)
Suisun Bay Channel[1] (Suisun, NY Slough, Bulls Head)	Tier I (No testing)	Tier I (No testing)	Tier I (No testing)	Confirmatory Grain-Size Analysis (5-year cycle)	Tier I (No testing)	Tier I (No testing)
Napa River	TBD	TBD	TBD	TBD	TBD	TBD
San Rafael	TBD	TBD	TBD	TBD	TBD	TBD

[1] These projects have potential placement at upland wetland restoration projects. If placement at a wetland restoration project is being proposed, then the sediments shall be analyzed for the constituents required by those projects' permits.

Notes: Tier III = Physical/Chemical Analysis, Benthic and Water Column Toxicity Tests and Bioaccumulation when necessary ITM or OTM requirements will be determined based on placement locations.
Confirmatory Grain-Size Analysis = Physical Analysis (grain size, total organic carbon, and total solids)

Key: MET = Modified Elutriate Test
TBD = to be determined

Redwood City Harbor: Channels

The Tier I evaluation for Redwood City Harbor channels in 2024 indicated that all dredged material from these channels was suitable for disposal at SF-DODS. In addition, sediment proposed for dredging from Sample Areas 1 and 2 is suitable for placement at MWRP as cover material and for use in the Section 1122 Strategic Placement Project. Sediment proposed for dredging from Sample Areas 3 through 9 is suitable for placement at MWRP as foundation material and sediment from Sample Areas 1 through 5 is suitable for placement at Cullinan Ranch and for placement at an in-Bay placement site.

The above suitability determination was based on Tier III analysis efforts conducted in 2023. This analysis also showed that the sediment in Redwood City Harbor channels is composed of 86 to 99 percent fines and less than 15 percent sand (USACE 2024d).

Redwood City Harbor: San Bruno Shoal

Testing of San Bruno Shoal took place in 2016 and showed that the sediment was suitable for unconfined aquatic placement at SF-10 and SF-11.

Richmond Harbor

The Tier I evaluation for Richmond Inner Harbor in 2024 indicated that dredged material from these channels was suitable for placement at SF-DODS and all in-Bay sites (USACE 2024b). In addition to the above site, material from Sampling Areas 1 through 4 was determined to be suitable for placement as cover material at MWRP and Cullinan Ranch, and material from Sampling Areas 5 and 6 was determined to be suitable for placement as foundation material at MWRP. Based on the 2021 sediment testing, dredged material from Richmond Inner Harbor ranges from 65 to 95 percent fines with the remainder being sand.

The Tier III evaluation for Richmond Outer Harbor in 2021 indicated that dredged material from these channels was suitable for unconfined aquatic placement at in-Bay sites, SF-DODS, and for placement as cover material at MWRP. Based on 2024 sediment testing, dredged material from Richmond Outer Harbor is varied; its sand composition ranges from 8 to 93, with the remainder being fines.

San Francisco Harbor

Sediment from San Francisco Harbor MSC has historically been granted a Tier I exemption because it is predominantly composed of sand, gravel, or rock. Based on 2010 and 2018 grain-size analysis, the sediment at the San Francisco Harbor MSC is composed of 96 to 97 percent sand. The total organic carbon levels in composite samples (a total of two composites) ranged from 1.0 percent to 1.3 percent for samples collected in 2018, which is considered low and in the highly suitable range for BUDM. Throughout the years that San Francisco Harbor MSC has been tested for maintenance dredging purposes, the sediment has been determined to be suitable for unconfined aquatic placement at SF-17 and SF-8.

Sediment sampling by USGS in 2010 indicated that the mean grain size in most of the San Francisco Bight (i.e., coastal and offshore area) falls in the fine-sand range (0.125 to 0.250 mm) with fine to medium sand (0.250 to 0.500 mm) occurring along Ocean Beach and on the inner part of the bar. Coarse sand (0.500 to 1.000 mm) was restricted to areas closest to the Golden Gate, where strong tidal currents effectively wash away finer sand. The physical characteristics of material dredged from the San Francisco Harbor MSC are generally compatible with the sand in the Ocean Beach nearshore environment (USACE 2013a).

San Pablo/Mare Island Strait

Tier 1 evaluation in 2023 of the Pinole Shoal determined that its sediments were suitable for unconfined aquatic placement at SF-9, SF-10, and SF-8. Tier III testing last occurred in 2021 and showed that sediment at Pinole Shoal is composed of 85 to 99 percent sands and gravel, with the remainder being fines.

Suisun Bay Channel and New York Slough

Tier I evaluation for Suisun Bay and New York Slough in 2024 showed that the sediment is suitable for unconfined aquatic placement at an in-Bay placement site such as SF-16 and SF-9, and for placement as cover material at upland/beneficial use sites. Grain-size testing in 2023 showed sediment ranges between 90 and 98 percent sand.

Napa River

Testing of the Napa River took place in 2022; all sediments were determined to be suitable for placement at permitted upland sites such as the Imola Avenue, South Coombs, and South Jefferson sites. In addition, sediment proposed for dredging from Sample Areas 1, 2, and 4 is suitable for placement at MWRP as foundation material and sediment from Sample Area 3 is suitable for placement at SF-9. Grain-size testing in 2022 shows that sands and gravel make up 98 percent of the sediment composition.

Petaluma River

Testing of the Petaluma River took place in June 2024. Sediments at the Upper Channel and Across the Flats were deemed suitable for unconfined aquatic placement at in-Bay site and for upland placement at Cullinan Ranch. A new determination of suitability for 2025 is expected to be released by the end of October 2024. Based on the 2024 testing, the sediment is composed of near 100 percent fines expect for sample areas 4 and 6 where the percent fines is 32-37.

San Rafael Creek

In 2021, sampling and testing sediment at San Rafael creek showed that sediment downstream of Station 168+00 is suitable for placement at in-Bay placement site SF-DODS, and for placement as cover material at MWRP. Sediment upstream of Station 168+00 is suitable for placement at SF-DODS due to potential contamination resulting from upstream construction activities. Based on 2022, sediment is composed of 73 to 93 percent fines.

3.5.3 Methodology and Thresholds of Significance

The project alternatives neither propose construction of new structures nor introduce elements that would increase potential risks related to rupture of a known earthquake fault; seismic shaking; or seismic-related ground failure, including liquefaction; or landsides. Similarly, because channels would be dredged to previously maintained depths, the project alternatives would not involve activities that would cause geologic units or soils to become unstable and potentially result in onsite or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse. This excludes minor erosion of the channel sides from sloughing that may occur after the channels are dredged. Placement of dredged material at existing permitted placement sites would not be expected to result in onsite or offsite landslides, lateral spreading, subsidence, liquefaction, or collapse because the placement of dredged material at these sites is managed and monitored to avoid such impacts. Because the project alternatives would have no potential impacts related to seismic risks or unstable geologic resources, these topics are not further addressed in this section. Additionally, as described in Section 3.1.1, because the Proposed Project would not result in adverse impact on minerals, this resource is not evaluated further in this Draft EA/EIR.

Therefore, the analysis considers whether the Proposed Project would result in any of the following:

- Substantial soil erosion
- Substantial degradation of sediment quality (i.e., substantially increase sediment contaminant concentrations above ambient conditions)
- Substantial sediment mounding

The alternatives present a range of dredged and placed sediment volumes for each alternative. In any given year, the average volume of dredge sediment could range from 2.13 million CY to 2.73 million CY. Therefore, the maximum amount of dredged sediment that could occur in one year is 2.73 million CY for all alternatives except the No Project Alternative. In the No Project Alternative, the maximum amount of dredged sediment that could occur in one year is 2.815 million CY due to increased volume at Richmond Outer Harbor. This represents a scenario where all channels are dredged within the same year and will be used to conduct the impact analysis.

3.5.4 Impacts and Mitigation Measures

3.5.4.1 Impact GE-1: Potential for Dredging, Transport, and Placement Activities to Result in Substantial Soil Erosion

No Action Alternative/No Project Alternative

The act of dredging removes sediment in the channels that has accumulated since the prior dredging event. The design dimensions of the channels are intended to preclude sloughing of the channel sides. Although the alternatives may result in minimal erosion of the channel sides from sloughing after they are dredged due to the disturbance of sediments, historic patterns of erosion and sediment accumulation would not be expected to change due to the act of the dredging under the No Action Alternative/No Project Alternative. Transport of dredged material would not disturb sediments, and therefore would not result in any erosion impacts.

Environmental Setting and Environmental Analysis

The potential for erosion impacts at and adjacent to the placement sites due to placement activities would be minimal. With the exception of SF-DODS, all of the other open-water placement sites, both inside and outside SF Bay, are considered dispersive (USACE et al. 1998). Therefore, although sediments placed at in-Bay locations may disperse, they would not be expected to erode beyond their original bed elevation. The disposition of dredged material at beneficial use and upland placement sites is managed by site operators so that substantial erosion impacts do not occur. Furthermore, at beneficial use sites, placement of dredged material would have beneficial impacts on soil resources by providing sediments needed to implement the site-specific intended beneficial use (e.g., habitat restoration, flood protection).

Additional potential beneficial impacts would result from the placement of dredged material at Ocean Beach Nearshore Placement Site (SF-17), which includes the Ocean Beach demonstration site and Ocean Beach itself. Sand placed in SF-17 is expected to stay in the nearshore, slowly moving shoreward while dispersing, and creating shallower depths. This scenario could lead to a slowing of bluff erosion as more wave energy is dissipated further offshore. Also, having a larger volume of sand at or inside the breaker zone (i.e., where wave and tidal currents can drive shore-normal and shore-parallel sand transport) is expected to extend the length of time sand remains on the beach. This is because each storm has the potential to erode a given volume of sand from the nearshore, beach, and bluffs; therefore, having more sand in the nearshore would likely result in a smaller cross-shore transport potential for beach erosion and bluff failure (USACE 2013a).

Newly placed sand at both SF-17 and the Ocean Beach nourishment site would immediately start dispersing. Post-placement surveys show that the elevation of the mound above the pre-placement bottom decreases by 1 to 2 feet in the year between placements. Consequently, placement of additional sand in the littoral zone would temporarily change existing erosion and accretion patterns offshore and along the beaches of Ocean Beach. However, those changes are not expected to be significant given the small placement footprint. Overall, the purpose of placement at SF-17 and Ocean Beach is to alleviate the beach erosion occurring along Ocean Beach by having more sand in the littoral system off the stretch of Ocean Beach south of Sloat Boulevard. The changes to erosion and accretion patterns from both options are considered to be temporary and not significant (USACE 2013a), and would be outweighed by the beneficial effects on shoreline stabilization.

Potential impacts and benefits of placing sediment at the alternative beneficial use sites listed in Section 1.5.2.2 would be similar to the current beneficial use sites and SF-17.

Under the No Action Alternative/No Project Alternative, a majority of the dredged sediment, approximately 83 percent, is placed at in-Bay sites and SF (SF-DODS), and 12 percent of the sediment is for BUDM. Wetland restoration and nature-based SLR adaption adaptation solutions, which are critical to ensure SLR and ecological resiliency for SF Bay, often require large amounts of suitable sediment. By maintaining the BUDM to 12 percent of total dredge sediment volume under these alternatives, the progress of restoration projects requiring suitable sediment may be delayed or limited. Furthermore, 48 percent of the dredged sediment is placed at SF-DODS, and therefore removed from the SF Bay sediment system. Based on a recent study conducted by SFEI, sediment/sand budgets in SF Bay for 2001 to 2021 showed net outflows of total sediment (4.0 million tons per year) exceeded net inflows (2.0 million tons per year) resulting in a net bed loss of 2.0 million tons per year (Battalio et al. 2024;

McKee et al. 2023). Sediment placement at (SF-DODS) contributes to the overall net loss of sediment from SF Bay and may lead to erosion of the Bay floor and shoreline, reduced availability of sediment for restoration projects, and overall reduction in the long-term resiliency of the SF Bay ecosystem.

- **NEPA Determination:** Under the No Action Alternative/No Project Alternative, erosion impacts would be minimal. While the removal of dredged sediment from the system may contribute to a net sediment loss in SF Bay, the impact this has on overall erosion in SF Bay is minimal. The placement of dredged material at beneficial use sites would have beneficial impacts on soil resources. The overall potential impact for dredging, transport, and placement activities to result in substantial soil erosion is less than significant.
- **CEQA Determination:** Under the No Action Alternative/No Project Alternative, erosion impacts would be minimal. While the removal of dredged sediment from the system may contribute to a net sediment loss in SF Bay, the impact this has on overall erosion in SF Bay is minimal. The placement of dredged material at beneficial use sites would have beneficial impacts on soil resources. The overall potential impact for dredging, transport, and placement activities to result in substantial soil erosion is less than significant.

Alternatives 1 through 4

Alternatives 1 to 4 experience the same degree of erosion impacts in and adjacent to the channels and placement sites as the No Action Alternative/No Project Alternative. Likewise, these alternatives experience the same beneficial impacts of placing sediment at SF-17 and the Ocean Beach nourishment site as the No Action Alternative/No Project Alternative.

Under Alternatives 1 through 4, the amount of dredged sediment placed at SF-DODS is greatly reduced and accounts for 0 to 35 percent of total dredged sediment, which reduces the overall net loss of sediment from SF Bay. These alternatives also increase the amount of sediment placed at upland direct placement sites and thus facilitate the creation and/or restoration wetland habitats along and around SF Bay by providing suitable soil material.

- **NEPA Determination:** Under Alternatives 1 through 4, erosion impacts would minimal. The increased placement of dredged material at beneficial use sites would have beneficial impacts on soil resources. The overall potential impact for dredging, transport, and placement activities to result in substantial soil erosion is less than significant.
- **CEQA Determination:** Under Alternatives 1 through 4, erosion impacts would minimal. The increased placement of dredged material at beneficial use sites would have beneficial impacts on soil resources. The overall potential impact for dredging, transport, and placement activities to result in substantial soil erosion is less than significant.

3.5.4.2 Impact GE-2: Potential for Dredging, Transport, and Placement Activities to Substantially Degrade Sediment Quality

No Action Alternative/No Project Alternative, Alternatives 1 Through 4

Generally, based on historic sediment testing data, dredged material from the federal navigation channels has been determined suitable for placement at the existing and proposed potential alternate placement sites identified for each channel in Chapter 2. Over time, some isolated areas in or adjacent to the channels have been identified as containing sediment that is NUAD. USACE would continue to avoid dredging the areas (e.g., portions of the Richmond Harbor federal channel adjacent to the United Heckathorn Superfund Site) that it has been able to avoid dredging in the past. Under all the alternatives, USACE would continue to conduct testing following guidelines in the Master Sampling and Analysis Plan, OTM, ITM, UTM, and the Guidelines for Implementing the ITM in the SF Bay Region; obtain suitability determinations from the DMMO for the placement of dredged material; and conduct placement in accordance with the LTMS goals to ensure BUDM, as appropriate and feasible. If future testing identifies NUAD material that must be dredged, all NUAD dredged material would be placed at upland sites, and in some cases MWRP, as determined during DMMO review. Conformance with the above processes would ensure that dredged material placement activities would not substantially degrade sediment quality at the placement sites.

USACE would also implement sediment bioaccumulation testing as detailed in the Agreement on Programmatic EFH Conservation Measures for Maintenance Dredging Conducted Under the LTMS Program (USACE and USEPA 2011). Per this agreement, if residual layer contamination that would be exposed after maintenance dredging is greater than that in the overlying sediment and exceeds the bioaccumulation trigger values established in the agreement, the need for potential management actions to address the residual contamination would be addressed on a case-by-case basis. Because the LTMS program does not include a remediation component, if substantially elevated concentrations of contaminants in sediment are found during testing conducted prior to dredging, the area of contamination would not be dredged and LTMS agencies would typically refer the project to toxic cleanup programs for further investigation.

Potential impacts and benefits of placing sediment at the alternative beneficial use sites listed in Section 01.5.2.2 would be similar to those at the current beneficial use sites.

- **NEPA Determination:** Under all alternatives, impacts on sediment quality would be less than significant.
- **CEQA Determination:** Under all alternatives, impacts on sediment quality would be less than significant.

3.5.4.3 Impact GE-3: Potential for Dredging, Transport, and Placement Activities to Result in Substantial In-Bay Sediment Mounding

No Action Alternative/No Project Alternative, Alternatives 1 Through 4

Based on the maximum amount of dredged sediment within one year, which assumes that all channels are dredged in one year, the sediment volumes placed at in-Bay sites by USACE dredging activities under each alternative are shown in Table 3-23. The maximum and average amount of sediment placed at each in-Bay site per year, over the 10-year dredging cycle, was calculated based on the placement locations and volumes shown in Tables 2-4, 2-6, 2-8, 2-10, 2-14 and 2-14, and is shown in Table 3-24.

Table 3-23. Annual Sediment Volume Placed at All In-Bay Sites Under Each Alternative

Alternative	Minimum in-Bay Placement (CY)	Average in-Bay Placement (CY)	Maximum in-Bay Placement (CY)
No Action	819,000	955,500	1,092,000
No Project	843,000	983,500	1,124,000
Alternative 1	955,500	1,146,600	1,501,500
Alternative 2	1,365,000	1,528,800	1,638,000
Alternative 3	955,500	1,092,000	1,228,500
Alternative 4	0	163,800	273,000

Key: CY = cubic yard

Table 3-24. Annual Sediment Volume Placed at Each In-Bay Site Under Each Alternative

Alternative		SF-9 (CY)	SF-10 (CY)	SF-11 (CY)	SF-16 (CY)
No Action	Maximum	0	190,000	700,000	170,000
	Average	0	112,500	367,000	170,000
No Project	Maximum	0	190,000	700,000	170,000
	Average	0	112,500	367,000	170,000
Alternative 1	Maximum	0	190,000	860,000	170,000
	Average	0	112,500	536,500	170,000
Alternative 2	Maximum	310,000	320,000	840,000	130,000
	Average	118,000	142,500	705,500	130,000
Alternative 3	Maximum	250,000	300,000	500,000	130,000
	Average	104,000	135,000	390,500	130,000
Alternative 4	Maximum	0	70,000	0	130,000
	Average	0	17,500	0	130,000

Key: CY = cubic yard
SF-9 Carquinez Strait placement site
SF-10 San Pablo Bay placement site
SF-11 Alcatraz Island placement site
SF-16 Suisun Bay placement site

Environmental Setting and Environmental Analysis

As noted in Section 1.2.1.1, the LTMS has a capacity goal of 1.25 million CY per year for placed sediment at all in-Bay sites. This total in-Bay placement capacity goal is measured by the LTMS as a blocked three-year average (DMMO 2022). This capacity includes placed sediment from all projects, including small (non-USACE) dredging projects. Small dredgers can account for up to 250,000 CY of sediment per year, though typically are less than 200,000 CY per year. The LTMS now requires medium dredgers to conduct an Integrated Alternatives Analysis and dispose of less than 20 percent of their sediment at in-Bay locations. The LTMS also sets limits for each in-Bay site as shown in Table 3-25. The total in-Bay and site-specific placement goals are set prevent mounding of sediments, limit impacts on fisheries and reduce potential navigational hazards at each site.

Table 3-25. Placement Limits for In-Bay Site

Placement Sites	Annual Capacity (CY)	Monthly Capacity (CY)
SF-9	2,000,000	1,000,000
SF-10	500,000	500,000
SF-11	4,000,000	300,000 (May–Sept) 400,000 (Oct–April)
SF-16	200,000	-
Total in-Bay	**1,250,000[1,2]**	**-**

[1] Calculated as the average of the most recent three years of in-Bay placement volumes
[2] This value does not account for a 250,000 CY contingency volume

Key: CY = cubic yard
SF-9 = Carquinez Strait placement site
SF-10 = San Pablo Bay placement site
SF-11 = Alcatraz Island placement site
SF-16 = Suisun Bay placement site

Assuming an allowance of 200,000 CY for small dredgers, the maximum in-Bay placement would have to be less than 1.05 million CY to remain under the in-Bay placement capacity goal of 1.25 million CY. In-Bay monthly and annual site capacities were considered in the development of the alternatives and none of the alternatives would place more sediment at the in-Bay sites than their current capacities, as shown in Table 3-25, despite the potential for the total in-Bay capacity goal of 1.25 million CY being exceeded. The No Action Alternative/No Project Alternative, and Alternatives 1 to 3 include potential maximum in-Bay placement to be greater than 1.05 million CY and, therefore, have the potential to exceed the in-Bay placement capacity goal. However, none of the alternatives exceed the capacity limits for the specific placement sites. Alternatives 1 and 2 have the most potential amount of in-Bay sediment placement in comparison to the other alternatives.

Between 1970-1990, large volumes of sediment were placed at SF-11 with the expectation that it would disperse. However, in 1982, a large mound of sediment was discovered at the site, prompting the need for site placement limits. Placement volumes during this time ranged from 1 to 3 million CY per year. Since 2010, placement volumes at SF-11 have been significantly lower, ranging from 75,000 CY to 540,000 CY per year. Alternative 1, which has the largest potential annual volume placed at SF-11, at 860,000 CY, is only 220,000 CY more than the maximum amount placed at SF-11 over the last 20 years,

and well below the volumes placed between 1970 and 1990 that resulted in mounding at SF-11. It is unlikely that the extra sediment volume for in-Bay placement under alternatives would create mounding impacts because the historic sediment mounding issues at SF-11 were correlated to substantially more in-Bay sediment placement volumes that than the potential volumes under alternatives.

In-Bay placement sites are generally dispersive, and sediment will migrate over time (USACE et al. 1998). When considering mounding impacts, it is important to consider the time scale at which impacts are evaluated. Short-term navigation impacts may occur until the sediment naturally disperses. A recent study conducted by SFEI on SF Bay sediment/sand budgets for 2001 to 2021 (Battalio et al. 2024; McKee et al. 2023) showed that net outflows of total sediment (4.0 million tons per year) exceeded net inflows (2.0 million tons per year) resulting in a net bed loss of 2.0 million tons per year. Therefore, more sediment is leaving SF Bay than is entering, and the Bay is losing sediment every year. This implies that sediment in SF Bay is generally dispersive and will find a means for transport out of SF Bay.

Based on these conditions and continued future constraints on in-Bay placement volume to their current site capacities, there would not be a significant increase in mounding or creation of a new navigation hazard compared to the CEQA and NEPA baseline.

- **NEPA Determination:** Under all alternatives, impacts related to potential for dredging, transport, and placement activities to result in substantial in-Bay sediment mounding would be less than significant.
- **CEQA Determination** Under all alternatives, impacts related to potential for dredging, transport, and placement activities to result in substantial in-Bay sediment mounding would be less than significant.

3.5.4.4 Impact GE-4: Potential for Dredging, Transport, and Placement Activities to Result in Cumulative Impacts on Soil Erosion, Sediment Quality and Sediment Mounding

No Action Alternative/No Project Alternative, Alternatives 1 Through 4

All alternatives would create less than significant impacts if implemented. When considering the other regional projects in Table 3-2, cumulative impacts on soil erosion, sediment quality, and sediment mounding would be minimal and short-term. Non-federal dredging is small compared to the volumes dredged and disposed for this project, such that their relative impact on soil erosion, sediment quality, and sediment mounding would also be small compared to project alternatives. The LTMS also allocates up to 250,000 CY of sediment per year for small dredgers in its in-Bay sediment placement limit, though generally small dredgers account for less than 200,000 CY per year. Additionally, these other regional projects would be compliant with permitting processes and requirements as required by law and with the necessary measures to mitigate geology soils and sediment quality impacts. The combined cumulative impacts of the alternatives and the other projects on soil erosion, sediment quality, and sediment mounding would not be significant.

- **NEPA Determination:** Project alternatives would not contribute to cumulatively considerable impacts on soil erosion, sediment quality, and sediment mounding.
- **CEQA Determination:** Project alternatives would not contribute to cumulatively considerable impacts on soil erosion, sediment quality, and sediment mounding.

3.6 Hazards and Hazardous Materials

This section describes the existing conditions for hazards including emergency planning and hazardous materials in the SF Bay region, and evaluates the potential hazard and hazardous materials impacts related to human health. Potential hazardous material impacts on sediments are addressed in Section 3.5 Geology, Soils, and Sediment Quality. Potential hazardous material impacts on water quality are addressed in Section 3.7, Hydrology and Water Quality. Hazards related to marine navigation are evaluated in Chapter 3.9 Transportation and Traffic.

3.6.1 Regulatory Setting

The following sections describe the regulatory framework applicable to potential hazards and hazardous materials impacts from the alternatives.

3.6.1.1 Federal

Federal regulations applicable to hazards and hazardous materials are discussed in the sections below.

Rivers and Harbors Act

The Rivers and Harbors Act of 1899 (33 U.S.C. § 401 et seq.) was the first federal water pollution act in the United States. This act addressed construction of structures in navigable waters, with a focus on protecting navigation, protecting waters from pollution; this act was a precursor to the CWA of 1972. Section 10 of the Rivers and Harbors Act of 1899 regulates creation of obstructions in navigable waters of the United States. USACE is not required to permit itself for projects sponsored and executed by USACE.

Oil Pollution Act

The Oil Pollution Act (OPA) (Title 33 U.S.C. §§ 2701 et seq.) establishes a liability system for oil spills into navigable waters or adjacent shorelines that injure or are likely to injure natural resources, and/or the services that those resources provide to the ecosystem or humans. Pursuant to the OPA, federal and state agencies and Indian tribes may act as trustees on behalf of the public to assess the injuries, scale restoration to compensate for those injuries, and implement restoration.

Various Oil or Hazardous Material Pollution Prevention Regulations for Vessels

This section addresses regulations related to oil and hazardous material pollution prevention regulations for vessels, including 3 U.S.C. 301 through 303; 33 U.S.C. 1321(j), 1903(b), 2735; 46 U.S.C. 70011; 46 U.S.C. 70034; EO 12777 (56 FR 54757, 3 C.F.R, 1991 Comp., p. 351); DHS Delegation No. 00170.1, Revision No. 01.3. Section 155.1020 also issued under Section 316 of Pub. L. 114-120. Section 155.480 also issued under Section 4110(b) of Pub. L. 101-380.

To operate in US waters and ports, applicable vessels regulated by USCG are required to provide a Vessel Response Plan to the USCG for review and approval. A Vessel Response Plan serves as an oil spill response plan for vessels and would include, at a minimum, a contact list, including the spill removal contractor and contacts for spill notifications; procedures for spill notifications; shipboard spill mitigation procedures to mitigate or prevent discharge or threat of discharge resulting from operations, accidents, or emergencies; and shore-based response activities, including notification, coordination actions, and organization structure for response. A Vessel Response Plan would be consistent with both the National Oil and Hazardous Substances Pollution Contingency Plan and the California Office of Spill Prevention and Response's Area Contingency Plan.

Clean Water Act Section 303(d)

Under Section 303(d) of the CWA, Impaired Water Bodies and Total Maximum Daily Loads (TMDL) (33 U.S.C. § 303(d)), each state is required to identify those waters within its boundaries for which effluent limits required by Section 301 are not stringent enough to meet water quality standards. The state must establish priority rankings for these waters and develop TMDLs to maintain beneficial uses and improve water quality. Seasonal variations in loading and a margin of safety are considered when TMDLs are established. In California, the State Water Resources Control Board (State Water Board) and Regional Water Quality Control Boards prepare the CWA Section 303(d) List of Water Quality Limited Segments Requiring TMDLs.

SF Bay is listed as impaired for pesticides (e.g., chlordane, DDT, dieldrin, dioxin, and furan compounds), mercury, invasive species, PCBs, selenium, and trash. In the greater SF Bay Area, Suisun Bay and San Pablo Bay are listed for these same parameters, except for trash. The Napa River is listed as impaired for pathogens and sedimentation/siltation. The tidal portion of the Petaluma River is listed as impaired for diazinon, nutrients, pathogens, and nickel.

Clean Water Act Section 401

See Section 1.6.1.3 for discussion of the CWA Section 401, including previous and planned project permitting. Section 401 of the CWA certifications must include effluent or other limitations to ensure compliance with applicable sections of the CWA and state law, including those related to hazardous material discharges.

Clean Water Act Section 402

The 1972 amendments to the CWA established the National Pollutant Discharge Elimination System (NPDES) permit program to control discharges of pollutants from point sources. The 1987 amendments to the CWA created a new section of the CWA devoted specifically to stormwater permitting (Section 402[p]), NPDES, 33 U.S.C. § 1342). USEPA has delegated administering and enforcing the provisions of CWA and NPDES to the State of California. NPDES is the primary federal program that regulates point-source and non-point-source discharges to waters of the United States. Projects disturbing areas 1 acre or greater in size are effectively prohibited unless the discharge complies with a NPDES permit. State Water Board Order No. 2022-0057, NPDES General Permit No. CAS000002, General Permit for

Stormwater Discharges Associated with Construction Activity (Construction General Permit), is the active general stormwater construction activity permit for the State of California and RWQCB.

Emergency Planning and Community Right-to-Know Act

The Emergency Planning and Community Right-to-Know Act of 1986 (also known as Title III of the Superfund Amendments and Reauthorization Act), 42 U.S.C. §§ 9601 et. seq, imposes requirements to ensure that hazardous materials are properly handled, used, stored, and disposed of, and to prevent or mitigate injury to human health or the environment if such materials are accidentally released.

Resource Conservation and Recovery Act

Under the Resource Conservation and Recovery Act of 1976 (RCRA) (40 C.F.R. §§ 239-282), USEPA regulates the generation, transportation, treatment, storage, and disposal of hazardous waste from "cradle to grave." Transportation of hazardous materials and hazardous waste is carried out by individuals or entities that move hazardous materials and waste from one site to another by highway, rail, water, or air (40 C.F.R. § 260.10).

Hazardous and Solid Waste Amendments

The 1984 RCRA Hazardous and Solid Waste Amendments (42 U.S.C. §§ 6901 et seq.) affirmed and extended the "cradle to grave" system of regulating hazardous wastes. The amendments specifically prohibit the use of certain techniques for the disposal of some hazardous wastes.

Hazardous Materials Transportation

Under the Hazardous Materials Transportation Act of 1975 (49 C.F.R.), the USDOT has the regulatory responsibility for the safe transportation of hazardous materials. The USDOT regulations govern all means of transportation except packages shipped by mail.

Occupational Safety and Health Act

The Occupational Safety and Health Act of 1970 (29 C.F.R. § 1910) created the Occupational Safety and Health Administration (OSHA), which sets standards for safe workplaces and work practices, including the reporting of accidents and occupational injuries.

3.6.1.2 State

State regulations applicable to hazards and hazardous materials are discussed in the following sections.

Lempert-Keene-Seastrand Oil Spill Prevention and Response Act

The Lempert-Keene-Seastrand Oil Spill Prevention and Response Act (California Government Code Title 2, Division 1, Chapter 7, Article 3.5) was passed in 1990 following the 1989 Exxon Valdez oil spill in the waters off Alaska and the 1990 American Trader oil spill offshore Orange County, California. The act sets forth a comprehensive oil spill prevention and response program that requires all marine facilities and vessels to comply with an integrated system of statewide regulations, operation manuals,

inspections, training, and drill programs to provide the “best achievable protection” of the state’s coastal and marine resources through the use of “best achievable technologies” and practices.

Unified Hazardous Waste and Hazardous Materials Management Regulatory Program

In January 1996, CalEPA adopted regulations that implemented a Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (Unified Program), Certified Unified Program Agency (CUPA), and California Health and Safety Code Sections 25404 et seq. at the local level. The agency responsible for implementation of the Unified Program is called CUPA. The Unified Program consists of six environmental and safety programs: the hazardous materials business plan (HMBP) program, the underground storage tank program, the hazardous waste generator program, the tiered permitting program for onsite treatment of hazardous waste and the California accidental release prevention program for highly hazardous materials.

California Hazardous Materials Release Response Plan and Inventory Law

The California Hazardous Materials Release Response Plan and Inventory Law of 1985 (Business Plan Act), California Health and Safety Code, Div. 20, Chapter 6.95, requires that businesses that store hazardous materials onsite prepare an HMBP and submit it to the local CUPA.

California Hazardous Waste Control Act, California Health and Safety Code

The California Hazardous Waste Control Act (Division 20, Chapter 6.5, Article 2, Section 25100 et seq.) regulates the generation, transportation, treatment, storage, and disposal of hazardous waste in California. The hazardous waste regulations establish criteria for identifying, packaging, and labeling hazardous wastes; dictate the management of hazardous waste; establish permit requirements for hazardous waste treatment, storage, disposal, and transportation; and identify hazardous wastes that cannot be disposed of in landfills. DTSC is also the administering agency for the California Hazardous Substance Account Act, also known as the State Superfund law, which provides for the investigation and remediation of hazardous substances pursuant to state law.

Hazardous Waste Transportation

The Hazardous Waste Transportation (Titles 13, 22, and 26 of the California Code of Regulations) regulates the transportation of hazardous waste originating in and passing through the state, including requirements for shipping, containers, and labeling.

Hazardous Materials Transportation Emergency Response

Caltrans and the California Highway Patrol have primary responsibility for enforcing federal and state regulations on California’s roadways and responding to hazardous materials transportation emergencies.

Occupational Safety and Health Administration, California Code of Regulations Title 8

Under California Code of Regulations Title 8, the California Division of Occupational Safety and Health (Cal/OSHA) has primary responsibility for developing and enforcing workplace safety regulations in California. Because California has a federally approved OSHA program, it is required to adopt regulations that are at least as stringent as those found in Title 29 of the C.F.R. Cal/OSHA standards are generally more stringent than federal regulations. The use of hazardous materials in the workplace requires employee safety training, safety equipment, accident and illness prevention programs, hazardous substance exposure warnings, and emergency action and fire prevention plan preparation.

3.6.2 Environmental Setting

3.6.2.1 Study Area

Three hazard sites in the study area were identified and discussed in the 2015 EA/EIR (USACE and Regional Water Board 2015). Two hazard sites remain, and no additional hazard sites were identified in the study area during this assessment. The hazard sites are:

- *Cosco Busan*, CA: In 2007, the container ship *Cosco Busan* struck the San Francisco-Oakland Bay Bridge, causing the release of 53,000 gallons of fuel into the water which spread throughout SF Bay. Restoration projects for *Cosco Busan* are still under way (CDFW 2024).
- United Heckathorn Superfund Site: This site contains elevated levels of dichloro-diphenyl-trichloroethane (DDTDDT) and dieldrin in the waters and sediments of the Parr Canal and Lauritzen Channel. It is located north of the Richmond Inner Harbor Santa Fe dredging channel. Since the 2015 EA/EIR (USACE and Regional Water Board 2015) was released, the EPA has determined that remediation goals have not been met in the channel, and they will select a new remedy for the channel (USEPA 2021).

The third hazard identified in the 2015 EA/EIR (USACE and Regional Water Board 2015) is the Suisun Bay Reserve Fleet. At this location, in the Suisun Bay Channel, military vessels stored for emergency use have slowly decayed, leaking fuel, rusting, collecting invasive species, and shedding metals and toxic paint into the surrounding area. As of 2017 the ships in worst condition have been removed from the fleet and additional cleanup operations have been completed so that the fleet is no longer considered a hazard (San Francisco Baykeeper 2017).

3.6.3 Methodology and Thresholds of Significance

This analysis assesses the anticipated impacts of the project alternatives concerning hazards and hazardous materials on human health and the environment. The project alternatives would involve maintenance dredging of federal navigation channels, transport of dredged material, and placement of dredged material at permitted placement sites.

As discussed in Section 3.5, Geology, Soils, and Sediment Quality, sediment testing results for previous USACE maintenance dredging episodes indicate that, in general, dredged material from the subject federal navigation channels has been suitable for unconfined aquatic placement. Contaminated dredged sediments that are not suitable for unconfined aquatic placement and do not meet the criteria for

placement at upland sites or permitted beneficial use or sites would be disposed at a permitted facility approved by the DMMO (e.g., a landfill). Therefore, the potential impacts related to release of hazardous materials to land are anticipated to not be adverse and are not further evaluated.

Because dredging, transport, and placement operations are conducted over open water, any releases of hazardous materials have the potential to negatively impact water quality within the study area. These potential effects are discussed in Section 3.7, Hydrology and Water Quality. Impact analysis in this section analyzes potential adverse effects to human health associated with hazards and hazardous materials.

3.6.4 Impacts and Mitigation Measures

3.6.4.1 Impact HM-1: Potential Public or Environmental Exposure from the Transport, Use, and Disposal of Hazardous Materials

No Action Alternative/No Project Alternative, Alternatives 1 Through 4

Under all alternatives, the DMMO would require approval of sediment analysis, which would include development of a sampling plan, sediment characterization, and a sediment removal plan. Handling and disposal of sediments would be in accordance with applicable permit conditions. Human health and safety impacts would be avoided through adherence with all federal, state, and local regulations regarding the use, transport, and disposal of hazardous materials during project activities.

Cleanup activities for *Cosco Busan* have been completed, although restoration efforts are still underway. The proposed dredge and placement operations would not interfere with restoration efforts.

The United Heckathorn Superfund Site is still under active surveillance with some exceedances of established remediation thresholds for DDT and dieldrin, specifically in the Lauritzen Channel, but these areas do not appear to be close enough to the Santa Fe Channel to impact the sediments there as recently as 2021 (USEPA 2021). As discussed in Section 3.5.2.2, sediment testing conducted in 2021 at Richmond Inner Harbor, the closest dredging location to the Heckathorn hazard site, determined dredged material was suitable for unconfined aquatic disposal. Sediment testing conducted by USACE in 2018 upstream of the dredging location adjacent to the United Heckathorn site also showed that sediment upstream of the dredging site also met the criteria for unconfined aquatic disposal and upland beneficial use (see Pacific EcoRisk and D.R. Reed and Associates Inc. 2021, Table 8-1). Therefore, it is not anticipated that dredging operations would encounter contaminated material from these or other sites.

Transport of dredged material by truck or train would be rare; it would only occur in circumstances where dredged material that is not suitable for unconfined aquatic disposal requires secondary placement at a land-based facility, such as a permitted landfill, after the material has dried. The transport of dried sediment is easily contained and is not anticipated to create hazardous emissions, therefore, human health impacts from land transport would be negligible. Additionally, the project alternatives would not pose a risk to human health due to waterborne recreation or fishing operations since the alternatives do not involve these activities in contaminated areas.

Environmental Setting and Environmental Analysis

Dredging operations in SF Bay pose the risk of accidental minor oil spills, hydraulic fluid leaks and/or hazardous materials releases into receiving water from vessels involved in dredging work. The risk is mitigated by the ongoing implementation of a vessel emergency spill response plan which would limit the potential of these materials to enter the receiving water. The *Essayons* and the *Yaquina* both operate under the spill response plan for the Portland District of USACE, which is the home port for these vessels. The spill response plan applies to all activities and operations of these vessels while they are operating in any waters of the United States, including SF Bay. It covers USACE responsibilities for accidental releases including discovery and notification procedures, incidental spill response, emergency spill response and containment, safety and health, pollutant disposal, spill response contracting, reporting, public information, training and exercise requirements, and the distribution of the document. Any assisting tugboats are required to operate under their own vessel emergency spill response plan.

The project boundary is not located within 0.25 mile of any existing or proposed school, and therefore would not emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school.

No proposed dredging operations are located on or near a site that is included on a list of hazardous material sites compiled pursuant to Government Code Section 65962.5; and as a result, create a significant hazard to the public or the environment.

Proposed dredging operations are not located near any existing airports, and therefore would not present a safety hazard for people residing and working in the vicinity of a public-use airport.

Proposed dredging operations will not be conducted near any private airstrip and would not present a safety hazard for people residing and working in the vicinity of a private airstrip.

The Proposed Project will take place entirely within SF Bay and some placement sites adjacent to SF Bay that are primarily marsh lands subject to tidal action. Therefore, the project does not expose people or structures to a significant risk of loss, injury, or death involving wildland fires.

- **NEPA Determination**: Under all alternatives, impacts on public or environmental exposure from the transport, use, and disposal of hazardous materials would be less than significant.
- **CEQA Determination**: Under all alternatives, impacts on public or environmental exposure from the transport, use, and disposal of hazardous materials would be less than significant.

3.6.4.2 Impact HM-2: Potential Impacts on Implementation of an Adopted Emergency Response Plan

No Action Alternative/No Project Alternative, Alternatives 1 Through 4

Under all alternatives, it is anticipated that there would be no interference with emergency operation or evacuation plans in the study area. In the event of an emergency, dredge equipment would be repositioned or removed from the federal navigation channel(s) to allow for the navigation of emergency response or evacuation vessels. Under all alternatives, dredging would result in long-term beneficial impacts on emergency response by eliminating shallow sediment and upholding the navigability of federal waterways, which in turn would facilitate the movement of vessels during emergency response operations.

- **NEPA Determination**: Under all alternatives, impacts on emergency response operations would be beneficial.
- **CEQA Determination**: Under all alternatives, there would be no impacts on emergency response operations.

3.6.4.3 Impact HM-3 Potential for Dredging, Transport, and Placement Activities to Result in Cumulative Impacts on Hazards and Hazardous Materials

No Action Alternative/No Project Alternative, Alternatives 1 Through 4

The Proposed Project and alternatives would either have no impact or not cause adverse impacts related to hazards and hazardous materials. Project alternatives would not result in cumulative hazards and hazardous materials use impacts when considered with other past, present, and reasonably foreseeable projects in Table 3-2. Specifically, in consideration of non-federal maintenance dredging in SF Bay, the DMMO would require approval of sediment analysis, which would include development of a sampling plan, sediment characterization, and a sediment removal plan, same as described for all alternatives.

- **NEPA Determination**: The project alternatives would not contribute to cumulatively considerable impacts from hazards and hazardous materials.
- **CEQA Determination**: The project alternatives would not contribute to cumulatively considerable impacts from hazards and hazardous materials.

3.7 Hydrology and Water Quality

This section summarizes the existing hydrologic and water quality environmental setting of SF Bay and the offshore ocean environment and analyzes the potential impacts of the project alternatives on water resources. Existing conditions and potential impacts associated with plans and water quality policies pursuant to compliance with the CZMA are addressed in Section 3.8 Land Use and Planning. Existing conditions and potential impacts associated with water quality impacts on fisheries and other aquatic species are addressed in Section 3.3 Biological Resources.

3.7.1 Regulatory Setting

The following sections describe the regulatory framework applicable to potential hydrology and water quality impacts from the alternatives.

3.7.1.1 Federal

Federal regulations applicable to hydrology and water quality are discussed in the sections below.

Clean Water Act

See Section 1.6.1.3 of this document for discussion of Sections 401 and 404 of the CWA, and Section 3.6.1.1 for discussion of Section 303(d) of the CWA.

The impaired water bodies list was most recently updated by the California State Water Resources Control Board and approved by USEPA in 2022. This list is updated every two years (Regional Water Board 2024). In addition to these listings, the greater SF Bay is also impaired for PAHs (State Water Board 2021).

Marine Protection, Resources, and Sanctuaries Act

See Section 3.5.1.1 for discussion of MPRSA. This regulation is relevant to Hydrology and Water Quality resources because of its mandate to protect against degradation of the marine environment and ecosystems by projects that place sediment in ocean waters.

Rivers and Harbors Act

See Section 3.6.1.1 for discussion of the Rivers and Harbors Act. This regulation is relevant to Hydrology and Water Quality resources because of its focus on protecting navigation and preventing pollution in navigable waters.

International Convention for Prevention of Pollution from Ships

The International Convention for the Prevention of Pollution from Ships (MARPOL) is the primary international convention covering the prevention of pollution in the marine environment by ships from operational or accidental causes. The MARPOL Convention (33 U.S.C. §§ 1901-1911) was adopted in 1973 and modified by the Protocol of 1978 (referred to as MARPOL 73/78). The regulations cover the prevention of pollution by oil, noxious liquids, harmful substances, and garbage from operational

measures, as well as from accidental discharges. The USCG is the responsible enforcement agency for MARPOL.

Coastal Zone Management Act, 16 U.S.C. § 1456

See Section 3.5.1.1 for discussion of the CZMA. This regulation is relevant to hydrology and water quality resources because of the requirement for the regulatory agency to ensure consistency with policies in the Coastal Zone, including those related to water quality.

Executive Order 11988: Floodplain Management

EO 11988: Floodplain Management (42 Federal Register 26951, 3 C.F.R., 1977 Comp., Part 117) requires federal agencies to avoid long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development whenever there is a practicable alternative. This EO relates primarily to the placement of dredged material and the appropriate management of lands that received dredged material for beneficial use.

3.7.1.2 State and Regional

State and regional regulations applicable to hydrology and water quality are discussed in the sections below.

McAteer-Petris Act

See Section 1.6.2.2 for discussion of the McAteer-Petris Act. This regulation is relevant to hydrology and water quality resources because of its mandate to protect SF Bay and its shoreline.

Porter-Cologne Water Quality Control Act of 1969, California Statutes 1942, Chapter 368

See Section 1.6.2.3 for discussion of the Porter-Cologne Act. This regulation is relevant to hydrology and water quality resources because of its focus on water quality and beneficial uses.

Dredged Material Management Office

The DMMO is a joint program of USACE, the Regional Water Board, BCDC, USEPA, and the CSLC. Participating agencies also include CDFW, NMFS, and the USFWS (See Section 1.2.1.1). The purpose of the DMMO is to cooperatively review sediment quality sampling plans, analyze the results of sediment quality sampling, and make suitability determinations for material proposed for placement in SF Bay. The 2021 DMMO Annual Report (DMMO 2022) lists DMMO responsibilities as follows:

- Review and approve sediment quality sampling and analysis plans
- Analyze the results of sediment quality tests
- Make suitability determinations for placement at in-Bay, ocean, and beneficial use sites
- Receive, review, and coordinate dredging project permit applications in the SF Bay Area

- Develop guidance documents as needed
- Coordinate implementation of programmatic requirements such as species consultations, alternative disposal site analyses and recordkeeping.

The DMMO agencies apply the most current version of the Guidelines for Implementing the ITM in the SF Bay Region (USACE 2001) when determining the dredged material testing that will be required for dredging projects proposing placement and/or disposal at designated sites in waters of the United States in SF Bay. These local guidelines supplement the more detailed information in the ITM and are not intended to be used on their own.

Additional background on the DMMO, including requirements for separate permit conditions and/or approvals by DMMO member agencies, is described above in Section 3.5.1.3.

3.7.2 Environmental Setting

The hydrologic and water quality settings within the study area were described in the 2015 EA/EIR (USACE and Regional Water Board 2015) and are still applicable for this Draft EA/EIR. General descriptions of the hydrologic setting and water quality conditions of SF Bay are provided in sections below, along with updated water quality monitoring and SLR information.

3.7.2.1 Hydrology

The SF Bay Estuary is the largest estuary on the west coast of the United States. Flows from rivers and streams draining California's Central Valley through the Delta, along with flows from rivers and streams draining directly into SF Bay are conveyed to the Pacific Ocean at the Golden Gate, the only outlet for these waters to the ocean. SF Bay consists of South SF Bay, which extends from the Bay Bridge to the southern terminus of SF Bay in San Jose, and the Central, Suisun, and San Pablo bays, which connect the Delta and the Pacific Ocean. Because of its highly dynamic and complex environmental conditions, SF Bay's deepwater channels, tidelands, marshlands, freshwater streams, and rivers support an extraordinarily diverse and productive ecosystem (Regional Water Board 2024).

Tides propagate through SF Bay from the Golden Gate to the Delta. These tides, in combination with sea level height, the extent and duration of river/stream flows into SF Bay, and meteorological (e.g., wind) conditions, affect hydrodynamics in SF Bay. This includes sediment deposition and transport, and salinity intrusion from the Pacific Ocean into SF Bay (Cloern et al. 2011). SF Bay's bathymetry of is an important factor affecting sediment dynamics. The broad, shallow areas incised by narrow channels of San Pablo Bay, Suisun Bay, are more prone to wind-generated currents and sediment resuspension than deeper areas such as the Central Bay (USACE et al. 1998).

Outside of the Golden Gate and into the Pacific Ocean, the California Current is a broad offshore flow that transports cold, low-salinity, subarctic waters toward the equator. However, two northerly flows—the Coastal Countercurrent and the California Undercurrent—dominate the flow regime in the vicinity of the Farallon Islands throughout most of the year. The Coastal Countercurrent generally moves nutrient-poor surface water over the continental shelf northward, while the California Undercurrent's strong northerly flow over the slope dominates in depths ranging from 100 to 1,000 meters. Currents in the vicinity of

SF-DODS are generally slow, which aids in minimizing the spread of water column plumes during and immediately following placement events. Studies by USEPA indicate that the ocean bottom in the vicinity of SF-DODS (and generally across the region at depths greater than 600 to 800 meters) is depositional. Wave heights are variable and usually greater during the late fall, winter, and spring because of the presence of storms and generally stronger sustained winds (USACE et al. 1998).

3.7.2.2 Water Quality

Water quality conditions in SF Bay are affected by various factors, including tidal movements, freshwater inflows from rivers and streams, and human activities. The water quality of many water bodies in SF Bay continues to be degraded from pollutants discharged from nonpoint sources, and from the cumulative effects of multiple point sources, including urban runoff. This degradation persists despite successful pollutant reduction efforts in the regulation of municipal and industrial wastewater point-source discharges through the NPDES program. Ongoing watershed management actions in the region represent a shift to a regional approach that acknowledges environmental impacts from all activities, and prioritizes regulation of these activities with input from local stakeholders rather than regulation of point sources (Regional Water Board 2024).

Water quality is managed and monitored by several agencies in SF Bay. The Regional Water Board plays a key role through development and implementation of the Water Quality Control Plan for the SF Bay Basin (Basin Plan). The Basin Plan is a water quality control planning document that designates beneficial uses and water quality objectives for waters of the State, including surface waters and groundwater. It also includes implementation programs to achieve water quality objectives (Regional Water Board 2024).

Monitoring Schedule and Trends

Contaminant concentrations in SF Bay are monitored by the SFEI via the RMP. See Section 3.5.2.2 for a description of the sampling schedule.

The SFEI RMP is currently piloting new monitoring plans for contaminants of emerging concern (CEC), which include chemicals not previously regulated or monitored such as per- and polyfluoroalkyl substances (added to monitoring in 2023), organophosphate esters (added in 2021), and bisphenols (added in 2021). The SFEI is also studying tire and vehicle contaminants as CECs. In addition to CECs, the SFEI has been studying microplastic pollution, releasing a large report in 2019 on this new pollutant of concern, namely plastics less than 5 mm in size (SFEI 2023). Microplastic levels are currently unregulated (State Water Board 2024). Recent water quality trends observed by SFEI through collection of the above data include the following (SFEI 2023):

- Algal blooms in 2022 and 2023 led to chlorophyll concentrations above 200 micrograms per liter.
- Detectable levels of tire and vehicle contaminants have been identified near discharge locations and in the SF Bay.
- There is a lack of declining PCB levels in SF Bay fish, despite approval of a total maximum daily load in 2009.

- Microplastics have been detected in the SF Bay water, sediment, prey fish, bivalves, and adjacent ocean.
- Sediment has declined on the SF Bay floor from the 1980s to the 2010s (total loss of around 1.2 billion cubic feet).

The Regional Water Board has adopted water quality attainment plans, referred to as total maximum daily loads, to address impairment of water quality in SF Bay by mercury and PCB concentrations. These plans include waste-load allocations for mercury and PCB sources to restore water quality in SF Bay. Dredging is recognized by the Regional Water Board to remove these contaminants, and therefore does not have a waste-load allocation. Contaminant levels are instead regulated by current levels in SF Bay sediment (USACE et al. 2013).

Offshore Ocean Environment

Trace amounts of PAHs, PCBs, pesticides, and metals have been documented in the offshore region over the continental shelf and shelf edge (USACE et al. 1998). Offshore regions typically contain lower contaminant concentrations.

Sea Level Rise

The rate of SLR in California from 1993 to present has been less than the global average primarily due to the natural variability in water level temporarily obscuring the background, climate-driven rate (Bromirski et al. 2011). Observed SLR was minimal from 1993 to 2008 and significant from 2008 to 2023. This pattern will likely persist in the future and longer tide gauge records together with recent observations suggest that SLR along the California coast should resemble the global average (Hamlington et al. 2021). From 1993 to 2023, the rate of SLR for California, on average, is 0.9 inch/decade (California Ocean Protection Council et al. 2024).

In January 2024, the California Ocean Protection Council released updated draft SLR projections and guidance which state that SLR will likely range from 0.6 to 0.8 feet in 2050 and 1.6 to 3.1 feet in 2100. These projections are based on the intermediate-low and intermediate scenarios for the San Francisco tide gauge.

Past placement of beneficial use sediment at wetland restoration sites helps provide resiliency against SLR. Wetland restoration provides protection against high and rising water levels in SF Bay by absorbing wave impacts and facilitating sediment deposition and natural tidal marsh creation.

3.7.3 Methodology and Thresholds of Significance

This section includes an analysis and determination of the impacts of the project alternatives on hydrology and water quality. Hydrology and water quality impacts from dredging would primarily be attributed to sediment disturbance. The analysis focused on whether the Proposed Project/Project Alternatives would:

- Substantially degrade water quality through alteration of water temperature, salinity, pH, and dissolved oxygen
- Substantially degrade water quality because of increased turbidity
- Substantially degrade water quality because of mobilization of contaminated sediments or release of hazardous materials
- Result in cumulative impacts on hydrology or water quality

3.7.4 Impacts and Mitigation Measures

3.7.4.1 Impact HY-1: Potential to Substantially Degrade Water Quality through Alteration of Water Temperature, Salinity, pH, and Dissolved Oxygen

No Action Alternative/No Project Alternative, Alternatives 1 Through 4

Based on studies by USACE, hopper, cutterhead, and clamshell dredging activities and placement of dredged material do not cause substantial changes to salinity, temperature, or pH (USACE 1976a, 1976b, 1977, 1990), and any associated minor changes are localized and short-lived. Minor decreases in dissolved oxygen concentrations, which may be reduced by 1 to 2 milligrams per liter during dredging and placement operations, were also found to be short-term, typically returning to ambient levels within 4 to 8 minutes (USACE 1976a, 1977, 1990). Significant changes in temperature, salinity, pH, and dissolved oxygen are not expected from vessel movement.

There would be increased potential for BUDM placement (e.g., upland direct placement, nearshore strategic placement, elevation augmentation/marsh spraying, and/or water column seeding) under Alternative 4. In general, sediment placed from scows settles rapidly, and any temporary decreases in dissolved oxygen concentrations would be dispersed from the placement area by the broader open water in SF Bay (USACE and Regional Water Board 2023). BUDM placement under this alternative could directly result in beneficial effects to water quality by augmenting the local supply of sediment available to support accretion in mudflats and tidal wetlands, which in turn may provide water quality benefits.

- **NEPA Determination**: Under all alternatives, the potential to substantially degrade water quality through alteration of water temperature, salinity, pH, and dissolved oxygen would be less than significant.
- **CEQA Determination**: Under all alternatives, impacts on water quality through alteration of water temperature, salinity, pH, and dissolved oxygen would be less than significant. Minor localized impacts on water temperature, salinity, pH, and/or dissolved oxygen during dredging activities and placement of dredged material may occur, but the effects would be short-lived.

3.7.4.2 Impact HY-2: Potential to Substantially Degrade Water Quality Because of Increased Turbidity

No Action Alternative/No Project Alternative

As described in Impact BI-2, the No Action Alternative and No Project Alternative include dredging activities with clamshell, hopper, and cutterhead-pipeline techniques, which are known to cause temporary and local resuspension of sediment, decrease in water clarity, and turbidity increases. Higher turbidity is expected for dredging of finer grain sediments compared to courser sediments, such as sand because finer sediments remain suspended in the water column longer than coarser sediments. The No Action Alternative and No Project Alternative impacts related to turbidity are anticipated to be minor, localized, and temporary (see also the detailed discussion in Impact BI-2).

Of the three techniques, clamshell (mechanical) dredging leads to the highest resuspension and turbidity increases due to the impact of the equipment on the ocean floor, and spillage during transport from the bottom to the water surface (Barnard 1978; NFMS 2015). The use of mechanical dredge equipment often results in more disturbance and sediment resuspension at the dredging site due to the mechanical force applied to the substrate. Sediment may also be introduced into the water column from spillage of materials during barge loading, and from overflow of water from barges (Nightingale and Simenstad 2001; NMFS 2015). However, based on monitoring data collected by USACE from 2015 to 2019 in Oakland Harbor, Richmond Inner Harbor, and Redwood City Harbor, decanting[23] operations during dredging of fine-grain sediment does not generate large plumes of suspended sediment that would adversely impact fish and other aquatic life (Regional Water Board 2019a).

Comparatively, hopper and cutterhead-pipeline dredging lead to less sediment disturbance as they are not as physically impactful to the Estuary bed and transport sediment directly to the vessel via pipework. These effects are generally short-term and occur in the lower portion of the water column, localized to the disturbance. Overflow of excess water in the hold of a hopper dredge poses a potential of increased turbidity as the suspended sediments are released into surrounding waters with overflow water (NMFS 2015). Turbidity increases are not expected from vessel movement.

Minor, temporary turbidity increases are also expected at placement sites. Impacts are anticipated to be lesser at the SF-DODS site compared to in-Bay sites. Resuspension of sediments at identified in-Bay sites will be higher due to placement in shallower estuarine water (USACE et al. 1998).

Under all alternatives, dredged sediment may be placed at one or multiple beneficial use sites, such as MWRP. Sediment additions at these sites may create short-term increases in turbidity during placement for wetland restoration but have the potential to create long-term beneficial increases in sediment retention and stabilization and pollutant filtration. Habitat benefits from placement at beneficial use sites are discussed in detail in Impact BI-5.

[23] Decanting refers to the release of water entrained with dredged sediment from a barge when the water reaches the top of a stand pipe that typically represents about 80 percent of barge capacity. The stand pipe acts as a weir, allowing the discharge of supernatant water to increase the barge's effective load.

Under the No Action Alternative and No Project Alternative, activities include approximately 1.7 million CY average dredged material using mechanical techniques, assuming all sites are dredged in one year. Under the No Action Alternative, approximately 2.7 million CY of sediment will be dredged, and under the No Project Alternative, approximately 2.8 million CY will be dredged. Dredging mechanisms include both mechanical and hydraulic techniques, with a 62 percent to 38 percent use ratio, respectively. Dredged material will be placed at in-Bay, in-ocean, upland, and SF-DODS sites for both the No Action Alternative and No Project Alternative. The same ratio of sediment would be placed at each site for each of the alternatives.

- **NEPA Determination**: Under the No Action Alternative, impacts related to the potential to substantially degrade water quality because of increased turbidity would be less than significant.
- **CEQA Determination**: Under the No Project Alternative, impacts related to the potential to substantially degrade water quality because of increased turbidity would be less than significant.

Alternative 1

Under Alternative 1, project activities involve dredging a total of 1.7 million CY average volume dredged, assuming all sites are dredged in one year—the same total as expected in the No Action Alternative and No Project Alternative. Alternative 1 also includes a 15 percent increase in sediment to be placed at in-Bay sites as compared to the No Action Alternative and No Project Alternative. Both mechanical dredging and in-Bay placement are associated with higher turbidity increases compared to hydraulic and SF-DODS or upland placement, respectively, and actions under Alternative 1 would result in a short-term and localized net increase in turbidity at dredging and placement sites. Through the increased potential for BUDM placement under this alternative compared to the No Action Alternative/No Project Alternative, beneficial effects to water quality could occur through augmentation of the local supply of sediment available to support accretion in mudflats and tidal wetlands along with sediment retention and stabilization, which may reduce long-term local/site-specific turbidity conditions.

- **NEPA Determination:** Under Alternative 1, impacts related to the potential to substantially degrade water quality because of increased turbidity would be less than significant.
- **CEQA Determination:** Under Alternative 1, impacts related to the potential to substantially degrade water quality because of increased turbidity would be less than significant.

Alternative 2

Alternative 2, with a total of 1.2 million CY average volume dredged, assuming all sites are dredged in one year, will result in an 18 percent reduction in mechanical dredging compared to the No Action Alternative and No Project Alternative. Alternative 2 instead uses more hydraulic dredging techniques, which are associated with lower turbidity levels than their mechanical counterparts. Actions under Alternatives 2 would result in short-term and localized net decreases in turbidity at dredging sites.

Under Alternative 2, a 20 percent increase in dredged material is to be placed at in-Bay sites compared to the No Action Alternative and No Project Alternative. Actions under Alternatives 2 would result in short-term and localized net increases in turbidity at placement sites. However, the increased potential for BUDM placement under this alternative compared to the No Action Alternative/No Project Alternative

could result in beneficial effects to water quality through augmenting the local supply of sediment available to support accretion in mudflats and tidal wetlands along with sediment retention and stabilization, which in turn may reduce long-term local/site-specific turbidity conditions.

- **NEPA Determination:** Under Alternative 2, impacts related to the potential to substantially degrade water quality because of increased turbidity under Alternative 2 would be less than significant.
- **CEQA Determination:** Under Alternative 2, impacts related to the potential to substantially degrade water quality because of increased turbidity would be less than significant.

Alternative 3

Alternative 3, with an average total of 1.5 million CY average volume dredged, assuming all sites are dredged in one year, will result in an 8 percent reduction in mechanical dredging compared to the No Action Alternative and No Project Alternative. Alternative 3 instead uses more hydraulic dredging techniques, which are associated with lower turbidity levels than their mechanical counterparts. Actions under Alternative 3 would result in short-term and localized net decreases in turbidity at dredging sites.

Under Alternative 3, a 15 percent increase in dredged material is to be placed at in-Bay sites compared to the No Action Alternative and No Project Alternative. Actions under Alternative 3 would result in short-term and localized net increases in turbidity at placement sites. Through the increased potential for BUDM placement under Alternative 3 compared to the No Action Alternative/No Project Alternative, beneficial effects to water quality could occur through augmentation of the local supply of sediment available to support accretion in mudflats and tidal wetlands along with sediment retention and stabilization, which may reduce long-term local/site-specific turbidity conditions at beneficial use placement sites.

- **NEPA Determination:** Under Alternative 3, impacts related to potential to substantially degrade water quality because of increased turbidity would be less than significant.
- **CEQA Determination:** Under Alternative 3, impacts related to potential to substantially degrade water quality because of increased turbidity would be less than significant.

Alternative 4

Under Alternative 4, project activities will cause a 14 percent increase in mechanical dredging by volume compared to the No Action Alternative and No Project Alternative, with a total of 2.1 million CY dredged, assuming all sites are dredged in one year. Due to increases in mechanical dredging, actions under Alternative 4 would result in a short-term and localized net increase in turbidity at dredging sites.

Alternative 4 will have a 30 percent reduction in maximum sediment placed at in-Bay sites compared to the No Action Alternative and No Project Alternative. Deposition placement under Alternative 4 would be concentrated around upland beneficial use, with at least 65 percent more sediment placed at upland beneficial use sites than the No Action Alternative and No Project Alternative. Actions under Alternative 4 would result in short-term and localized net decreases in turbidity at placement sites.

Alternative 4 includes increased potential for BUDM placement (e.g., upland direct placement, nearshore strategic placement, elevation augmentation/marsh spraying, and/or water column seeding). In general, sediment placed from scows settles rapidly, and any temporary increases in turbidity would be dispersed from the placement area by the broader open water in the Bay (USACE and Regional Water Board 2023). BUDM placement under this alternative could directly result in beneficial effects to water quality by augmenting the local supply of sediment available to support accretion in mudflats and tidal wetlands along with sediment retention and stabilization, which in turn may provide long-term, localized water quality benefits such as filtration functions and an associated decrease in turbidity.

- **NEPA Determination:** Under Alternative 4, impacts related to the potential to substantially degrade water quality because of increased turbidity would be less than significant.
- **CEQA Determination:** Under Alternative 4, impacts related to the potential to substantially degrade water quality because of increased turbidity would be less than significant.

3.7.4.3 Impact HY-3: Potential to Substantially Degrade Water Quality from Mobilization of Contaminated Sediments or Release of Hazardous Materials

No Action Alternative/No Project Alternative, Alternatives 1 Through 4

Contaminants associated with dredged soils and sediments can be reintroduced to the water environment during dredging process as sediments are disturbed. To prevent mobilization of contaminants and hazardous materials, sediment from proposed sites will be tested prior to dredging. Sites which test positive for higher contamination levels will be avoided by USACE for future dredging, including in all the alternatives. If dredging of contaminated sites is unavoidable, collected sediment will be placed further from water bodies, i.e., upland.

Contaminants are not often easily separated from sediments, even during dredging activities, and are not anticipated to cause related impacts. Preventative measures and planning will be coordinated between USACE and DMMO for all dredging activities, and USACE will implement best management practices and comply with the Regional Water Board water quality protection measures. Vessels engaged in project work will be operated within relevant regulations to prevent contamination, and dredged material will be secured during transport. Through proactive measures, minimal release of contaminants and hazardous materials is expected from dredging activities.

- **NEPA Determination:** Under all alternatives, impacts related to the potential to substantially degrade water quality from mobilization of contaminated sediments or release of hazardous materials would be less than significant.
- **CEQA Determination:** Under all alternatives, impacts related to the potential to substantially degrade water quality from mobilization of contaminated sediments or release of hazardous materials would be less than significant.

3.7.4.4 Impact HY-4: Potential for Dredging, Transport, and Placement Activities to Result in Cumulative Impacts on Hydrology or Water Quality

No Action Alternative/No Project Alternative, Alternatives 1 Through 4

All alternatives would create negligible, short-term impacts if implemented, and have the potential to incur cumulative hydrology or water quality impacts with the other regional projects in Table 3-2. Potential cumulative impacts could include short-term changes to water quality such as temperature, dissolved oxygen, and turbidity differences, as well as contaminant mobilization or introduction. All projects are subject to permitting from the Regional Water Board and must comply with applicable water quality standards. In addition, the projects' effects are anticipated to be short-term and localized. Under these conditions, no ongoing cumulative impacts are expected.

- **NEPA Determination:** Project alternatives would not contribute to cumulatively considerable impacts on hydrology or water quality.
- **CEQA Determination:** Project alternatives would not contribute to cumulatively considerable impacts on hydrology or water quality.

3.8 Land Use and Planning

This section provides an overview of the land use planning context and examines the potential impacts on land use resulting from the implementation of the proposed alternatives.

3.8.1 Regulatory Setting

The following sections describe the regulatory framework applicable to potential land use and planning impacts from the alternatives.

3.8.1.1 Federal

Federal regulations applicable to land use and planning are discussed in the following sections

Coastal Zone Management Act

See discussion of the CZMA in Section 3.5.1.1. As stated in that section, an application for an updated CZMA consistency determination will be prepared in 2024 and submitted to BCDC and CCC.

3.8.1.2 State and Regional

State and regional regulations applicable to land use and planning are discussed in the sections below.

California Coastal Act

The California Coast Act (CCA) (CPR, Div. 20) includes specific policies (Division 20 of the California PRC) for planning and regulatory decisions made by CCC and local governments, once those local governments adopt Local Coastal Programs that are approved by the CCC. The CCA covers dredging and placement activities along with many other development activities within the coastal zone.

McAteer-Petris Act and San Francisco Bay Plan

The Bay Plan, and its relationship to the McAteer-Petris Act, is described in Section 1.2.1.1. The McAteer-Petris Act is further described in Section 1.6.2.2. Bay Plan policies relevant to Land Use and Planning Resources for this Draft EA/EIR are listed below.

Dredging policies (amended October 2019) in the Bay Plan relevant to the Proposed Project are as follows:

1. *Dredging and dredged material disposal should be conducted in an environmentally and economically sound manner. Dredgers should reduce disposal in the Bay and certain waterways over time to achieve the LTMS goal of limiting in-Bay placement volumes to a maximum of one million cubic yards per year. The LTMS agencies should implement a system of disposal allotments to individual dredgers to achieve this goal only if voluntary efforts are not effective in reaching the LTMS goal. In making its decision regarding disposal allocations, the Commission should confer with the LTMS agencies and consider the need for the dredging and the dredging projects, environmental impacts, regional economic impacts, efforts by the dredging community to implement and fund alternatives to in-Bay placement, and other relevant factors. Small dredgers should be exempted from allotments, but all dredgers should comply with policies 2 through 12.*

2. *Dredging should be authorized when the Commission can find: (a) the applicant has demonstrated that the dredging is needed to serve a water-oriented use or other important public purpose, such as navigational safety; (b) the materials to be dredged meet the water quality requirements of the San Francisco Bay Regional Water Quality Control Board; (c) important fisheries and Bay natural resources would be protected through seasonal restrictions established by the California Department of Fish and Game, the USFWS and/or the NMFS, or through other appropriate measures; (d) the siting and design of the project will result in the minimum dredging volume necessary for the project; and (e) the materials would be disposed of in accordance with Policy 3.*

3. *Dredged material should, if feasible, be reused or disposed outside the Bay and certain waterways. Except when reused in an approved fill project, dredged material should not be disposed in the Bay and certain waterways unless disposal outside these areas is infeasible and the Commission finds: (a) the volume to be disposed is consistent with applicable dredger disposal allocations and disposal site limits adopted by the Commission by regulation; (b) disposal would be at a site designated by the Commission; (c) the quality of the material disposed of is consistent with the advice of the San Francisco Bay Regional Water Quality Control Board and the inter-agency DMMO; and (d) the period of disposal is consistent with the advice of the California Department of Fish and Game, the USFWS and the NMFS.*

4. *If an applicant proposes to dispose dredged material in tidal areas of the Bay and certain waterways that exceeds either disposal site limits or any disposal allocation that the Commission has adopted by regulation, the applicant must demonstrate that the potential for adverse environmental impact is insignificant and that non-tidal and ocean disposal is infeasible because there are no alternative sites available or likely to be available in a reasonable period, or because the cost of disposal at alternate sites is prohibitive. In making its decision whether to authorize such in Bay disposal, the Commission should confer with the LTMS agencies and consider the factors listed in Policy 1.*

5. *To ensure adequate capacity for necessary Bay dredging projects and to protect Bay natural resources, acceptable non-tidal disposal sites should be secured and the Deep Ocean Disposal Site should be maintained. Further, dredging projects should maximize use of dredged material as a resource consistent with protecting and enhancing Bay natural resources, such as creating, enhancing, or restoring tidal and managed wetlands, creating, and maintaining levees and dikes, providing cover, and sealing material for sanitary landfills, and filling at approved construction sites.*

6. *Dredged material disposed in the Bay and certain waterways should be carefully managed to ensure that the specific location, volumes, physical nature of the material, and timing of disposal do not create navigational hazards, adversely affect Bay sedimentation, currents, or natural resources, or foreclose the use of the site for projects critical to the economy of the Bay Area.*

7. *All proposed channels, berths, turning basins, and other dredging projects should be carefully designed so as not to undermine the stability of any adjacent dikes, fills or fish and wildlife habitats.*

8. *The Commission should encourage increased efforts by soil conservation districts and public works agencies in the 50,000 square-mile Bay tributary area to continuously reduce soil erosion as much as possible.*

9. *To protect underground fresh water reservoirs (aquifers): (a) all proposals for dredging or construction work that could penetrate the mud "cover" should be reviewed by the San Francisco Bay Regional Water Quality Control Board and the State Department of Water Resources; and (b) dredging or construction work should not be permitted that might reasonably be expected to damage an underground water reservoir. Applicants for permission to dredge should provide additional data on groundwater conditions in the area of construction to the extent necessary and reasonable in relation to the Proposed Project.*

10. *Interested agencies and parties are encouraged to explore and find funding solutions for the additional costs incurred by transporting dredged material to nontidal and ocean disposal sites, either by general funds contributed by ports and other relevant parties, dredging applicants or otherwise.*

11. *A project that uses dredged sediment to create, restore, or enhance Bay or certain waterway natural resources may be approved if:*

12. *The Commission, based on detailed site-specific studies, appropriate to the size and potential impacts of the project, that include, but are not limited to, site morphology and physical conditions, biological considerations, the potential for fostering invasive species, dredged sediment stability, and engineering aspects of the project, determines all of the following:*

    a. *Project would provide, in relationship to the project size, substantial net improvement in habitat for Bay species;*

    b. *No feasible alternatives to the fill exist to achieve the project purpose with fewer adverse impacts on Bay resources;*

    c. *The amount of dredged sediment to be used would be the minimum amount necessary to achieve the purpose of the project;*

    d. *Beneficial uses and water quality of the Bay would be protected; and*

    e. *There is a high probability that the project would be successful and not result in unmitigated environmental harm;*

13. *The project includes an adequate monitoring and management plan and has been carefully planned, and the Commission has established measurable performance objectives and controls that would help ensure the success and permanence of the project, and an agency or organization with fish and wildlife management expertise has expressed to the Commission its intention to manage and operate the site for habitat enhancement or restoration purposes for the life of the project;*

14. *The project would use only clean sediment suitable for aquatic disposal and the Commission has solicited the advice of the San Francisco Bay Regional Water Quality Control Board, the Dredged Material Management Office and other appropriate agencies on the suitability of the dredged sediment;*

15. *Dredged sediment would not be placed in areas with particularly high or rare existing natural resource values, such as eelgrass beds and tidal marsh and mudflats, unless the material would be needed to protect or enhance the habitat. The habitat project would not, by itself or cumulatively with other projects, significantly decrease the overall amount of any particular habitat within the Suisun, North, South, or Central Bays, excluding areas that have been recently dredged;*

16. *The Commission has consulted with the California Department of Fish and Wildlife, the NMFS, and the USFWS to ensure that at least one of these agencies supports the Proposed Project; and*

17. *The project's design and goals incorporate the best available science on the use of dredged sediment for habitat projects.*

18. *After a reasonable period of monitoring, if either:*

    a. *The project has not met its goals and measurable objectives, and attempts at remediation have proven unsuccessful, or the dredged sediment is found to have substantial adverse impacts on the natural resources of the Bay, then the dredged sediment would be removed, unless it is demonstrated by competent environmental studies that removing the material would have a greater adverse effect on the Bay than allowing it to remain, and the site would be returned to the conditions existing immediately preceding placement of the dredged sediment.*

    b. *To ensure protection of Bay habitats, the Commission should not authorize placement of more than a minor amount of dredged sediment for projects that are similar to the Oakland Middle Harbor Enhancement Area project in characteristics including, but not limited to, scale, bathymetric modification, and type of habitat creation, until The Oakland Middle Harbor Enhancement Area project is completed successfully.*

    c. *The Commission should encourage research and well-designed pilot projects to evaluate:*

        1. *The appropriate amounts of all habitat types within the Bay, especially for support and recovery of endangered species;*

        2. *The appropriate biological, hydrological, and physical characteristics of locations in the Bay for habitat creation, enhancement, and restoration projects that use dredged sediment;*

        3. *The potential for direct, indirect, and cumulative impacts of such projects;*

        4. *The effectiveness of different dredged sediment placement strategies for habitat restoration, enhancement, and creation; and*

        5. *The feasibility of the beneficial reuse of dredged sediment in the Bay and certain waterways for habitat creation, enhancement, and restoration.*

19. *The Commission should continue to participate in the LTMS, the DMMO, and other initiatives conducting research on Bay sediment movement, the effects of dredging and disposal on Bay natural resources, alternatives to Bay aquatic disposal, and funding additional costs of transporting dredged material to non-tidal and ocean disposal sites.*

Policies in the Bay Plan pertaining to Fish, Other Aquatic Organisms, and Wildlife (amended October 2019) in the Bay Plan that are relevant to the Proposed Project are:

1. *To assure the benefits of fish, other aquatic organisms and wildlife for future generations, to the greatest extent feasible, the Bay's tidal marshes, tidal flats, and subtidal habitat should be conserved, restored and increased.*

2. *Native species, including candidate, threatened, and endangered species; species that the California Department of Fish and Wildlife, the National Marine Fisheries Service, and/or the USFWS have listed under the California or Federal Endangered Species Acts; and any species that provides substantial public benefits, as well as specific habitats that are needed to conserve, increase, or prevent the extinction of these species, should be protected, whether in the Bay or behind dikes. Protection of fish, other aquatic organisms, and wildlife and their habitats may entail placement of fill to enhance the Bay's ecological function in the near-term and to ensure that they persist into the future with sea level rise.*

3. *In reviewing or approving habitat restoration projects or programs the Commission should be guided by the best available science, including regional goals, and should, where appropriate, provide for a diversity of habitats for associated native aquatic and terrestrial plant and animal species.*

4. *The Commission should:*

    a. *Consult with the California Department of Fish and Wildlife, and the USFWS or the NMFS, whenever a Proposed Project may adversely affect an endangered or threatened plant, fish, other aquatic organism or wildlife species;*

    b. *Not authorize projects that would result in the "taking" of any plant, fish, other aquatic organism or wildlife species listed as endangered or threatened pursuant to the state or federal Endangered Species Acts, or the federal Marine Mammal Protection Act, or species that are candidates for listing under these acts, unless the project applicant has obtained the appropriate "take" authorization from the USFWS, NMFS or the California Department of Fish and Wildlife; and*

c. *Give appropriate consideration to the recommendations of the California Department of Fish and Wildlife, the NMFS or the USFWS in order to avoid possible adverse effects of a Proposed Project on fish, other aquatic organisms and wildlife habitat.*

5. *The Commission may permit fill or a minimum amount of dredging in wildlife refuges necessary to enhance or restore fish, other aquatic organisms and wildlife habitat, or to provide appropriately located public facilities for wildlife observation, interpretation and education*

6. *Allowable fill for habitat projects in the Bay should (a) minimize near term adverse impacts on and loss of existing Bay habitat and native species; (b) provide substantial net benefits for Bay habitats and native species; and (c) be scaled appropriately for the project and necessary sea level rise adaptation measures in accordance with the best available science. The timing, frequency, and volume of fill should be determined in accordance with these criteria.*

7. *Sediment placement for habitat adaptation should be prioritized in 1) subsided diked baylands, tidal marshes, and tidal flats, as these areas are particularly vulnerable to loss and degradation due to sea level rise and lack of necessary sediment supply, and/or in 2) intertidal and shallow subtidal areas to support tidal marsh, tidal flat, and eelgrass bed adaptation. In some cases, sediment placement for a habitat project in deep subtidal areas may be authorized if substantial ecological benefits will be provided and the project aligns with current regional sediment availability and needs.*

Water Quality policies (Amended June 2003) in the Bay Plan relevant to the Proposed Project are:

1. *Bay water pollution should be prevented to the greatest extent feasible. The Bay's tidal marshes, tidal flats, and water surface area and volume should be conserved and, whenever possible, restored and increased to protect and improve water quality. Fresh water inflow into the Bay should be maintained at a level adequate to protect Bay resources and beneficial uses.*

2. *Water quality in all parts of the Bay should be maintained at a level that will support and promote the beneficial uses of the Bay as identified in the San Francisco Bay Regional Water Quality Control Board's Water Quality Control Plan, San Francisco Bay Basin and should be protected from all harmful or potentially harmful pollutants. The policies, recommendations, decisions, advice and authority of the State Water Resources Control Board and the Regional Board, should be the basis for carrying out the Commission's water quality responsibilities.*

Environmental Setting and Environmental Analysis

Policies in the Bay Plan pertaining to Tidal Marshes and Tidal Flats (amended 2019) relevant to the Proposed Project are:

1. *Tidal marshes and tidal flats should be conserved to the fullest possible extent. Filling, diking, and dredging projects that would substantially harm tidal marshes or tidal flats should be allowed only for purposes that provide substantial public benefits and only if there is no feasible alternative.*

2. *Any proposed fill, diking, or dredging project should be thoroughly evaluated to determine the effect of the project on tidal marshes and tidal flats, and designed to minimize, and if feasible, avoid any harmful effects.*

3. *Projects should be sited and designed to avoid, or if avoidance is infeasible, minimize adverse impacts on any transition zone present between tidal and upland habitats. Where a transition zone does not exist and it is feasible and ecologically appropriate, shoreline projects should be designed to provide a transition zone between tidal and upland habitats.*

4. *To provide for the restoration of Bay wetlands, state, regional, and local government land use, tax, and funding policies should not lead to the conversion of restorable lands to uses that would preclude or deter potential restoration. The public should make every effort to acquire these lands for the purpose of habitat restoration and wetland migration.*

5. *Where feasible, former tidal marshes and tidal flats that have been diked from the Bay should be restored to tidal action in order to replace lost historic wetlands or should be managed to provide important Bay habitat functions, such as resting, foraging and breeding habitat for fish, other aquatic organisms, and wildlife. As recommended in the Baylands Ecosystem Habitat Goals Update report (2015), approximately 65,000 acres of areas diked from the Bay should be restored to tidal action and supported to maintain a healthy Bay ecosystem on a regional scale. Regional ecosystem targets should be updated periodically to incorporate the best available science to guide regionally appropriate conservation, restoration, and climate adaptation. To the greatest extent feasible, habitat projects should be sustained by natural processes; increase habitat connectivity; restore hydrological connections; provide opportunities for endangered species recovery; and provide opportunities for landward migration of Bay habitats. As conditions change, management measures may be needed to maintain habitat and ecological function in some areas.*

6. *Any habitat project should include clear and specific long-term and short-term biological and physical goals, success criteria, a monitoring program, and as appropriate, an adaptive management plan. Design and evaluation of the project should include an analysis of: (a) how the project's adaptive capacity can be*

enhanced so that it is resilient to sea level rise and climate change; (b) the impact of the project on the Bay's and local embayment's sediment transport and budget; (c) localized sediment erosion and accretion; (d) the role of tidal flows; (e) potential invasive species introduction, spread, and their control; (f) rates of colonization by vegetation; (g) the expected use of the site by fish, other aquatic organisms and wildlife; (h) an appropriate buffer, where feasible, between shoreline development and habitats to protect wildlife and provide space for marsh migration as sea level rises; (i) site characterization; (j) how the project adheres to regional restoration goals; (k) whether the project would be sustained by natural processes; and (l) how the project restores, enhances, or creates connectivity across Bay habitats at a local, sub-regional, and/or regional scale.

7. *If a habitat project's success criteria have not been met, benefits and impacts should be analyzed to determine whether appropriate adaptive measures should be implemented. If substantial adverse impacts on the Bay and/or native or commercially important species have occurred, the project should be further modified to reduce its impacts.*

8. *The level of design; amount, duration, and extent of monitoring; and complexity of the adaptive management plan required for a habitat project should be consistent with the purpose, size, impact, level of uncertainty, and/or expected lifespan of the project. Habitat projects should have a funding strategy for monitoring and adaptive management of the project, commensurate with the level of monitoring and adaptive management that is required for the project, to demonstrate that the applicant has considered costs and identified potential funding sources for any necessary monitoring and management.*

9. *The Commission should encourage and support regional efforts to collect, analyze, share, and learn from habitat monitoring data. Where feasible and appropriate, the Commission should encourage monitoring for habitat restoration projects that coordinates with regional efforts and improves the value and usefulness of data.*

10. *Based on scientific ecological analysis, project need, and consultation with the relevant federal and state resource agencies, fill may be authorized for habitat enhancement, restoration, or sea level rise adaptation of habitat.*

11. *The Commission should encourage and authorize pilot and demonstration projects that address sea level rise adaptation of Bay habitats. These projects should include appropriately detailed experimental design and monitoring to inform initial and future work. Project progress and outcomes should be analyzed and reported expeditiously. The size, design, and management of pilot and demonstration projects should be such that it will minimize the project's potential to negatively impact Bay habitats and species.*

12. *The Commission should encourage and support research on:*

    1. *Habitat restoration, enhancement, and creation approaches, including strategies for: increasing resilience to sea level rise, placing fill, evaluating habitat type conversion, enhancing habitat connectivity, and improving transition zone design.*

    2. *The estuary's sediment processes.*

    3. *Detection and monitoring of invasive species and regional efforts for eradication of specific invasive species.*

Policies for Subtidal Areas (Amended 2019) in the Bay Plan that are relevant to the Proposed Project are:

1. *Any proposed filling or dredging project in a subtidal area should be thoroughly evaluated to determine the local and Bay-wide effects of the project on: (a) the possible introduction or spread of invasive species; (b) tidal hydrology and sediment movement; (c) fish, other aquatic organisms and wildlife; (d) aquatic plants; and (e) the Bay's bathymetry. Projects in subtidal areas should be designed to minimize and, if feasible, avoid any harmful effects.*

2. *Subtidal areas that are scarce in the Bay or have an abundance and diversity of fish, other aquatic organisms and wildlife (e.g., eelgrass beds, sandy deep water or underwater pinnacles) should be conserved. Filling, changes in use; and dredging projects in these areas should therefore be allowed only if: (a) there is no feasible alternative; and (b) the project provides substantial public benefits.*

3. *Any subtidal habitat project should include clear and specific long-term and short-term biological and physical goals, success criteria, a monitoring program, and as appropriate, an adaptive management plan. Design and evaluation of the project should include an analysis of: (a) the ecological need for the project; (b) the effects of relative sea level rise; (c) the impact of the project on regional and local sediment budget and transport; (d) localized sediment erosion and accretion; (e) the role of tidal flows; (f) potential invasive species introduction, spread, and control; (g) rates of colonization by vegetation, where applicable; (h) the expected use of the site by fish, other aquatic organisms and wildlife; (i) characterization of and changes to local bathymetric features; (j) how the project will adhere to the best available and regionally appropriate science on subtidal restoration and conservation goals; and (k) whether the project would be sustained by natural processes.*

4. *If a habitat project's success criteria have not been met, benefits and impacts should be analyzed to determine whether appropriate adaptive measures should be implemented. If substantial adverse impacts on the Bay or native or commercially important species have occurred, the project should be further modified to reduce its impacts.*

5. *The level of design; amount, duration, and extent of monitoring; and complexity of the adaptive management plan required for a habitat project should be consistent with the purpose, size, impact, level of uncertainty, and/or expected lifespan of the project. Habitat projects should have a funding strategy for monitoring and adaptive management of the project, commensurate with the level of monitoring and adaptive management that is required for the project., to demonstrate that the applicant has considered costs and identified potential funding sources for any necessary monitoring and management.*

6. *The Commission should encourage and support regional efforts to collect, analyze, share, and learn from habitat monitoring data. Where feasible and appropriate, the Commission should encourage monitoring for habitat restoration projects that coordinates with regional efforts and improves the value and usefulness of data.*

7. *Subtidal restoration projects should be designed to: (a) promote an abundance and diversity of fish, other aquatic organisms and wildlife; (b) restore rare subtidal areas; (c) establish linkages between deep and shallow water and tidal and subtidal habitat in an effort to maximize habitat values for fish, other aquatic organisms and wildlife; or (d) expand open water areas in an effort to make the Bay larger.*

8. *Based on scientific ecological analysis and consultation with the relevant federal and state resource agencies, fill may be authorized for habitat enhancement, restoration, or sea level rise adaptation of habitat if the Commission finds that no other method of enhancement or restoration except filling is feasible.*

9. *The Commission should encourage and authorize pilot and demonstration projects that address sea level rise adaptation of Bay habitats. These projects should include appropriately detailed experimental design and monitoring to inform initial and future work. Project progress and outcomes should be analyzed and reported expeditiously. The size, design, and management of pilot and demonstration projects should be such that it will minimize the project's potential to negatively impact Bay habitats and species.*

10. *The Commission should continue to support and encourage expansion of scientific information on the Bay's subtidal areas, including: (a) inventory and description of the Bay's subtidal areas; (b) the relationship between the Bay's physical regime and biological populations; (c) sediment dynamics, including sand transport, and wind and wave effects on sediment movement; (d) oyster shell transport; (e) areas of the Bay used for spawning, birthing, nesting, resting, feeding, migration, among others, by fish, other aquatic organisms and wildlife; (f) where and how habitat restoration, enhancement, and creation should occur considering species/habitat needs and suitable project sites; and (g) if, where, and what type of habitat type conversion may be acceptable.*

Navigational Safety and Oil Spill Prevention policies (Amended July 2001) in the Bay Plan relevant to the Proposed Project are:

1. *Physical obstructions to safe navigation, as identified by the US Coast Guard and the Harbor Safety Committee of the San Francisco Bay Region, should be removed to the maximum extent feasible when their removal would contribute to navigational safety and would not create significant adverse environmental impacts. Removal of obstructions should ensure that any detriments arising from a significant alteration of Bay habitats are clearly outweighed by the public and environmental benefits of reducing the risk to human safety or the risk of spills of hazardous materials, such as oil.*

2. *The Commission should ensure that marine facility projects are in compliance with oil spill contingency plan requirements of the Office of Spill Prevention and Response, the US Coast Guard and other appropriate organizations.*

3.8.2 Environmental Setting

The land use and planning study area encompasses the SF Bay and shoreline areas, which occur in the following 11 counties: Marin, Sonoma, Napa, Solano, Sacramento, San Joaquin, Contra Costa, Alameda, Santa Clara, San Mateo, and San Francisco. BCDC[24] has jurisdiction over much of the study area, with the exception of a small portion of the eastern extent of the study area east of Pittsburg along the Suisun Bay Channel and the San Francisco Harbor MSC.

The Bay Plan, first adopted in 1969, and last updated in October 2019, is BCDC's policy document specifying goals, objectives, and policies for BCDC jurisdictional areas (BCDC 2020). Policies in the Bay Plan applicable to the Proposed Project include those in the following categories: Dredging; Fish, Other Aquatic Organisms, and Wildlife; Water Quality; Tidal Marshes and Tidal Flats; Subtidal Areas; and Navigational Safety and Oil Spill Prevention. Policies relevant to the Proposed Project are listed in Section 3.8.1.

The CCC has jurisdiction over the coastal zone, which extends approximately 3,000 feet into eastern end of the MSC, including SF-8 and the Ocean Beach Nearshore Placement Site (SF-17).

3.8.3 Methodology and Thresholds of Significance

The land use evaluation focuses on consistency with coastal land use policies and plans. The analysis considered whether the project would conflict with applicable land use plans, policies, or regulations that an agency with jurisdiction over the project has adopted to avoid or mitigate environmental effects.

[24] See discussion of BCDC and Bay Plan in Section 1.2.1.1

3.8.4 Impacts and Mitigation Measures

The project alternatives would involve the maintenance dredging of existing federal navigation channels and placement of dredged material at existing placement sites. These activities would have no potential to divide an existing community or substantially affect existing land uses and land use patterns in the study area, because no new land uses, types of activities, or improvements would be implemented. In addition, the use of any alternative placement sites identified in Section 1.5.2.2 would be unlikely to result in such impacts based on their location and existing surrounding land uses; however, USACE would not use the alternative placement sites identified in Section 1.5.2.2 until appropriate environmental review is completed, including evaluation of impacts on land use.

3.8.4.1 Impact LU-1: Potential Conflict with Applicable Plans and Policies

No Action Alternative/No Project Alternative

This land use evaluation focuses on land use policies that affect waters and shoreline development in the study area. Maintenance dredging and sediment placement operations have occurred in the waters of SF Bay for decades; the No Action Alternative and No Project Alternative would be a continuation of USACE's current maintenance dredging program for the federal navigation channels in SF Bay. Under the No Action Alternative and No Project Alternative, dredging and placement activities would be similar to USACE maintenance dredging operations previously concurred with by the CCC and BCDC. Bay Plan updates since the last project approvals (2015 EA/EIR and 2019 Consistency Determination) did not include additions or revisions that substantially change policies relevant to dredging and potential project impacts. In accordance with the CZMA, both the BCDC and the CCC would assess USACE's determination of consistency regarding dredging and placement operations within their respective jurisdictions. It is not expected that continuation of dredging operations would conflict with plans, regulations, or policies considered under the CZMA, including the California Coastal Management Program (CCMP) and the Bay Plan.

The No Action Alternative and No Project Alternative would not require any new land-based facilities or construction. Nor would they result in any new infrastructure or residences that may indirectly stimulate development or growth in the study area. USACE's dredging, transport, and placement activities would continue to be consistent with policies considered under the Bay Plan including Dredging policies; Fish, Other Aquatic Organisms, and Wildlife policies; Water Quality policies; Tidal Marshes and Tidal Flats policies; Subtidal Areas policies, and Navigational Safety and Oil Spill Prevention policies (see policies in Section 3.8.1). The BCDC would review USACE's consistency determination for dredging and placement activities that would occur within BCDC's jurisdiction to verify that the activities would be consistent, to the maximum extent practicable, with the Bay Plan.

USACE's dredging, transport, and placement activities would continue to be consistent with policies considered under the California Coastal Management Plan and Article 4 of the California Coastal Act. The only federal navigation channel within the jurisdiction of the CCC addressed in this Draft EA/EIR is the San Francisco Harbor MSC. Placement sites SF-17 and a portion of SF-8 are within CCC's jurisdiction. For previous dredging operations, USACE submitted a negative determination to the CCC for maintenance dredging at the San Francisco Harbor MSC and placement of dredged material at SF-8, SF-

17, and onshore at Ocean Beach. A federal agency may submit negative determination for an activity that "is the same as or is similar to activities for which consistency determinations have been prepared in the past (15 CFR § 930.35(a)(2))." The negative determination demonstrated that the proposed dredging and placement activities for the San Francisco Harbor MSC would be consistent—to the maximum extent practicable—with the CCMP and Article 4 of the California Coastal Act; and that the proposed activities were consistent with the annual maintenance dredging program for the San Francisco Harbor MSC implemented by USACE, and previously concurred with by the CCC. While the CCC has concurred with USACE's negative determination in the past and for future dredging operations, USACE would be required to request concurrence from the CCC on a negative determination to verify that continuing activities would be consistent to the maximum extent practicable with the CCMP and California Coastal Act.

Since the federal navigation channels discussed in this Draft EA/EIR are designated navigation projects authorized by Congress, dredging and placement activities would not require a lease agreement from the CSLC for use of public trust lands based on the navigational servitude provisions of the Submerged Lands Act. While the Submerged Lands Act confers CSLC ownership over all submerged navigable lands within the state, it explicitly recognizes the federal government's constitutional authority regarding navigation matters, thus exempting such projects.

The No Action Alternative and No Project Alternative would comply with applicable land use plans and policies.

- **NEPA Determination:** Under the No Action Alternative, there would be no impact on land use as related to potential conflict with applicable plans and policies.
- **CEQA Determination:** Under the No Project Alternative, there would be no impact on land use as related to potential conflict with applicable plans and policies.

Alternatives 1 Through 4

Implementation of Alternatives 1 through 4 would be very similar to the No Action Alternative and No Project Alternative. All alternatives would remain compliant with plans, regulations, or policies considered under the CZMA, including the CCMP and the Bay Plan. Alternatives 1 through 4 would increase beneficial use and habitat restoration, as compared to the No Action Alternative and No Project Alternative, and would support BCDC's habitat restoration and SLR adaptation.

- **NEPA Determination**: Under Alternatives 1 through 4, there would be adverse effect on land use as related to potential conflict with applicable plans and policies. Project activities would comply with applicable land use plans and policies under all alternatives. With increase in beneficial placement, which supports Bay Plan policies and goals, there would be an overall beneficial impact from the project related to compliance with land use policies.
- **CEQA Determination**: Under Alternatives 1 through 4, there would be no impact on land use. Project activities would comply with applicable land use plans and policies under all alternatives.

3.8.4.2 Impact LU-2: Potential for Dredging, Transport, and Placement Activities to Result in Cumulative Impacts on Land Use

No Action Alternative/No Project Alternative, Alternatives 1 Through 4

Because the project would not result in any land use impacts (i.e., the project would not conflict with applicable land use plans and policies), it would not contribute to cumulative land use impacts.

- **NEPA Determination**: Project alternatives would not contribute to cumulatively considerable impacts on land use.
- **CEQA Determination**: Project alternatives would not contribute to cumulatively considerable impacts on land use.

3.9 Transportation and Traffic

This section describes the existing transportation systems and infrastructure in the study area and analyzes potential transportation impacts from implementation of the alternatives. As described in Chapter 2, Alternatives, the project alternatives would involve maintenance dredging of the federal navigation channels, and transport and placement of the dredged material, at a combination of in-water and adjacent landward placement sites.

Dredged material is rarely transported by land because this method is more expensive and inefficient compared to water transport. Transport of dredged material by truck or train would only occur in circumstances where dredged material that is not suitable for unconfined aquatic disposal requires secondary placement. In this case, sediments would be transported by dredge or barge to a rehandling site until the sediments are dry, at which point they would be taken to a land-based facility such as a landfill via truck or train. As discussed in Section 3.5.2.2, sediment testing results indicate that dredged material from the subject federal navigation channels would be suitable for unconfined aquatic placement therefore, transport of dredged material on land would be rare. Land-based transport of dredged material from USACE's maintenance dredging projects in SF Bay did not occur during the 2000 to 2012 baseline period or in the last 10 years under permitted maintenance dredging. There is extensive roadway, railway, bicycle, and pedestrian infrastructure within the study area; however, since land-based transport of dredged material would be rare, the project's alternatives would not result in noticeable impacts on vehicle, rail, pedestrian, or bicycle use. Because impacts on land-based transportation and transit would be negligible, these modes of transportation are not further discussed in this section. Therefore, this section evaluates the potential impact of the project alternatives on marine navigation in the study area.

3.9.1 Regulatory Setting

Regulatory authorities relevant to transportation and traffic are discussed in the sections below.

3.9.1.1 Federal

Inland Navigational Rules Act

The Inland Navigational Rules Act of 1980 (Public Law 96-591, 94 Stat. 3415, 33 C.F.R. pt. 83), more commonly known as the Inland Rules, governs many rivers, lakes, harbors, and inland waterways including SF Bay. Rule 27, Vessels Not Under Command or Restricted in Their Ability to Maneuver, specifies lighting and safety requirements for vessels engaged in dredging or underwater operations that are restricted in their ability to maneuver. In addition, Title 33 C.F.R. § 88.15 contains requirements for lighting on floating or supported dredge pipelines.

United States Marine Highway Program, Energy Independence and Security Act

The United States Marine Highway Program, Energy Independence and Security Act of 2007 (§§ 1121 and 1123), which is administered by the USDOT Maritime Administration (MARAD) is intended to expand the use of inland, Great Lakes Saint Lawrence Seaway System, intracoastal, and coastal waterways for the transportation of freight and passengers to mitigate landside congestions, reduce greenhouse gas emissions per ton-mile moved and accomplish other objectives. The program, which is loosely based on the European model of inland waterways, saw major updates in 2023.

3.9.1.2 Regional

San Francisco Bay Area Water Emergency Transportation Authority

The San Francisco Bay Water Emergency Transportation Authority (WETA) is a regional public transit agency tasked with operating and expanding ferry service on SF Bay. WETA also coordinates water transit response during regional emergencies.

3.9.2 Environmental Setting

3.9.2.1 Study Area

The Proposed Project involves maintenance dredging of federal navigation channels, and transport and placement of dredged material at in-water and shoreline beneficial use sites. Dredged material is primarily transported via water vessels, which is more cost-effective and efficient than land-based transportation (see Section 2.3.1.3). Because land-based transportation and transit would be minimal relative to the total volume of dredged material transport, as well as existing levels of land-based traffic, these modes of transportation are not further discussed in this section. This section focuses on the evaluation of the potential impact of the project alternatives on marine navigation in the study area.

3.9.2.2 Vessel Movement in the Study Area

Vessel activity within SF Bay encompasses both incoming and outgoing ships as well as movements solely within the Bay Area. This vessel traffic includes tugs, government vessels, passenger ferry ships, cruise ships, commercial shipping vessels, recreational boats, commercial and sport fishing boats, board sailors, and personal watercraft.

SF Bay ranks among the four largest Pacific Coast ports for container cargo. The Port of Oakland loads and discharges more than 99 percent of the containerized goods moving through Northern California. Oakland's cargo volume made it the ninth busiest container port in the United States in 2023 (Port of Oakland 2024). The Bay Area includes four additional ports, and the proposed dredging activities would support the continued operation of the Port of Sacramento and the Port of Stockton (USACE and Regional Water Board 2015).

The United States Marine Highway Program aims to relieve landside congestion, reduce air emissions, and generate other public benefits by increasing the efficiency of the surface transportation system by promoting waterways as an alternative to landside shipping and transportation. The Marine Highway M-580 Route includes the Sacramento and San Joaquin Rivers, and connects commercial navigation channels, harbors, and ports in Northern California from Sacramento to Oakland and beyond the SF Bay Area via the M-5 route. If fully implemented, a proposed marine highway service between the Ports of Oakland, Stockton, and West Sacramento, in the Bay Area would see improvements in congestion on major roadways. It would significantly reduce the amount of truck emissions associated with the current distribution system (USDOT 2024b). Proposed dredging activities would support sections of both marine highways in the Bay Area.

Maneuvering deep-draft ships in narrow channels with minimal underkeel clearance poses high navigational risks, given the complexities of tides, currents, and weather conditions in the Bay. To avoid grounding, deep-draft vessels traveling through SF Bay are usually restricted to the main shipping channels. Instances of vessels running aground have been documented across various areas of the region, primarily attributed to the narrow width of numerous channels. Groundings may result in damage to vessels and property, with the potential for serious environmental consequences. If a vessel becomes stranded within a channel, it can impede the passage of other vessels or contribute to the formation of new shoals, which may cause significant disruptions to maritime commerce (HSC 2020).

Critical Maneuvering Areas (CMA) are areas within the SF Bay and Delta Region where additional standards of care are required due to the restrictive nature of the channel, the prevalence of adverse currents, or the proximity of hazards. Large vessels, tugs with tows of 1,600 gross tons or more, and all tugs with tows in petroleum service should not transit through CMAs when visibility is less than 0.5 nautical mile. Locations in the Bay identified as CMAs are Redwood Creek, San Mateo-Hayward Bridge, Islais Creek Channel, Oakland Harbor Regulated Navigation Area, San Francisco-Oakland Bay Bridge (West of Treasure Island), Richmond Inner Harbor, the east span of the Richmond–San Rafael Bridge, the Union Pacific Bridge, the up-bound New York Slough, and the Rio Vista Lift Bridge (HSC 2020).

Environmental Setting and Environmental Analysis

Water transit carries only a fraction of the total SF Bay Area travelers, but it plays a meaningful role in reducing congestion and providing mobility in the key trans-Bay bridge corridors throughout the SF Bay Area. The SF Bay Area WETA manages the largest ferry service in the Bay. Since 2017, WETA has introduced seven vessels that accommodate 400 passengers or more and in 2019 the SF Bay Ferry served over three million passengers for the first time. Ferry service throughout the Bay is expected to increase, requiring new ports, port expansions, and more vessels (WETA 2024a). Existing ferry service is summarized in Table 3-26. Services to Oakland and Vallejo use the federal navigation channels.

Table 3-26. Existing Regional Network of Ferry Transit Services and Operators

Corridor/Ferry Route	Operators
Alameda (Main Street): Oakland	WETA (Blue & Gold Fleet)[1]
Angel Island: Tiburon	Angel Island, Tiburon Ferry Company
Pier 41 – Sausalito	Blue and Gold Fleet
San Francisco: Alameda (Seaplane Lagoon)	WETA (Blue & Gold Fleet)[1]
San Francisco: Harbor Bay	WETA (Blue & Gold Fleet)[1]
San Francisco: Oakland—Alameda (Main Street)	WETA (Blue & Gold Fleet)[1]
San Francisco: Richmond	WETA (Blue & Gold Fleet)[1]
San Francisco: Vallejo—Mare Island	WETA (Blue & Gold Fleet)[1]
San Francisco: Pier 41	WETA (Blue & Gold Fleet)[1]
San Francisco: Larkspur	Golden Gate Bridge, Highway and Transportation District
San Francisco: Sausalito	Golden Gate Bridge, Highway and Transportation District
San Francisco: Tiburon	Golden Gate Bridge, Highway and Transportation District
San Francisco: Angel Island State Park	Golden Gate Bridge, Highway and Transportation District
San Francisco: Treasure Island	Treasure Island, Yerba Buena Island Ferry
South San Francisco: Oakland—Alameda (Main Street)	WETA (Blue & Gold)[1]

Sources: Angel Island Tiburon Ferry 2024; Blue and Gold Fleet 2024; Golden Gate Bridge, Highway and Transportation District 2024; Treasure Island San Francisco 2024; WETA 2024b

[1] Blue & Gold Fleet operates these services under an O&M contract with WETA.

Key: WETA = San Francisco Bay Area Water Emergency Transportation Authority

3.9.3 Methodology and Thresholds of Significance

Because the Proposed Action/Proposed Project and alternatives would be conducted in waterways, this transportation evaluation focuses on marine navigation. Many of the CEQA Appendix G thresholds for transportation/traffic, as written, do not apply to the project alternatives because they are focused on land-based or air transportation. Therefore, the following project-specific thresholds were established considering the topics addressed in the transportation/traffic CEQA thresholds that could be applied to navigation to evaluate the potential for navigation impacts under NEPA and CEQA:

- Would the project alternatives disrupt or substantially impede marine navigation including mass transit? For the purposes of this analysis, a marine traffic disruption would occur if dredging or placement activities substantially interfered with vessel navigation, and/or substantially increased the volume of vessel movement in the study area.
- Would the project alternatives result in inadequate emergency access or create substantial navigational safety risks?

3.9.4 Impacts and Mitigation Measures

3.9.4.1 Impact TR-1: Potential to Disrupt or Impede Marine Navigation

No Action Alternative

Maintenance dredging and sediment placement operations have occurred in the waters of SF Bay for decades; the No Action Alternative would be a continuation of USACE's current maintenance dredging program for the federal navigation channels in SF Bay, as authorized.

Dredging is temporary and its duration depends on factors such as the volume of sediment in each channel, the frequency of dredging, and the equipment used for dredging and transporting sediment. For the federal channels addressed in this Draft EA/EIR, the duration of dredging ranges from 5 to 65 days; however, vessels and equipment move along the channel as dredging operations occur, limiting the amount of time a dredge would be operating in a specific location. Federal navigation channels are generally wide enough to allow the passage of vessel traffic and accommodate dredge equipment at the same time. Dredges would move out of the way for larger vessels to pass, but dredging activities may occasionally impede or delay some vessels. Under all alternatives, dredging and placement activities would comply with all applicable safety and vessel traffic requirements, including specifications for dredge pipelines.

Hopper dredges generally have less impact on marine navigation because they are self-propelled, move continuously during dredging operations and can store dredged material for transport. Cutterhead-pipeline and clamshell-bucket dredges often take up more space in a channel since operations require the use of a dredge plant, where dredge equipment is located, and four or five support vessels in the immediate dredge area to provide equipment and maneuver the dredge plant. Additionally, cutterhead and clamshell-bucket dredges are stationary during operation and may need to temporarily cease dredging activities to move out of the way of larger passing vessels. Cutterhead-pipeline dredges pump material directly onto placement sites, therefore, it does not involve transport of dredged material by

vessel. However, clamshell dredges do require additional vessels to store and transport dredged material to placement sites.

Maintenance dredging and placement operations are anticipated to increase vessel activity within the study area, particularly during transport to placement sites; however, the amount of vessel traffic would be similar to traffic levels during previous maintenance dredging initiatives by USACE. An increase in vessel traffic due to dredging operations would be negligible considering the existing volume of vessel movement in the study area. Therefore, adverse impacts on navigation under the No Action Alternative would be minimal and short-term. Dredging would have a long-term beneficial impact by removing shoaled sediment and maintaining the navigability of the federal channels.

- **NEPA Determination**: Under the No Action Alternative, short-term impacts on marine navigation would be less than significant, and long-term impacts would be beneficial. The overall potential impact for dredging, transport, and placement activities to have the potential to disrupt or impede marine navigation is less than significant.

No Project Alternative

Under the No Project Alternative, existing dredging activities and the current dredging program as implemented by USACE would continue irrespective of current federally authorized dredging frequencies for channels. For Richmond Outer Harbor and Pinole Shoal, dredging would occur every other year rather than annually. The reduced annual maintenance, or entire lack annual maintenance of dredging for Richmond Outer Harbor and Pinole Shoal channels would potentially increase the risk of a navigational hazard that would result in vessel groundings, allisions, or collisions, as well as oil spills that could result from such incidents. However, under this alternative, similar to other alternatives evaluated in this Draft EA/EIR, emergency dredging would be performed by USACE to address navigation hazards if the depth of a channel becomes a concern for navigation, as reported by the San Francisco Bar Pilots, then subject to issuance of an emergency declaration by the USCG, then review and action by USACE.

- **CEQA Determination**: Under the No Project Alternative, impacts on marine navigation would be less than significant.

Alternatives 1 Through 4

Implementation of Alternatives 1 through 4 would be very similar to the No Action Alternative and No Project Alternative, but Alternatives 1 through 4 have slightly different dredging methods in some locations. The alternatives using cutterhead-pipeline and clamshell-bucket dredges instead of hopper dredges may result in more significant impacts on marine navigation during dredging operations since they are not as mobile and require more equipment, thus taking up more space in the channel.

The following channels have different anticipated dredging methods depending on the alternative: Inner Richmond Harbor, Richmond Outer Harbor, and San Pablo Bay (Pinole Shoal). Dredging in Inner Richmond Harbor would use clamshell dredges for Alternatives 1 and 4, and hopper dredges for Alternatives 2 and 3 compared to clamshell dredges for the No Action Alternative and No Project Alternative. Alternatives 1 through 4 would use a hopper or cutterhead-pipeline dredge as an alternate

method if necessary. Dredging in Richmond Outer Harbor and San Pablo Bay (Pinole Shoal) would use a hopper dredge for all Alternatives except Alternative 4 which would use a clamshell dredge. Alternatives 1 through 3 would use a clamshell or cutterhead-pipeline dredge and Alternative 4 would use a hopper or cutterhead-pipeline dredge as an alternate method, as necessary. Alternatives with clamshell and cutterhead-pipeline methods may result in short-term adverse impacts on marine navigation during dredging operations; however, the impacts on marine navigation would be negligible considering the existing volume of vessel movement in the study area in the project area. The following channels have different alternate dredging methods from the No Action Alternative and No Project Alternative: Oakland Inner and Outer, Petaluma Across the Flats, Redwood City Harbor channels, San Bruno Shoal, San Rafael Creek, and Suisun Bay Channel. The alternate dredging methods would only occur in certain circumstances and may result in short-term beneficial or adverse impacts on marine navigation depending on the dredging method.

Delays may occur more frequently in alternatives with cutterhead-pipeline and clamshell-bucket dredges; however, dredging operations are not anticipated to cause significant adverse impacts on marine navigation since most federal channels are wide enough to allow for vessels to pass while dredging equipment is present. In all alternatives, dredging operations would be paused to move equipment to allow for larger vessels to pass if necessary. The USCG is responsible for organizing vessel traffic and maintaining regulated navigation areas to reduce vessel congestion where maneuvering room is limited.

Therefore, adverse impacts on navigation under Alternatives 1 through 4 would be minimal and short-term. Dredging would have a long-term beneficial impact by removing shoaled sediment and maintaining the navigability of the federal channels.

- **NEPA Determination**: Under Alternatives 1 through 4, short-term impacts on marine navigation would be less than significant and long-term impacts would be beneficial. The overall potential impact for dredging, transport, and placement activities to have the potential to disrupt or impede marine navigation is less than significant.
- **CEQA Determination**: Under Alternatives 1 through 4, impacts on marine navigation would be less than significant.

3.9.4.2 Impact TR-2: Potential to Create Navigational Safety Risks

No Action Alternative/No Project Alternative, Alternatives 1 Through 4

Under all alternatives, dredging and placement activities would comply with applicable vessel traffic and safety requirements, including specifications for dredge pipelines. Notes to mariners and navigational warning markers would be used as needed to prevent navigational hazards. Additional in-Bay placement may occur under the Alternatives 1 through 4, as compared to the No Action Alternative and No Project Alternative. However, there would not be a significant increase in mounding or creation of a new navigation hazard (see Section 3.5.4.3).

Therefore, there would be no impacts related to navigational safety risks.

Dredging would have a long-term beneficial impact by removing shoaled sediment that could pose a navigation hazard and thus allowing for safe navigation in the federal channels.

- **NEPA Determination**: Under all alternatives, impacts on navigational safety under all alternatives would be beneficial.
- **CEQA Determination**: Under all alternatives, there would be no impacts on navigational safety.

3.9.4.3 Impact TR-3: Potential for Dredging, Transport, and Placement Activities to Result in Cumulative Impacts on Transportation and Traffic

No Action Alternative/No Project Alternative, Alternatives 1 Through 4

The project alternatives may temporarily delay vessels while dredge equipment is present in channels which would have short-term adverse impacts on navigation in federal channels. Present and reasonably foreseeable projects described in Table 3-2 may require vessel use in federal channels; however, most vessels associated with these projects are mobile and would not be expected to result in cumulative impacts related to transportation. Anticipated projects that require dredging within federal channels would also require dredging equipment that may cause short-term adverse impacts on transportation. However, multiple dredging projects are not anticipated to happen in the same location at the same time; therefore, would not contribute to cumulative impacts. Additionally, the Proposed Project would not cause long-term adverse impacts related to transportation; therefore, it would not contribute to cumulative transportation use impacts.

- **NEPA Determination**: The project alternatives would not contribute to cumulatively considerable impacts on navigation.
- **CEQA Determination**: The project alternatives would not contribute to cumulatively considerable impacts on navigation.

3.10 Summary of Impacts and Mitigation Measures for Proposed Action/Proposed Project

This section provides a summary of potential impacts and mitigation measures for the Proposed Action/Proposed Project as a whole (Table 3-27). As described in Section 3.1.4, the potential environmental impacts of the Proposed Action/Proposed Project assume that USACE will proceed with a phased implementation of the No Project Alternative, Alternative 1, and Alternative 2. Specifically, this impact analysis approach for the Proposed Action/Proposed Project considers the impacts described within the No Project Alternative for the first year, Alternative 1 for the next 1 to 2 years, approximately, and Alternative 2 for subsequent years to analyze the effect over the entire 10-year period. Accordingly, impacts, minimization, and mitigation from the Proposed Action/Proposed Project during the first year will be equivalent to impacts, minimization, and mitigation described under the No Project Alternative above. Impacts and minimization during the next 1 to 2 years will be equivalent to impacts and minimization described under Alternative 1 measures above. Impacts and minimization in subsequent years will be equivalent to impacts and minimization described under Alternative 2 above. Further, considering the Proposed Action/Proposed Project as a whole, there are no additional impacts beyond those described under the alternatives above. As such, impacts from the Proposed Action/Proposed Project will be less

than significant and not cumulatively considerable with mitigation and minimization described under each of the alternatives above.

Table 3-27. Summary of Net Impacts and Findings for Proposed Action/Proposed Project

Potential Impact Pathway	Mitigation Measures[1]	Proposed Action/Proposed Project
Air Quality, Climate Change, and Greenhouse Gas Emissions		
Impact AQ-1: Potential violation of any air quality standard or contribute substantially to an existing or projected air quality violation.	No Mitigation Measures	NEPA: LTS CEQA: LTS
Impact AQ-2: Potential conflict with or Obstruction of Implementation of an Applicable Air Quality Plan.	No Mitigation Measures	NEPA: B CEQA: NI[2]
Impact AQ-3: Potential for exposure of Sensitive Receptors to Substantial Pollutant Concentrations.	No Mitigation Measures	NEPA: LTS CEQA: LTS
Impact AQ-4: Potential to Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.	No Mitigation Measures	NEPA: LTS CEQA: LTS
Impact AQ-5: Result in Cumulative Impacts on Regional Air Quality	No Mitigation Measures	NEPA: NSCI CEQA: NSCI
Biological Resources		
Impact BI-1: Potential Effects on Fish and Benthic Invertebrate Survival Caused by Entrainment	BI1-1: Compensatory Mitigation – *No Project*	NEPA: LTS CEQA: Significant when implementing the No Project Alternative; reduced to LTS with BI1-1 Mitigation Measure
Impact BI-2: Potential Adverse Effects of Increased Turbidity Caused by Dredging and Material Placement on Special-Status Species, Critical Habitat and Commercially Valuable Marine Species	No Mitigation Measures	NEPA: LTS CEQA: LTS
Impact BI-3: Potential Effects on Fish and Marine Mammals Caused by Noise from Dredging Activities	No Mitigation Measures	NEPA: LTS CEQA: LTS
Impact BI-4: Potential Effects of Maintenance Dredging and Material Placement on Benthic Habitat	No Mitigation Measures	NEPA: LTS CEQA: LTS

Potential Impact Pathway	Mitigation Measures[1]	Proposed Action/Proposed Project
Impact BI-5: Potential Effects Caused by Upland Beneficial Use of Dredged Material Placement	No Mitigation Measures	NEPA: B CEQA: LTS
Impact BI-6: Potential Effects Caused by the Resuspension of Contaminated Sediments	No Mitigation Measures	NEPA: LTS CEQA: LTS
Impact B7: Potential Interference of Migratory Passage for fish and marine mammals	No Mitigation Measures	NEPA: LTS CEQA: LTS
Impact BI-8: Potential Effects of Dredging Activities on Roosting, Nesting, and Foraging Avian Species	No Mitigation Measures	NEPA: LTS CEQA: LTS
Impact BI-9: Potential Disturbance of EFH and "Special Aquatic Sites" Including Eelgrass Beds and Mudflats	No Mitigation Measures	NEPA: LTS CEQA: LTS
Impact BI-10: Potential for Dredging, Transport, and Placement Activities to Result in Cumulative Impacts on Biological Resources	No Mitigation Measures	NEPA: NSCI CEQA: NSCI
Cultural and Tribal Resources		
Impact CT-1: Substantial Adverse Change to a Historical Resource or Disturb Unique Archaeological Resources	CT1.-1: Cultural Resources Monitoring Program – *All Alternatives* CT1-2: Inadvertent Archaeological Discovery – *All Alternatives*	NEPA: LTS with mitigation CEQA: LTS with mitigation
Impact CT-2: Potential to Disturb Human Remains, including those Interred Outside of Formal Cemeteries	CT2-1: Treatment of Human Remains – *All Alternatives*	NEPA: LTS with mitigation CEQA: LTS with mitigation
Impact CT-3: Potential Impacts to Native American Sacred Sites or Religious Ceremonies	No Mitigation Measures	NEPA: LTS CEQA: LTS
Impact CT-4: Potential for Dredging, Transport, and Placement Activities to Result in Cumulative Impacts on Historical Resources	All Alternatives: CT1.-1: Cultural Resources Monitoring Program CT1-2: Inadvertent Archaeological Discovery CT2-1: Treatment of Human Remains	NEPA: NSCI with mitigation CEQA: NSCI with mitigation

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Potential Impact Pathway	Mitigation Measures[1]	Proposed Action/Proposed Project
Geology, Soils, and Sediment Quality		
Impact GE-1: Potential for Dredging, Transport, and Placement Activities to Result in Substantial Soil Erosion	No Mitigation Measures	NEPA: LTS CEQA: LTS
Impact GE-2: Potential for Dredging, Transport, and Placement Activities to Substantially Degrade Sediment Quality	No Mitigation Measures	NEPA: LTS CEQA: LTS
Impact GE-3: Potential for Dredging, Transport, and Placement Activities to Result in Substantial in-Bay Sediment Mounding	No Mitigation Measures	NEPA: LTS CEQA: LTS
Hazards and Hazardous Materials		
Impact HM-1: Potential Public or Environmental Exposure from the Transport, Use, and Disposal of Hazardous Materials	No Mitigation Measures	NEPA: LTS CEQA: LTS
Impact HM-2: Potential Impacts to Implementation of an Adopted Emergency Response Plan	No Mitigation Measures	NEPA: B CEQA: LTS
Impact HM-3 Potential for Dredging, Transport, and Placement Activities to Result in Cumulative Impacts on Hazards and Hazardous Materials	No Mitigation Measures	NEPA: NSCI CEQA: NSCI
Hydrology and Water Quality		
Impact HY-1: Potential to Substantially Degrade Water Quality through Alteration of Water Temperature, Salinity, pH, and Dissolved Oxygen	No Mitigation Measures	NEPA: LTS CEQA: LTS
Impact HY-2: Potential to Substantially Degrade Water Quality Because of Increased Turbidity	No Mitigation Measures	NEPA: LTS CEQA: LTS
Impact HY-3: Potential to Substantially Degrade Water Quality from Mobilization of Contaminated Sediments or Release of Hazardous Materials	No Mitigation Measures	NEPA: LTS CEQA: LTS
Impact HY-4: Potential for Dredging, Transport, and Placement Activities to Result in Cumulative Impacts on Hydrology or Water Quality	No Mitigation Measures	NEPA: NSCI CEQA: NSCI

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Potential Impact Pathway	Mitigation Measures[1]	Proposed Action/Proposed Project
Land Use and Planning		
Impact LU-1: Potential Conflict with Applicable Plans and Policies	No Mitigation Measures	NEPA: No Impact CEQA: No impact
Impact LU-2: Potential for Dredging, Transport, and Placement Activities to Result in Cumulative Impacts on Land Use	No Mitigation Measures	NEPA: NSCI CEQA: NSCI
Transportation and Traffic		
Impact TR-1: Potential to Disrupt or Impede Marine Navigation	No Mitigation Measures	NEPA: LTS CEQA: LTS
Impact TR-2: Potential to Create Navigational Safety Risks	No Mitigation Measures	NEPA: B CEQA: NI[2]
Impact TR-3: Potential for Dredging, Transport, and Placement Activities to Result in Cumulative Impacts on Transportation and Traffic	No Mitigation Measures	NEPA: NSCI CEQA: NSCI

[1] Standard Practices and avoidance and minimization measures, as identified in LTMS BiOps (NMFS 1998, 2015; USFWS 1999, 2004a, 2004b, 2024) and EFH Consultation (USACE and USEPA 2011) would be employed under all alternative to reduce impacts to species and habitat. See Section 2.3.1.5 for more information.

[2] Impacts would be similar under NEPA and CEQA; however, CEQA does not permit beneficial impact determinations.

Key: B = beneficial
CEQA = California Environmental Quality Act
EFH = essential fish habitat
LTS = less than significant
NEPA = National Environmental Policy Act
NI = no impact
NSCI = no significant cumulative impacts

4.0 Public, Agency, and Tribal Involvement

This chapter summarizes the outreach efforts conducted to the public, agencies, and tribes as part of this project to request their involvement. Public and agency participation has occurred as a part of the environmental review process, pursuant to the requirements of NEPA and CEQA. Tribal outreach has also occurred in accordance with federal and state requirements. Stakeholders and public agencies, including those with permitting authority for the project, have been engaged and involved as described below. This section will be updated throughout the NEPA/CEQA process as additional involvement occurs.

4.1 Notice of Preparation and Public Scoping

Consistent with CEQA guidance for preparation of an EIR, the Regional Water Board submitted an NOP to the California State Clearinghouse on February 13, 2024, to alert potentially interested parties of the project and to invite participation in the environmental review process. The NOP was also posted to the USACE and Regional Water Board websites and distributed through the LTMS, RDMMP, and Regional Water Board's CEQA email listservs. The NOP included the project description and a figure of the study area. It also announced the scoping period and public scoping meeting information.

The scoping period ran from February 13, 2024, through March 14, 2024. A scoping meeting with option for in-person or virtual participation was held at the Regional Water Board's office in Oakland, California, on Tuesday, March 5, from 4:00 to 6:00 p.m. The purpose of the scoping meeting was to solicit public comments on the scope of the EA/EIR and provide a brief overview of the proposed alternatives to the public. The scoping meeting presentation explained the public comment process, the environmental review process and schedule, and the procedure for submitting oral and written comments. There were 21 participants at the meeting. All participants were virtual; there were no in-person attendees.

Twenty-one comments were received during the public scoping period. Eight comments were received from four attendees during the scoping meeting. An additional 13 comment letters were received via email. Appendix F provides a summary of all comments received, organized by applicable resource area, along with comment responses. Although all comments were considered, some comments pertained to items beyond the scope of this Draft EA/EIR and therefore were not addressed in this document.

4.2 Review of the Public Draft EA/EIR

A Draft EA/EIR notice of availability was distributed through the same avenues as those used for scoping, with updates made to reflect any feedback received via the scoping process. During the public review period, written comments should be sent to USACE at SF-Bay-Dredging@usace.army.mil and the Regional Water Board, c/o Jazzy Graham-Davis (Jazzy.Graham-Davis@Waterboards.ca.gov).

The Draft EA/EIR is available at

- San Francisco Regional Water Quality Control Board
  1515 Clay Street, Suite 1400
  Oakland, CA 94612

An electronic copy of the Draft EA/EIR is available at: San Francisco District > Missions > Projects and Programs > Regional Dredge Material Management Plan.

Commenters should use "SF Bay Dredging EA/EIR" in the subject line for comments on the Draft EA/EIR. Commenting agencies and organizations should include the name of a contact person for the agency or organization. Commenters will be automatically added to the distribution list for future notices and information about the Proposed Project environmental review process. All comments received, including names and addresses, will become part of the official administrative record and may be available to the public. Commenters may request USACE and the Regional Water Board withhold contact information from public disclosure, which will be honored to the extent allowable under California law. For USACE and the Regional Water Board to consider withholding contact information, this request must be stated prominently at the beginning of the submitted comments.

During the review period, a public meeting will be held on November 19, 2024. A meeting notice will be published 10 days before the meeting with time and participation information, including, if applicable, an in-person location. There will be a remote attendance option.

4.3 Agencies and Organizations Contacted

Table 4-1 lists the federal, state, and local agencies and other organizations that were contacted during the preparation of this Draft EA/EIR (this list will be updated as the NEPA/CEQA process advances).

Table 4-1. Agencies and Organizations Contacted

Agencies and Organization Contacted	
Federal Agencies	
• NMFS • USFWS • US Coast Guard • US Coast Guard Civil Engineering Unit Oakland • USEPA (LTMS Executive Committee member) • USFWS LTMS Management Committee member	• Federal Emergency Management Agency • National Park Service • NOAA Office of Coastal Management • San Francisco Veterans Affairs Medical Center • USDOT • US Department of Agriculture
State and Local Agencies	
• Alameda County Flood Control Zone 7 • Alameda County Flood Control District • BART • BCDC (LTMS Executive Committee member) • California Department of Transportation	• Contra Costa County Flood Control and Water Conservation District • East Bay Regional Park District • Marin County • Napa County Flood Control and Water Conservation District

Public, Agency, and Tribal Involvement

Agencies and Organization Contacted	
• California Department of Water Resources • California State Coastal Conservancy • CSLC • CDFW (LTMS Executive Committee member) • CSLC (LTMS Management Committee member for DMMO issues) • City of Alameda • City of Pacifica • City of Petaluma • City of San Francisco • City of San Rafael • City of Sausalito	• San Francisco Airport • San Francisco Regional Water Quality Control Board Region 2 • San Francisco Public Utilities Commission • Solano County • Sonoma County • Sonoma County Regional Parks • Sonoma Water • South Bay Salt Ponds Restoration Project • State Coastal Conservancy (LTMS Management Committee member for beneficial reuse issues) • Suisun Resource Conservation District • Valley Water
Organizations	
• Bay Planning Coalition • Bay.org • British Petroleum (BP) • California Marine Affairs Navigation Conference • California State University East Bay • Chevron • Curtin Maritime • Delta Stewardship Council • Dixon Marine Services • Ducks Unlimited • Dutra Group • Ellen Johnck Consulting • Environmental Resources Management • Environmental Science Associates • Manson Construction • Marathon Petroleum • Mare Island Dry Dock • Moran Shipping • Natural Resources Defense Council • One Shoreline • Point Blue Conservation Science	• Port of Oakland • Port of Redwood City • Port of Richmond • Port of San Francisco • Port of Stockton • Port of West Sacramento • RI Dredge • San Francisco Bay Joint Venture • San Francisco Bay Restoration Authority • San Francisco Baykeeper • SFEI • San Francisco Estuary Partnership • San Francisco Marine Exchange • San Mateo Harbor • Save San Francisco Bay • Schoonmaker Marina • Shell • Stevedoring Services of America • TSO Corp • Valero • Wild Oyster Project

4.4 Tribal Notification

Per USACE Tribal Consultation Policy (USACE 2012c), USACE must "provide affected Tribes an opportunity to participate in the decision-making process that will ensure these tribal interests are given due consideration in a manner consistent with tribal sovereign authority; Consulting, consistent with government-to-government relations and consistent with protocols mutually agreed to by the particular tribe and the US Department of Defense, including necessary dispute resolution processes." USACE acknowledges all federally recognized tribes are sovereign governments; thus, those tribes located in the study area are considered rightsholders. USACE has a fundamental tribal trust responsibility and will maintain government-to-government relationships with tribes.

AB 52 amended CEQA and created a separate resource category called "tribal cultural resources" (PRC Section 21074). AB 52 requires lead agencies to provide notification and the opportunity to request consultation to California Native American tribes that are traditionally and culturally affiliated with the geographic area of a Proposed Project.

In December 2023, USACE and Regional Water Board initiated Tribal consultation regarding the development of the RDMMP to engage with Tribal communities and ensure their perspectives and concerns are integrated into the environmental and cultural review process.

On February 6, 2024, a consultation meeting was held with representatives from the Federated Indians of Graton Rancheria. The primary focus of this meeting was to identify and address potential inadvertent impacts on Tribal Cultural Resources associated with the RDMMP. The Confederated Villages of Lisjan and the Amah Mutsun Tribal Band also provided comments. Ongoing consultation with the Federated Indians of Graton Rancheria and the Confederated Villages of Lisjan Nation continues, with a focus on the findings of effect related to our environmental assessments. This engagement is essential for identifying any additional Tribal resources, sacred sites, or areas of traditional cultural or religious significance that require further consideration within the RDMMP. In response to the feedback received during this meeting, the USACE has since developed a suite of mitigation measures aimed at minimizing impacts to cultural and tribal resources.

In compliance with USACE Tribal Consultation Policy and AB 52, USACE coordinated with the NAHC in March 2024 for this large-scale undertaking and received a list of tribal contacts in Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma Counties. A Sacred Lands File (SLF) search was conducted in March 2024 with the Native American Heritage Commission (NAHC). The results of this search were positive, indicating the presence of potential cultural resources that necessitate additional consultation. As a result, over 60 California Tribes were contacted to identify any concerns to sacred sites and tribal resources. USACE and the Regional Water Board reached out to tribes (via email) and requested their comments on the project. The list of tribes consulted, a summary of tribal consultation, and a copy of correspondence are provided in Appendix E. To date, the Regional Water Board has had one meeting with the Federated Indians of Graton Rancheria. Tribal outreach with non-AB52 tribes is also included in the outreach program.

4.5 Environmental Justice

The federal government defines environmental justice as the "just treatment and meaningful involvement of all people, regardless of income, race, color, national origin, tribal affiliation, or disability, in agency decision making and other Federal activities that affect human health and the environment" (Executive Order [EO] 14096). While there are multiple definitions depending on the federal or state authority, environmental justice generally "encompasses the ideas that minority and low-income individuals, communities, and populations should not be disproportionately exposed to environmental hazards."[25] Environmental justice factored into the formulation and selection of alternatives considered in the RDMMP and evaluated in this Draft EA/EIR.

Under NEPA, environmental justice has been a consideration in federal agency decision making since 1994, when EO 12898 established the responsibility of each federal agency to make "achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations."[26] The Federal Interagency Working Group on Environmental Justice & NEPA Committee (2016) compiles practices and recommendations for federal agencies to conduct environmental justice analyses in NEPA that are consistent with EO 12898, including approaches for meaningful engagement.[27] EO 14096 defines "meaningful engagement" as: 1) Providing timely opportunities for people to share information or concerns and participate in agency decision-making processes, 2) Fully considering public input provided as part of agency decision-making processes, and 3) Seeking out and encouraging involvement of persons and communities in federal activities that affect human health and the environment through:

- Ensuring language and disability access
- Expanding notice and outreach to broader audiences
- Identifying and addressing barriers to access
- Providing technical assistance, tools, and resources

EO 14096 builds upon EO 12898, simplifying language from "disproportionately high and adverse" to "disproportionate and adverse," and clarifies that environmental justice analyses should address direct, indirect, and cumulative effects. The most recent expression of federal policy on environmental justice comes from President Biden's EO on Revitalizing Our Nation's Commitment to Environmental Justice for All and includes the following policy statement: "To fulfill our Nation's promises of justice, liberty, and equality, every person must have clean air to breathe; clean water to drink; safe and healthy foods to eat; and an environment that is healthy, sustainable, climate-resilient, and free from harmful pollution and chemical exposure. Restoring and protecting a healthy environment—wherever people live, play, work,

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25 Lena Freij, Centering Environmental Justice in California: Attempts and Opportunities in CEQA, 28 Hastings Envt'l L.J. 75 (2022) Available at: "Centering Environmental Justice in California: Attempts and Opportunity" by Lena Freij (uclawsf.edu)

26 CEQ Guidance: Environmental Justice: Guidance Under the National Environmental Policy Act (10 December 1997).

27 EO 14096 requires federal agencies to provide opportunities for the meaningful engagement of persons and communities with environmental justice concerns who are potentially affected by federal activities related to human health and the environment.

learn, grow, and worship—is a matter of justice and a fundamental duty that the federal government must uphold on behalf of all people" (EO 14096).

The Justice40 initiative, established under EO 14008, directed that recommendations be made for certain Federal investments to have a goal of providing 40 percent of the overall benefits to disadvantaged communities. In 2022, the Department of the Army, Civil Works, issued a memorandum to the Commanding General of USACE concerning the implementation of environmental justice and the federal Justice40 Initiative. In this memorandum, the Department of the Army, Civil Works, establishes an environmental justice policy for USACE and directs USACE to consider environmental justice and disproportionate impacts on disadvantaged communities in all phases of project planning and decision making (Department of the Army, Civil Works 2022).

In 2023, the CEQ published the "Bipartisan Permitting Reform Implementation Rule" in the Federal Register (88 FR 49924). Prior to this rule, environmental justice reviews were associated with NEPA review, but were not codified in the NEPA regulations. The new rule, which went into effect in July 2024, contains explicit language mandating the inclusion of environmental justice in NEPA evaluations.

The State of California defines environmental justice as "the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies."[28] In California Public Resources Code (PRC) § 30107.3, California's legislature defined environmental justice as follows:

> *(a) Environmental justice" means the fair treatment and meaningful involvement of people of all races, cultures, incomes, and national origins, with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies.*
>
> *(b) "Environmental justice" includes, but is not limited to, all the following:*
>
> *(1) The availability of a healthy environment for all people.*
>
> *(2) The deterrence, reduction, and elimination of pollution burdens for populations and communities experiencing the adverse effects of that pollution, so that the effects of the pollution are not disproportionately borne by those populations and communities.*
>
> *(3) Governmental entities engaging and providing technical assistance to populations and communities most impacted by pollution to promote their meaningful participation in all phases of the environmental and land use decision making process.*
>
> *(4) At a minimum, the meaningful consideration of recommendations from populations and communities most impacted by pollution into environmental and land use decisions.*

[28] California Government Code §65040.12(e)

CEQA does not have specific environmental justice guidelines; however, several California regulatory agencies, including the State Water Board and the Regional Water Board, have developed environmental justice practices specifically designed to ensure that environmental justice issues affecting minority populations, low-income populations, and/or Indian tribes and Indigenous communities are adequately considered in agency decision making.

Assembly Bill (AB) 2108[29] requires the State Water Board and Regional Water Board to engage in equitable, culturally relevant community outreach to promote meaningful civic engagement from potentially impacted communities of proposed discharges of waste that may have disproportionate impacts of water quality in disadvantaged communities. This includes community and tribal outreach to tribes that have not requested notification under AB 52. In furtherance of AB 2108's mandate, the Regional Water Board consults with tribes and environmental justice community representatives consistent with AB 2108 on issuance of WDRs that have potential tribal and environmental justice impacts. Additionally, the Regional Water Board uses the San Francisco Bay Restoration Regulatory Integration Team (BRRIT) as an agency coordinating tool on shoreline restoration projects in environmental justice communities (such as Heron's Head Park in San Francisco). The Regional Water Board considers BRRIT/Policy Management Committee coordination and outreach to tribes on cultural resources being exposed by shoreline changes relating to SLR.

4.5.1 Environmental Justice Approach

To inform the assessment of the environmental justice impacts associated with each action, this analysis used the Environmental Justice and Social Equity policies adopted by the San Francisco BCDC, the regulatory body responsible for guiding development in and around SF Bay. The key Environmental Justice and Social Equity policies that apply to this analysis are as follows:[30]

1) *Equitable, culturally-relevant community outreach and engagement should be conducted by local governments and project applicants to meaningfully involve potentially impacted communities for major projects and appropriate minor projects in underrepresented and/or identified vulnerable and/or disadvantaged communities, and such outreach and engagement should continue throughout the Commission review and permitting processes. Evidence of how community concerns were addressed should be provided. If such previous outreach and engagement did not occur, further outreach and engagement should be conducted prior to Commission action.*

[29] AB 2108, Water policy: environmental justice: disadvantaged and tribal communities, was approved and filed with the California Secretary of State on September 16, 2022.

[30] San Francisco Bay Conservation and Development Commission, San Francisco Bay Plan Part IV – Development of the Bay and Shoreline: Findings and Policies. Available at: San Francisco Bay Plan | SF Bay Conservation & Development (ca.gov)

2) *If a project is proposed within an underrepresented and/or identified vulnerable and/or disadvantaged community, potential disproportionate impacts should be identified in collaboration with the potentially impacted communities. Local governments and the Commission should take measures through environmental review and permitting processes, within the scope of their respective authorities, to require mitigation for disproportionate adverse project impacts on the identified vulnerable or disadvantaged communities in which the project is proposed.*

The analysis' adherence to the Environmental Justice and Social Equity policies adopted by BCDC satisfies the environmental justice requirements of AB2108 Waste Discharge (State of California). AB2108 is triggered by a discharge of waste that has a disproportionate impact on a disadvantaged community.

4.5.2 Anticipated Environmental Justice Impacts

Preliminary environmental justice concerns include air quality impacts, water contact recreation, and fishing issues. Environmental justice concerns will be informed and verified by engaging with residents and community stakeholders. USACE and the Regional Water Board have developed a communications plan for this project for outreach and engagement to project stakeholders, including communities with environmental justice concerns. In addition, the lead agencies will send an advance notice of the availability of the Draft EA/EIR and an invitation for comments to community organizations identified as part of the database search described below. The results of these outreach and engagement efforts will be incorporated into the final version of this Draft EA/EIR.

The Proposed Project and its alternatives are not expected to have significant cumulative environmental effects on any of the resource areas studied. Additionally, it is not expected that the Proposed Project will have cumulative effects that would disproportionately impact any populations with environmental justice concerns identified through existing database research and outreach.

The project's direct impacts on air quality and greenhouse gases were not found to be significant or cumulatively considerable. The project would facilitate the continued use of federal navigation channels by petroleum-related shipping and operations in San Fransisco Bay, which would therefore result in an indirect impact to air quality and greenhouse gas emissions. The project's impacts on water quality are temporary and not expected to be significant due to strict adherence to sediment testing guidelines and the regulation of materials that will be placed at various placement and beneficial use sites. While resource agency and public concerns have been raised about the potential impact of maintenance dredging operations on fish species, these concerns will be addressed through the implementation of avoidance and minimization measures including adherence to work windows and limitations on the use of hopper dredging that will reduce these impacts to less than significant levels (see Section 3.3.4.1). There are not expected to be cumulatively considerable impacts on fisheries that might impact identified environmental justice communities.

Maintenance dredging operations could, however, result in short-term increased turbidity that could temporarily impact water contact recreation and fishing activities in proximity to populations with environmental justice concerns. Areas that may be affected by short-term impacts are shown in

Figure 4-1. While these effects are not considered significant or cumulatively considerable, the project sponsor recognizes that these short-term impacts could affect communities with environmental justice concerns for brief periods during certain dredging operations. The project sponsor has engaged in outreach and discussion with these communities to identify key locations that may fall within areas of vulnerability. Ongoing outreach will take place to identify opportunities to provide relevant information to affected communities and discuss appropriate actions. Tribal and Indigenous knowledge will be sought and incorporated into the project development process, as discussed in Section 4.4.

4.5.3 Identification of Populations with Environmental Justice Concerns

The analysis used a mixture of spatial and demographic data to delineate which socially vulnerable communities[31] were within the impact area of the Proposed Action/Proposed Project. For this analysis, socially vulnerable communities were defined as US Census block groups with high concentrations of one or a combination of individuals meeting the following socioeconomic indicators:

- Disabled
- Minority
- Over 65 and alone
- No high school degree
- Limited English proficiency
- Not a US citizen
- Severe housing cost burden
- Very low income
- No vehicle
- Renter
- Single parent
- Under the age of five

The data for these socioeconomic indicators came from the American Community Survey 2021 five-year estimates. The demographic analysis area was defined as a 1.5-mile buffer area around each dredged material placement site and USACE-maintained federal navigation channel area. To determine which Census block groups fell within the impact areas, the geospatial location of each placement site and channel area with their respective 1.5-mile buffers were overlaid with BCDC's Community Vulnerability Tool (BCDC 2023) data set and the CEQ's Climate and Economic Justice Screening Tool (CEJST). A search of churches and faith-based groups in the 1.5-mile buffer was also conducted using the BCDC Community Vulnerability Tool.

[31] Vulnerable populations include low-income and minority populations, as defined in EO 12898, as well as additional populations with environmental concerns, as expanded under EO 14096 and new NEPA rules, including age and disability.

Public, Agency, and Tribal Involvement

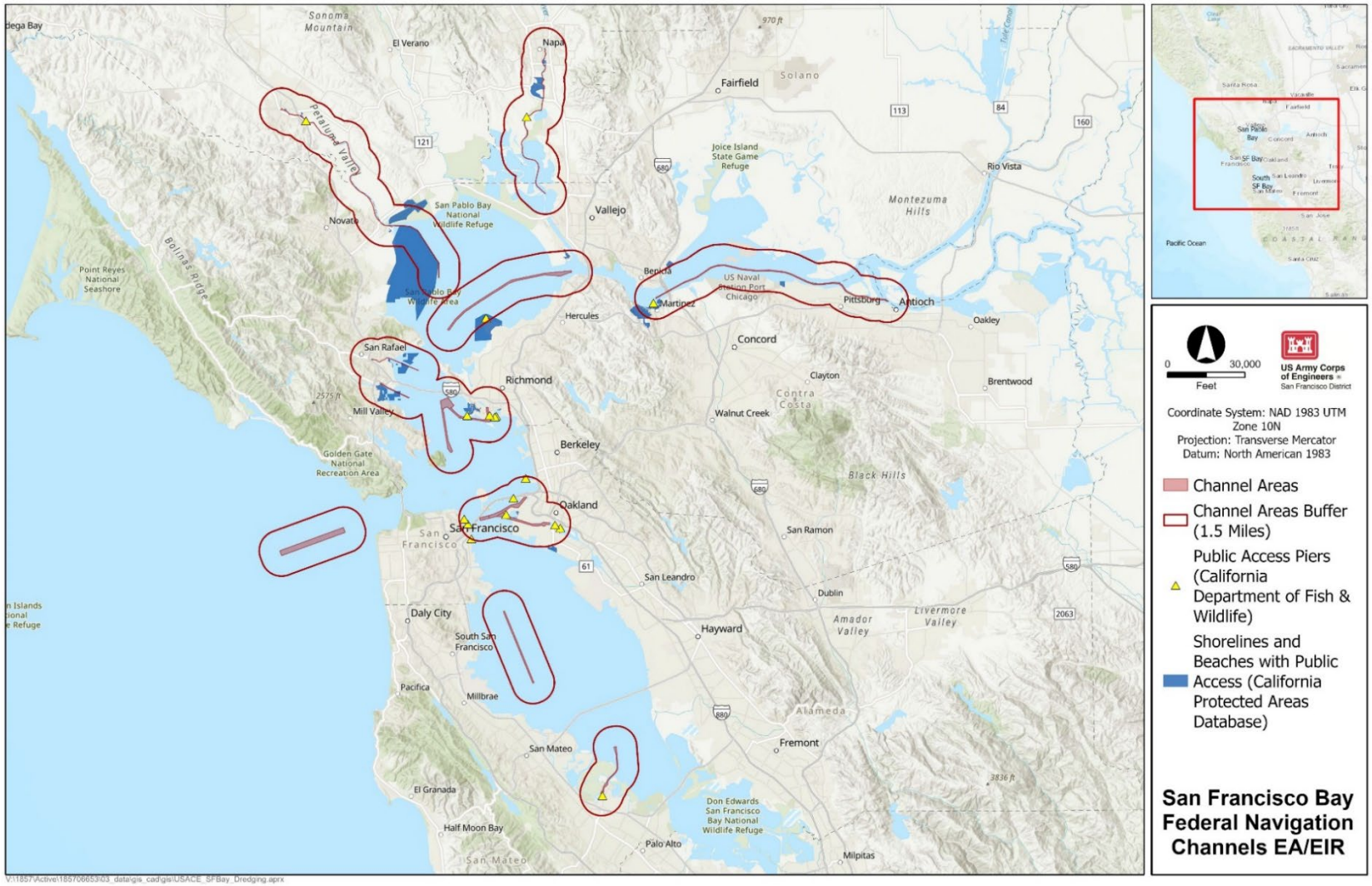


Figure 4-1. Public Access Areas and Piers that Could be Affected by Short-Term Turbidity

The BCDC and CEJST tools differ in that the BCDC tool queries Census block groups, while CEJST uses Census tracts. The results of the queries of both tools were compared, and the BCDC tool overlapped all but one CEJST Census tract (Census Tract 329.02 [San Francisco County, CA]). This tract does not border any water bodies and is nearly one-mile east SF Bay; therefore, impacts to vulnerable communities are not expended to occur from dredging activities in this area. Given that the BCDC tool provides more granular data, including five levels of vulnerability ratings ranging from "not calculated" to "highest," (compared to CEJST scoring of disadvantaged/not disadvantaged), results of the BCDC tool analysis only were carried forward in this evaluation.

The BCDC Community Vulnerability data set includes the socioeconomic data for Bay Area Census block groups in determining the five categories of social vulnerability rankings (see Table 4-2). The social vulnerability criteria analyzed included:

- Renters
- Very low income
- Under five years of age
- Not a US citizen
- Without vehicle
- With disability
- Single parent family
- Communities of color
- 65 or older living alone
- Limited English proficiency
- Without high school diploma
- Severely housing cost burdened

Table 4-2. San Francisco Bay Conservation and Development Commission Categories of Social Vulnerability

Social Vulnerability Class	Class Criteria
Highest social vulnerability	Block group had: 8 or more social vulnerability indicators with rates in the 70th percentile, relative to the 9-county Bay Area; and/or 6 or more social vulnerability indicators with rates in the 90th percentile, relative to the 9-county Bay Area
High social vulnerability	Block group did not meet criteria in "Highest" category, and had: 6 to 7 indicators in the 70th percentile; and/or 4 to 5 indicators in the 90th percentile
Moderate social vulnerability	Block group did not meet criteria in "Highest" and "High" categories, and had: 4 to 5 indicators in 70th percentile; and/or 3 indicators in the 90th percentile
Low social vulnerability	Block group did not meet any of the criteria above
Not calculated	Contained characteristics that were not estimated in the American Community Survey, due to low population and other factors leading to low survey response.

Source: BCDC 2023

4.5.4 Results of Desktop Demographic Analysis

The process documented in Section 4.5.3 resulted in the identification of approximately 473 Census block groups that met moderate to highest social vulnerability scores and fell within the buffer areas of the placement sites and channel areas. Figure 4-2 below demonstrates where each socially vulnerable Census block group intersected with the impact areas of a placement site and channel area. According to the map, the largest concentrations of Census block groups meeting the highest social vulnerability thresholds (in red) that fall within the impact area are in West Oakland, southeast Richmond, Pittsburg, and Antioch.

Table 4-3 provides the percentage of the total land area of any block group that *intersects* with the 1.5-mile buffer depicted in Figure 4-2.

Table 4-3. Total Land Area of Environmental Justice Communities Intersecting 1.5-Mile Buffer

Block Group Social Vulnerability Ranking	Percent of Land Area of Block Groups that Intersect 1.5-Mile Buffer
Highest social vulnerability	2.18
High social vulnerability	6.97
Moderate social vulnerability	18.77
Low social vulnerability	71.23
Not Calculated	0.85

The BCDC data used two indicators (70th percentile and 90th percentile), across 12 categories to score whether a block group was highest, high, or moderate social vulnerability. Social vulnerability indicator percentiles are relative to nine counties in the Bay Area (Marin, Sonoma, Napa, Solano, Contra Costa, Alameda, Santa Clara, San Mateo, and San Francisco). Data values were sourced from the 2017–2021 American Community Survey. Tables 4-4 and 4-5 provide a count of the number of each social vulnerability category, broken down by indicator, that occurred in the social vulnerability communities within the 1.5-mile buffer. There were 473 highest, high, or moderate social vulnerability block groups that intersected with the 1.5-mile buffer, so the maximum number for any socioeconomic characteristic would be 473. The only two categories that were noticeably different between the two indicator thresholds were “Renters” and “People with disability.”

Table 4-4. Number of Socially Vulnerable Block Groups with Indicator in 70th Percentile

Socioeconomic Characteristic	Number of Socially Vulnerable Block Groups within Buffer with this Indicator in the 70th Percentile.
Very low income	400
Without a high school degree	309
Renters	289
Single parent families	285
Without a vehicle	268
Communities of Color	260
Limited English proficiency	244
Not US citizens	241
People with disability	230
Under 5	188
65 and over living alone	182
Severely housing cost burdened	73

Table 4-5. Number of Socially Vulnerable Block Groups with Indicator in 90th Percentile

Socioeconomic Characteristic	Number of Socially Vulnerable Block Groups within Buffer with this Indicator in the 90th Percentile.
Very low income	217
Single parent families	145
Without a high school degree	135
People with disability	102
Without a vehicle	101
Limited English proficiency	100
Communities of Color	95
Renters	92
Not US citizens	80
Under 5	73
65 and over living alone	67
Severely housing cost burdened	5

Refer to Appendix C for the full list of impacted socially vulnerable Census blocks.

Data from this analysis will be used to inform initial engagement strategies and aid in the identification of any potential measures to mitigate disproportionate impacts on populations with environmental concerns.

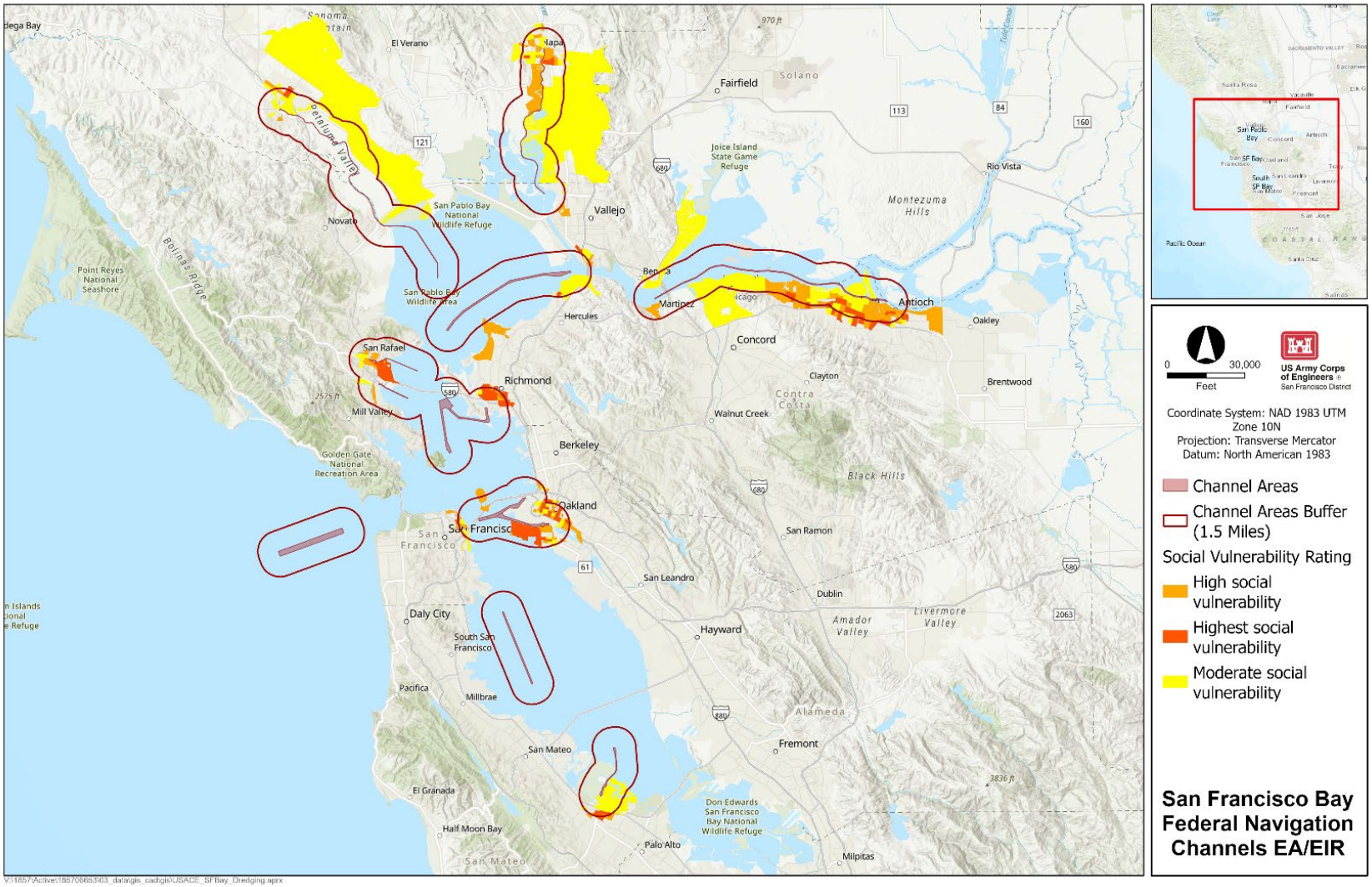


Figure 4-2. Communities with Environmental Justice Concerns in the Project Area

4.5.5 Environmental Justice Community Notification

In accordance with the mandates, codes, and directives presented above in Section 4.5, USACE and the Regional Water Board have developed a communications plan for this project that contains a roadmap for outreach to and engagement with stakeholders with environmental justice concerns. The results of these outreach and engagement efforts to the communities identified using the methods described in Section 4.5.3 will be incorporated into future iterations of this Draft EA/EIR.

To ensure this project does not disproportionately impact communities with environmental justice concerns in the SF Bay region, environmental justice community representatives were invited to participate in a virtual public meeting prior to the public review period for this Draft EA/EIR to receive information and for USACE and the Regional Water Board to address any specific concerns or questions. The meeting was held October 15, 2024, at 4:00 p.m.

5.0 Other Required Analyses

This chapter summarizes impacts and mitigation measures and compares the project alternatives. It also includes additional analysis required under NEPA and CEQA.

5.1 Preferred Alternative

This Draft EA/EIR considers the No Action Alternative/No Project Alternative and four action alternatives, with Alternative 2 as the Proposed Project, for maintenance dredging of federal navigation channels in SF Bay and the associated placement of dredged material. This document is available for public review and comment, and comments may be submitted at the public meeting and in writing to USACE and the Regional Water Board. After considering public and agency comments, USACE and the Regional Water Board will prepare a Final EA/EIR. Comments received from the public and agencies on the alternatives presented in this draft document will be considered in USACE's development of the Preferred Alternative under NEPA. The Preferred Alternative is the alternative that best fulfills the purpose and need and agency objectives for the project while balancing impacts on the natural and human environment. The Final EA/EIR will present the Preferred Alternative and address public and agency comments.

5.2 Environmentally Superior Alternative

Per CEQA Guidelines (Section 15126.6[e][2]), if the environmentally superior alternative is the No Project Alternative, then the EIR must also identify an environmentally superior alternative among the other alternatives. For the reasons described in this Draft EA/EIR, the environmentally superior alternative is not the No Project Alternative.

The type and degree of environmental impacts among all the alternatives are similar; differences in impacts are related to the proportion and location of hopper dredge use versus mechanical dredge use under each alternative, along with the extent of BUDM. The action alternatives presented in this document would have lower adverse environmental impacts and more environmentally beneficial effects through increased BUDM for restoration of habitat for listed species. Alternative 4, Beneficial Use – Maximized, proposes placing all suitable material at upland beneficial use sites. Therefore, it is considered to be the environmentally superior alternative under CEQA.

USACE and the Regional Water Board will consider public and agency comments received on this Draft EA/EIR during the public review process to identify the Preferred Alternative in the Final EA/EIR.

5.3 Significant Impacts

Under NEPA, if, after preparing an EA, the federal agency determines that an action will not have a significant effect on the human environment (40 C.F.R. § 1508.13), a finding of no significant impact (FONSI) will be issued. NEPA also allows for a mitigated FONSI, in cases where an action may pose some significant effects, but where mitigation measures will be adopted to reduce these effects to a level where they are no longer significant (CEQ and CalOPR 2014).

Other Required Analyses

Under CEQA Guidelines (Section 15382) a significant impact is defined as "a substantial, or potentially substantial, adverse change within the area affected by the project." CEQA requires the agency to identify each impact it has determined to be significant (CEQA guidelines Section 15126.2, subd. [a]). Any feasible mitigation measures that can reduce a significant impact must be adopted under CEQA.

With implementation of the following mitigation measures, the cultural, and tribal impacts of all alternatives would be reduced to less than significant:

- CT1-1: Cultural Resources Monitoring Program (all alternatives)
- CT1-2: Inadvertent Archaeological Discovery (all alternatives)
  CT2-1: Treatment of Human Remains (all alternatives)

Biological impacts would be less then significant under all the alternatives, except for the No Project Alternative, which would be reduced to less than significant with the implementation of the following mitigation measure under CEQA:

- BI1-2: Fish Deterrent Equipment

Proposed Action/Proposed Project would not have any significant impacts.

5.4 Irreversible and Irretrievable Commitment of Resources and Significant Irreversible Environmental Changes

NEPA requires the identification of "any irreversible and irretrievable commitments of resources which would be involved in the Proposed Action should it be implemented" (40 C.F.R. 1502.16). Resources that are irreversibly or irretrievably committed to a project are those that are used on a long-term or permanent basis. This includes the use of nonrenewable resources, such as metal and fuel, and natural or cultural resources. These resources are irretrievable in that they would be used for a project when they could have been used for other purposes. Human labor is also considered an irretrievable resource. Another impact under this category is the unavoidable destruction of natural resources that could limit the range of potential uses of that environment.

Implementation of the Proposed Action/Proposed Project would require a negligible amount of human labor and consumption of fuel, oil, and lubricants for maritime vessels and equipment. Dredged material represents a valuable resource, having a variety of potential beneficial uses. The practice of disposing of dredged material as a waste at unconfined aquatic disposal sites effectively constitutes an irretrievable loss of the potential use of the material as a resource. The establishment of new habitat restoration sites would result in irreversible land use changes. The Proposed Action/Proposed Project would add to natural resources through BUDM in SF Bay, enhancing the range of potential uses and benefits to SF Bay.

Other Required Analyses

The CEQA Guidelines (Section 15126.2(d)) require an evaluation of the significant irreversible environmental changes that would be caused by a project if implemented. Specifically, the CEQA Guidelines refer to the need to evaluate and justify the consumption of nonrenewable resources and the extent to which the project commits future generations to similar uses of nonrenewable resources. CEQA also requires that irreversible damage that could result from an environmental accident associated with the project be evaluated.

Dredging and placement activities would require the use of fossil fuels for the operation of vessels and equipment. The commitment of these resources would apply under all alternatives, including the No Action Alternative/No Project Alternative. Fossil fuel consumption under all alternatives would be similar to that by USACE's historical and current maintenance dredging operations in SF Bay.

5.5 Relationship Between Local Short-Term Uses of the Environment and Long-Term Productivity

NEPA requires an analysis of the relationship between a proposed project's short-term impacts on the environment and the effects that these impacts may have on the maintenance and enhancement of the long-term productivity of the affected environment. Impacts that narrow the range of beneficial uses of the environment are of concern. This refers to the possibility that choosing one site reduces future flexibility in pursuing other options or that using a parcel of land or other resources often eliminates the possibility of other uses at that site.

In the short term, effects to the human environment with implementation of the Proposed Project and its alternatives would primarily relate to dredging and BUDM. Water quality, biological resources, and air quality would be impacted in the short term. These short-term adverse impacts include increases in turbidity, disturbance of benthic communities, effects on fish and wildlife, and emissions of pollutants. These impacts would be minor, localized, and temporary during dredging and placement activities. The potential entrainment of special-status fish species would be minimized through BUDM. In the long term, beneficial impacts on biological resources, water resources, and marine transportation would occur. BUDM would increase environmental productivity and expand the range of beneficial uses of the environment in SF Bay.

5.6 Growth-Inducing Impacts

CEQA guidelines Section 15126.2(e) requires an examination of the direct and indirect impacts of a proposed project, including the potential of the project to induce growth leading to changes in land use patterns, population densities, and related impacts on environmental resources. CEQA guidelines Section 15126.2(e) specifically requires an EIR to include a discussion of the Proposed Project's potential to foster economic growth, population growth, or the construction of additional housing directly or indirectly in the surrounding environment. This includes projects that would remove obstacles to population growth. It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment. NEPA does not offer specific guidance on growth-inducing impacts.

Other Required Analyses

A project may have direct and/or indirect growth-inducement potential. An example of direct growth inducement would be a project that involves the construction of new housing that would result in new residents moving to the area. An example of indirect growth-inducement potential would be a project that provides substantial new permanent employment opportunities (e.g., commercial, industrial, or governmental enterprises) or removes an obstacle to additional growth and development, such as removing a constraint on a required public utility or service.

Growth inducement itself is not an environmental impact, but it may lead to foreseeable environmental impacts including increased demand on public services and infrastructure, increased traffic, increased noise, degradation of air or water quality, degradation or loss of plant or animal habitats, or conversion of agricultural and open space land to urban uses.

The purpose of the Proposed Project is to provide for the continued maintenance of the existing federal navigation channels in SF Bay to historically authorized depths. The Proposed Project does not involve the construction of new housing, nor is it a project that would result in new permanent employment opportunities. Therefore, the Proposed Project would not have any direct growth-inducing impacts.

The Proposed Project and its alternatives would not increase the depth of the existing federal navigation channels, nor does it involve an expansion of the areas previously included in the federal maintenance dredging program. The ongoing maintenance of the federal navigation channels in SF Bay is critical to the survival of several established water-related activities and industries including various ports and associated goods movement, ferry transportation, cruise ships, manufacturing, fuel refining, military uses, and recreational boating. However, these activities and industries have been ongoing for decades in and around SF Bay and are not expected to increase or decrease because of the continued maintenance of existing federal navigation channels. Therefore, the Proposed Project is not expected to have any indirect growth-inducing impacts.

The Proposed Action/Proposed Project would not remove a barrier to growth and development, such as increasing existing cargo throughput or shifting cargo from one port to another within SF Bay. In its 2019–2050 Bay Area Seaport Forecast, BCDC notes that the Port of Oakland, which handles 99 percent of the containerized cargo moving through SF Bay, may grow at a slow, moderate, or strong rate over the next 30 years depending on many factors including the overall economy, trade relations, the rate of adoption of automation, and the buildout of available land. The continued availability of existing federally maintained shipping channels is assumed for each of these growth projections and is not a determining factor in the growth projections (BCDC 2019). The growth of refineries, of which there are five located within SF Bay, is likewise not determined by the continued availability of existing federally maintained shipping channels. While the existing refineries rely on the existing federal channels for the transport of raw and refined products, the current depth and configuration of the navigation channels is adequate to accommodate the minimal growth expected in this industry within SF Bay, which is constrained by space, aging facilities (most over 100 years old), environmental regulations, economics, and a demand for cleaner fuels (Sedgwick et al. 2019). Therefore, the Proposed Project would not remove a barrier to growth and development.

5.7 Areas of Known Controversy

5.7.1 Placement of Dredged Material in San Francisco Bay

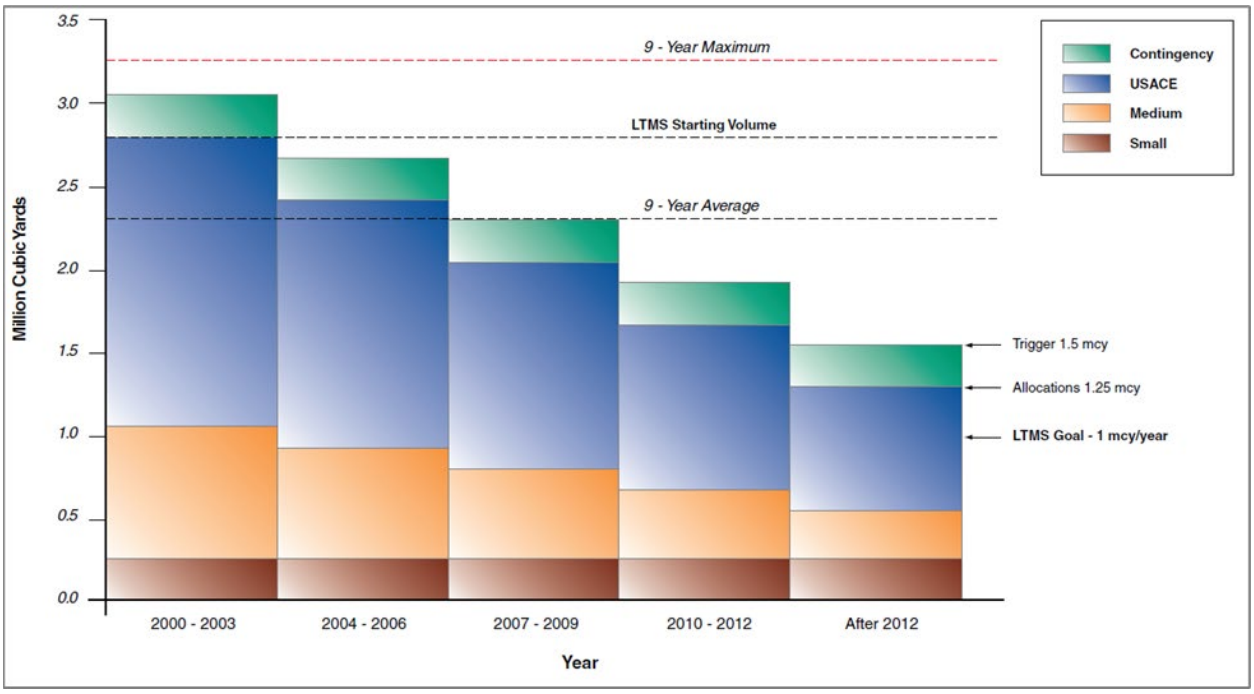
Different agencies have different interpretations of their respective policies that add regulatory constraints on the placement of dredged material in SF Bay. For example, BCDC, which administers the Coastal Zone Management Plan for SF Bay under the CZMA, limits in-Bay placement of dredged material in its Bay Plan Dredging Policy 1:

> *Dredging and dredged material disposal should be conducted in an environmentally and economically sound manner. Dredgers should reduce disposal in the Bay and certain waterways over time to achieve the L TMS goal of limiting in-Bay placement volumes to a maximum of one million cubic yards per year. The LTMS agencies should implement a system of disposal allotments to individual dredgers to achieve this goal only if voluntary efforts are not effective in reaching the L TMS goal. In making its decision regarding disposal allocations, the Commission should confer with the LTMS agencies and consider the need for the dredging and the dredging projects, environmental impacts, regional economic impacts, efforts by the dredging community to implement and fund alternatives to in-Bay placement, and other relevant factors. Small dredgers should be exempted from allotments, but all dredgers should comply with policies 2 through 12.*

While acknowledging that the LTMS in-Bay placement targets are voluntary, BCDC imposes mandatory limits on medium and large dredgers of one million CY combined and on small dredgers placing 250,000 CY of dredged material in-Bay. The agency has expressed apprehension around any changes to these voluntary targets and interprets the LTMS trigger for consideration of mandatory allocations to be 1.25 million CY—that is, 1 million CY for large and medium dredgers and 0.25 million CY for small dredgers. The agency is undergoing a process to analyze the Bay Plan and consider whether any amendments may be necessary, and through a series of workshops, there has been significant input that this policy (among others) may need to be amended.

Similarly, the Regional Water Board, which administers WQCs under Section 401 of the CWA, also outlines in its Basin Plan that 1.25 million CY per year is the in-Bay placement limit for dredged material and that this limit is the trigger for consideration of mandatory allocations. The Regional Water Board has indicated willingness to pursue Basin Plan amendments to permit more in-Bay placement of dredged material, as well as to pursue permitting flexibility to achieve the broader, shared goal of increasing BUDM.

LTMS partner agencies have different interpretations of the LTMS trigger for consideration of mandatory allocations. The LTMS Management Plan outlines this trigger to be the target of 1.25 million CY plus the 250,000 CY contingency volume. As stated in the management plan, “at the triennial LTMS review, if the average in-Bay placement volume from the prior three years exceeds the in-Bay targets plus the 250,000 CY contingency, the LTMS agencies will initiate consideration of allocations” (Figure 5-1).



Notes: San Francisco Bay Long-Term Management Strategy (LTMS) step-down from 2000 to the present indicating the 3-year LTMS in-Bay placement of dredged material goal of 1 million CY per year (though there are no mechanisms to achieve said goal), voluntary allocations of 1.25 million CY per year, and trigger mechanism at 1.5 million CY per year.

Figure 5-1. Reductions of In-Bay Dredged Material Placement Since Year 2000 Relative to San Francisco Bay Long-Term Management Strategy for Dredged Material

Implementing Alternative 1 or 2, both of which are aimed at achieving the LTMS BUDM goals, would require revisiting regional policies such as the LTMS as well as encouraging and finding novel flexibility in permitting processes. Several partner agency leaders have expressed support for re-opening the LTMS to consider changing these in-Bay goals, targets, and triggers, given the significant loss of sediment to deep ocean over the course of the implementation of the LTMS step-down and the compounding effects of SLR and sediment loss from a system with critical sediment needs.

As a holistic system interconnected from the subtidal Bay bottom to the upland migration space needed for ecosystem sustainability, it is imperative to keep sediment in the San Francisco Bay system. Placement of material at in-Bay, dispersive sites, while not as desirable as placing sediment in the shallow subtidal environment to re-nourish mudflats or in subsided and leveed baylands to restore high and low marsh plain elevations, is better than losing the sediment to the deep ocean, 55 nautical miles west of the Golden Gate Bridge.

In addition, diffusion of sediment, which occurs on the order of days to years, can help the Bay bottom keep pace with SLR and when coupled with Alternatives 1 and 2's BUDM volumes for wetland restoration, can help the entire Bay system keep pace with SLR. It is also critical to note that the in-Bay placement volume proposed in this Draft EA/EIR and the RDMMP in Alternatives 1 and 2 represents only marginal increases in in-Bay placement and does not rival the volume of material placed in-Bay prior to LTMS creation. As such, any changes to the LTMS target and trigger are not expected to induce any significant navigational hazards or substantially increased environmental impacts.

5.7.2 Strategic Expansion of Hydraulic Dredging in San Francisco Bay

USACE is authorized to dredge Richmond Outer Harbor and Pinole Shoal (San Pablo Bay) channels every year by hydraulic dredge. However, SF Bay is home to several endangered species, and most relevant to hopper dredging is delta smelt. The delta smelt exists mostly in Suisun and San Pablo Bays given their proximity to the Delta. It is the view of state and federal resource agencies with jurisdiction over delta smelt that hydraulic hopper dredging entrains individuals and represents a take of the endangered species. Specifically, it is the view of CDFW that the impact can be mitigated to less than significant by hopper dredging only one channel in SF Bay in a given year and limiting dredging to the stated environmental work windows.

While CDFW does not have jurisdiction over USACE, a federal entity, the Regional Water Board included these recommendations in the WQC for 2015 to 2019 and 2020 to 2024, requiring that USACE only use hopper dredging in one of the two channels listed above. It has been USACE's policy, therefore, to dredge the two channels in alternating years, given that the cost to the nation of mechanically dredging these channels in alternating years would be too great and equipment availability and market conditions would constrain USACE's ability to fulfill its navigation mission within the given environmental work windows.

As such, the discussion around potentially expanding hydraulic hopper dredging in SF Bay is potentially controversial, even though the purpose in doing so is to restore more wetland habitat, which would directly benefit delta smelt by providing refugia and habitat space in the tidal channels. MWRP practitioners have found an abundance of delta smelt in phase I cells of their restored wetlands (pers. comm., Cassie Pinnell, Vollmar Natural Lands Consulting, Senior Ecologist for the MWRP, 2024). Additionally, USGS is studying endangered fish species use of restored wetlands versus natural wetlands in San Pablo Bay, and preliminary results indicate they have similarly beneficial effects on delta smelt. This point of potential controversy has been reiterated most recently during the early stages of the biological assessment preparation for longfin smelt (USACE in progress), a CDFW state-listed species and soon-to-be federally listed species, with USFWS.

In that document, it is proposed that the significant increase in BUDM for wetland restoration would provide built-in minimization and avoidance for the strategically expanded hopper dredging. However, USFWS has indicated that wetland restoration benefits are already accounted for in the restoration site project and that benefits cannot be "double counted," though they are integral to the consideration of any dredging impacts associated with taking sediment to a wetland restoration site. Similarly, CDFW has hinted that its position on entrainment impacts and required minimization measures remains unchanged

and that additional compensatory mitigation (i.e., purchasing of credits at a mitigation bank) would be required to reduce the impacts of expanded hopper dredging to less than significant. It should be noted that under the 1999 LTMS BiOp, NMFS determined that BUDM can be used as mitigation for work performed outside work windows. Additionally, BUDM provides habitat and species benefits above what would be required for compensatory mitigation by expediting habitat creation and by providing benefits to a greater number of species over a larger area

If at the conclusion of agency consultation, it is determined that additional mitigation is required, this would make Alternative 2 economically infeasible for consideration as the Federal Standard Base Plan, even though it provides over 11.5 million CY of dredged material for beneficial use over 20 years, which equates to nearly 1,200 acres of wetland habitat created over that timeframe (assuming approximately 6-foot height of wetland to reach high marsh plain). For context, that is the equivalent of more than the entire Hamilton Wetlands Restoration Project footprint.

To achieve California's and the SF Bay's regional climate adaptation and habitat restoration goals, as well as to meet USACE's Command Philosophy Notice goal of beneficially using 70 percent of its dredged material by 2030, novel and creative policy and planning is required. It is myopic to limit necessary long-term benefits due to temporary, short-term impacts, especially if those long-term benefits can help address the short-term impacts. More scientific study is required to understand how BUDM for wetland restoration can support endangered species more than the impacts of the creative methods to achieve those BUDM volumes. USACE eagerly awaits USGS study results and along with several partner agencies, stakeholders, and organizations in SF Bay is eager to engage resource agencies to find workable and needed solutions to adapt to climate change as soon as possible.

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APPENDIX A

Draft Clean Water Act Section 404(B)(1) Evaluation

Draft Clean Water Act Section 404(B)(1) Evaluation

San Francisco Bay Federal Channels Operation and Maintenance Dredging and Sediment Placement Activities, Dredging Years 2025-2034

October 2024

Prepared for:

US Army Corps of Engineers ®
San Francisco District

CALIFORNIA WATER BOARDS
San Francisco Bay

Prepared by:

SCOUT | Stantec
A MENTOR-PROTÉGÉ JOINT VENTURE

Project Name:

San Francisco Bay Federal Channels Operation and Maintenance
Dredging and Sediment Placement Activities
NEPA Identification Code:
CECWP_SPN_105059

Draft
Environmental Assessment/Environmental Impact Report

San Francisco Bay Federal Channels Operation and Maintenance Dredging and Sediment Placement Activities, Dredging Years 2025 – 205–2034

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ABBREVIATIONS

BUDM	beneficial use of dredged material
CFR	Code of Federal Regulations
CWA	Clean Water Act
EA	Environmental Assessment
EIR	Environmental Impact Report
LTMS	Long-Term Management Strategy for Dredged Material
NMFS	National Marine Fisheries Service
SF-8	San Francisco Bar Channel Placement Site
SF-DODS	San Francisco Deep Ocean Disposal Site
USACE	US Army Corps of Engineers
USFWS	US Fish and Wildlife Service

1.0 Introduction

This appendix evaluates compliance of the proposed action, with Clean Water Act (CWA) Section 404(b)(1) Guidelines published at 40 Code of Federal Regulations (CFR) part 230 which requires the US Army Corps of Engineers (USACE) to provide a written evaluation that demonstrates compliance with the substantive criteria used to evaluate discharges of dredged or fill material.

San Francisco Bay, along with its tributary rivers, streams, adjacent wetlands, and the Pacific Ocean out to the 3-mile limit, are waters of the United States pursuant to Section 404 of the CWA. Section 404(b)(1) of the CWA provides procedures for the evaluation of permits for discharge of dredged or fill material into waters of the United States. USACE implements Section 404 of the CWA, and although it does not issue itself permits, USACE must demonstrate compliance with Section 404 of the CWA. The following evaluation is provided in accordance with Section 404(b)(1) of the CWA Guidelines (40 CFR 230).

2.0 Proposed Action and Alternatives

USACE proposes to continue maintenance dredging of federal navigation channels in San Francisco Bay and the associated placement of dredged material for a roughly ten-year period beginning in dredging year 2025 and continuing until 2034, with the potential for projects to extend into early 2035 (through February) due to uncertainties in contracting awards, funding, regulatory constraints, and equipment availability.[1]

The federal navigation channels that are anticipated to be dredged by USACE during the planning horizon for this Draft EA/EIR include: Oakland Harbor, Redwood City Harbor, Richmond Harbor, San Francisco Harbor (Main Ship Channel only) San Pablo Bay/Mare Island Strait, Suisun Bay Channel Napa River Channel, Petaluma River Channel, and San Rafael Creek Channel. Oakland Harbor, Richmond Harbor, San Francisco Harbor (Main Ship Channel), San Pablo Bay/Mare Island Strait, Suisun Bay Channel, and Redwood City Harbor are dredged annually or semi-annually. The remaining sites of Napa River Channel, Petaluma River Channel, and San Rafael Creek Channel are dredged on cycles between four to seven years, as necessary. Suisun Slough Channel is dredged much less frequently.

The study area spans the shoreline and marine areas of the following 11 counties: Marin, Sonoma, Napa, Solano, Sacramento, San Joaquin, Contra Costa, Alameda, Santa Clara, San Mateo, and San Francisco. The geographic scope of the study area comprises the estuarine waters of the San Francisco Bay region, portions of the Sacramento-San Joaquin Delta west of Sherman Island. Outside the Golden Gate, the study area includes the San Francisco Deep Ocean Disposal Site (SF-DODS), the San Francisco Bar Channel Placement Site (SF-8), and the nearshore zone off Ocean Beach, as well as the waters used by vessels enroute to these sites.

Maintenance dredging typically involves the following steps: 1) Surveying a site to identify sediment accumulated (shoaled) above authorized project depth, then sampling and testing for sediment quality; 2) excavating shoaled sediment from the dredging site; 3) transporting dredged sediment via scows, hopper dredges, or pipeline to the designated placement site(s); and 4) placing the sediment at either disposal or beneficial use of dredge material (BUDM) site(s). “Disposal” is defined as the placement of material in an area where the material is anticipated to remain in place and have no measurable benefit. In open-water placement sites, nondispersive sites are considered disposal; in confined placement sites, disposal applies if the material is not intended to be offloaded for another beneficial use. The reuse of dredged sediment for construction, levees, tidal wetland restoration or other projects is described as beneficial use. Transitional placement is defined as keeping sediment in the riverine or coastal system as a part of a management process or in a period of transition. The use of placement and disposal sites is described under the description of the alternatives in Chapter 2 of the *San Francisco Bay Federal Channels Operation and Maintenance Dredging and Sediment Placement Activities, Dredging Years 2025-2034, Draft Environmental Assessment/Environmental Impact Report (EA/EIR) (USACE 2024).*

[1] Dredging year refers to the calendar year in which dredging is planned to begin. In some cases, dredging episodes associated with a dredging year can extend past the end of the calendar year.”

All six alternatives evaluated in the Draft EA/EIR include two categories of dredging methods performed by USACE for maintenance dredging in San Francisco Bay: hydraulic and mechanical dredging. In hydraulic dredging, hopper or cutterhead ships are typically used to remove sediment via suction through hydraulic pipelines. Hopper dredges store suctioned sediment on board for later placement; cutterhead-pipeline dredges use a pipeline to deposit suctioned sediment directly at placement sites. USACE mechanical dredging in San Francisco Bay is typically done with clamshell dredgers. These dredgers use buckets that are opened, dropped vertically to the dredging locations, and closed around sediment, which is then lifted and deposited on a scow or barge. Placement can occur via bottom-dumping from split-hull scows or hopper dredges, via a slurry (i.e., mixed water and sediment for mobilization) that is pumped off by means of a pipe offloader from scows or hopper dredges, or via direct delivery from cutterhead dredges to pipelines and transported by booster pumps, if necessary, to the placement site.

The Draft EA/EIR evaluates in detail the potential environmental impacts of the following alternatives: the No Action Alternative, Diversion from Deep Ocean Disposal (Alternative 1), Regional Optimization, Leverage Hopper Dredging (Alternative 2), Cost-Share Opportunity (Alternative 3), Maximized (Alternative 4), and the proposed action.

2.1 No Action/No Project Alternative

The No Action Alternative would continue to execute the navigation dredging program in the same way as it has been done in the past, as authorized. This alternative would place approximately 0 percent of dredged sediment at upland beneficial use sites, approximately 45 to 55 percent at deep ocean disposal sites, approximately 30 to 40 percent at in-Bay sites, approximately 5 to 15 percent at ocean beneficial use sites, approximately 0 to 10 percent at ocean sites, and approximately 0 to 10 percent at upland (sponsor-provided) sites. This baseline condition was constructed based on the current navigation program, replicating how each channel would be dredged, how frequently each would be dredged, and where the sediment would be placed from each channel.

The No Action Alternative and No Project Alternative differ in that the No Action Alternative represents the current authorized dredging program, which calls for annual dredging of Richmond Outer Harbor and Pinole Shoals with a hopper dredge. The No Project Alternative, in contrast, represents the current, ongoing dredging operation as implemented over the last permit period per California Environmental Quality Act (CEQA) Guidelines section 15126.6(e)(3)(A), where hopper dredging was restricted pursuant to the CWA 401 Certification resulting in biannual dredging of Richmond Outer Harbor and Pinole Shoals. The No Action Alternative is used as the baseline alternative for NEPA. The No Project Alternative is the baseline under CEQA because it is the same as the existing physical setting (CEQA Guidelines section 15126.6(e) (1)).

2.2 Diversion from Deep Ocean Disposal (Alternative 1)

This alternative would implement the No Action Alternative, except that a federal project otherwise slated for ocean disposal at SF-DODS may be split between placement in-Bay and at an upland beneficial use site to achieve additional BUDM while maintaining the same cost. In taking this approach, at the Bay-wide programmatic level, this alternative would increase placement of dredged sediment at upland beneficial use sites from approximately 0 percent (No Action Alternative) to 5 to 20 percent; to decrease deep

ocean disposal from approximately 45 to 55 percent (No Action Alternative) to 10 to 40 percent; and to increase in-Bay placement from approximately 30 to 40 percent to 35 to 55 percent at in-Bay sites annually. The remaining placement category percentage ranges would remain the same as for the No Action Alternative.

2.3 Regional Optimization, Leverage Hopper Dredging (Alternative 2)

This alternative would increase hopper dredging in the Bay to offset the increased cost of beneficial use to achieve more BUDM than Alternative 1 and the No Action Alternative. Hopper dredging can be increased to include Richmond Inner Harbor or Oakland Harbor or a mixture of both projects. Placement with a hopper dredge is usually limited to in-Bay because the government dredge, the *Essayons*, is unable to place material upland. Therefore, beneficial use volume from another project using clamshell or a hydraulic dredge with pumpoff capability would be required. Ultimately, this alternative would increase BUDM placement from approximately 0 percent (No Action Alternative) to 20 to 30 percent; to decrease deep ocean disposal from approximately 45 to 55 percent (No Action Alternative) to 0 to 10 percent; and to increase in-Bay placement from approximately 30 to 40 percent (No Action Alternative) to 50 to 60 percent. The other category percentage ranges remain the same as for the No Action Alternative.

2.4 Cost Share Opportunity (Alternative 3)

This alternative would build on Alternative 2 (above) by taking more sediment to upland beneficial use sites within the Water Resources Development Act 2020 Section 125a threshold for easily justifying the cost share of the BUDM incremental cost for Operations and Maintenance budgets. At the Bay-wide programmatic level, this alternative would increase BUDM placement from approximately 0 percent (No Action Alternative) to 35 to 45 percent; decrease deep ocean disposal from approximately 45 to 55 percent (No Action Alternative) to 0 to 10 percent; and increase in-Bay placement from approximately 30 to 40 percent (No Action Alternative) to 35 to 45 percent. The other category percentage ranges remain the same as for the No Action Alternative.

2.5 Maximized (Alternative 4)

This alternative would place all suitable material at upland beneficial use sites, including a portion of sediment being placed at nearshore strategic placement beneficial use sites designed to leverage tidal and wave energy to transport sediment from shallow subtidal placement areas to existing intertidal mudflats and marshes. This alternative can also be executed with the volume of sediment placed at the nearshore strategic placement beneficial use sites being placed at upland beneficial use sites instead. At the bay-wide programmatic level, this alternative proposes to increase BUDM placement from approximately 0 percent (No Action Alternative) to 65 to 75 percent; to increase beneficial use nearshore strategic placement from approximately 0 percent (No Action Alternative) to 5 to 15 percent; to decrease deep ocean disposal from approximately 45 to 55 percent (No Action Alternative) to 0 to 10 percent; and to decrease in-Bay placement from approximately 30 to 40 percent (No Action Alternative) to 0 to 10 percent. The other category percentage ranges remain the same as for the No Action/Future Without Project.

2.6 Proposed Action

The proposed action would consist of phased implementation of a combination of the USACE Federal Standard Base Plan alternatives—the No Project Alternative, Alternative 1, and Alternative 2—as described in detail in Chapter 2 of the Draft EA/EIR.

The proposed phased implementation would be conducted as follows:

- **2025, No Project Alternative:** Continuing the No Project Alternative allows USACE the time necessary to appropriately plan for and implement the changes required for Alternative 1 and eventually Alternative 2.
- **2026 to 2027, Alternative 1:** The earliest USACE would be able to implement Alternative 1 would be 2026.
- **2027 to 2034, Alternative 2:** The earliest USACE would be able to implement Alternative 2 would be 2027. This time is necessary to allow USACE to work to expand the capacity of its hopper dredges, including using the West Coast Hopper Dredging contract (refer to Section 2.3 of the Draft EA/EIR).

Table A-1 shows the maximum volumes dredged for all alternatives for each likely dredging method. Under the No Action Alternative, clamshell dredging is the main dredging method used by volume of material dredged. This information is used as the basis of analysis for impacts to water quality.

Table A-1. Maximum Volume in Cubic Yards of Dredged Material for Each Likely Dredging Method

Dredge Method	No Action	No Project	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Clamshell	3,630,000	3,630,000	3,630,000	2,655,000	3,165,000	4,920,000
Cutterhead	375,000	375,000	375,000	375,000	375,000	375,000
Hopper	1,935,000	1,935,000	1,935,000	2,910,000	2,400,000	645,000

3.0 Alternatives Analysis

Section 404 (b)(1) requires an evaluation of alternatives for projects that include the discharge of dredged or fill material into waters of the United States. Under the guidelines, practicability of alternatives is taken into consideration and no alternative may be permitted if there is a less environmentally damaging practicable alternative (40 CFR 230.5(c)). The least environmentally damaging practicable alternative must:

- Meet the overall project purpose.
- Be practicable with respect to cost, technology, and logistics.
- Avoid and minimize discharge of dredged or fill material into waters of the United States.
- Not entail significant impacts to other non-aquatic environmental resources.

3.1 Overall Project Purpose

USACE is mandated by Congress to maintain the navigability of federal navigation channels. Accumulation of sediment in these channels can present navigation safety hazards. Maintenance dredging removes this sediment and returns the channels to authorized depths. As described in Section 1.1 of the Draft EA/EIR, the overall project purpose is to provide safe, reliable, and efficient waterborne transportation systems (channels, harbors, and waterways) for the movement of commerce, national security needs, and recreation, which is achieved through continuing to dredge federal navigation channels in San Francisco Bay. This basic project purpose is to provide safe, reliable, and efficient waterborne transportation systems. The basic purpose is water dependent as defined by 40 CFR Part 230 since it cannot be fulfilled outside of an aquatic environment.

3.2 Practicability

The act of dredging is not specifically regulated under Section 404 of the CWA; however, the type of dredge equipment used factors into the placement process (i.e., the discharge of dredged and fill material). The dredge equipment type determines technologically viable placement site options as well as the cost of dredged material placement, and therefore is a practicability consideration in this Section 404(b)(1) evaluation.

All alternatives would involve dredging the federal channels with a combination of hydraulic and mechanical dredge equipment and placing the dredged materials at an approved placement site. The choice of dredging method for a particular area is determined by various site-specific factors. These include the type of substrate, sediment quality, site bathymetry and layout, wave energy, dredging depth, desired production rate, placement method and distance, environmental concerns, and spatial constraints. Additionally, considerations such as equipment costs and availability play a significant role in the decision-making process for selecting the most suitable dredging approach.

Therefore, for the purpose of this evaluation, all alternatives are considered practicable with respect to technology and logistics.

3.3 Impacts to Waters of the United States

USACE, as mandated by Congress, is responsible for maintaining the navigability of federal navigation channels to their authorized depth. The amount of material to be dredged and consequently placed would be dependent on the extent of sediment accumulation in the federal navigation channels. In general, clamshell dredging results in higher levels of resuspended sediments and turbidity than hydraulic dredging. However, while the amount of material dredged via clamshell dredging from the federal navigation channels and discharged into waters of the United States differs (see Table A-1), the potential effects on water quality (e.g., increased suspended particles and turbidity) would be the less than significant under all alternatives, as described in Section 3.7.4 of the Draft EA/EIR.

4.0 Technical Evaluation/Potential Impacts of the Proposed Action

USACE's maintenance dredging and dredged material placement must comply with the regulations set forth in 33 CFR Part 335-338, which define the "Federal Standard." The Federal Standard, also known as the Base Plan, is defined by USACE regulations as the least costly dredging and dredged material disposal or placement alternative (or alternatives) identified by USACE that is consistent with sound engineering practices and meets all federal environmental requirements including those established under Section 404 of the CWA; the Marine, Protection, Research and Sanctuaries Act; and the Coastal Zone Management Act.

The proposed action would consist of phased implementation of a combination of the USACE Federal Standard Base Plan alternatives: the No Project Alternative, Alternative 1, and Alternative 2. The potential impacts of the maintenance of the federal navigation channels in San Francisco Bay by USACE were analyzed in the Draft EA/EIR, which incorporates analysis from previous environmental review documents.

This section evaluates the significance of potential adverse impacts resulting from the continuation of historically authorized maintenance dredging of the federal navigation channels and the placement of dredged materials at the placement sites under the proposed action pursuant to Subpart C though Subpart F of the Section 404(b)(1) Guidelines (Table A-2). References are included to the section(s) of the Final EA/EIR where the analysis relevant to each applicable evaluation factor is presented.

Table A-2. Technical Evaluation of Proposed Action Implementation

Technical Evaluation Factors for the Proposed Action	Evaluation	Impact Level
Potential Impacts on Physical and Chemical Characteristics of the Aquatic Ecosystem (Subpart C)		
Substrate Sections 3.5.4.2, 3.7.4.1, 3.7.4.2 and 3.7.4.3 of the Draft EA/EIR	Effects would be localized and short-term. Possible beneficial effects due to augmenting the local supply of sediment available to support accretion in mudflats and tidal wetlands.	Not significant
Suspended particles/turbidity Section 3.3.4.5 of the Draft EA/EIR	Effects from dredging would be minor, localized, and temporary. Sediment at placement sites may create short-term increases in turbidity during placement for wetland restoration but have potential to create long-term beneficial increases in sediment retention and stabilization, and pollutant filtration.	Not significant

Technical Evaluation Factors for the Proposed Action	Evaluation	Impact Level
Water Sections 3.7.4.1, 3.7.4.2 and 3.7.4.3 of the Draft EA/EIR	Based on studies by USACE, hopper, cutterhead, and clamshell dredging activities and placement of dredged material do not cause substantial changes to salinity, temperature, or pH (USACE 1976a, 1976b, 1977, 1990), and any associated minor changes would be localized and short-lived.	Not significant
Current patterns and water circulation Section 3.5.4.1 of the Draft EA/EIR	The amount of dredging to be conducted is negligible in relationship to the volume of water and the tidal forces present in San Francisco Bay. The amount of material placed at aquatic or upland sites is likewise negligible in relationship to the volume of water and tidal forces present in San Francisco Bay.	Not significant
Normal water fluctuations Section 3.5.4.1 of the Draft EA/EIR	The amount of dredging to be conducted is negligible in relationship to the volume of water and the tidal forces present in San Francisco Bay. The amount of material placed at aquatic or upland sites is likewise negligible in relationship to the volume of water and tidal forces present in San Francisco Bay.	Not significant
Salinity gradients Sections 3.7.4.1, 3.7.4.2 and 3.7.4.3 of the Draft EA/EIR	Based on studies by USACE, hopper, cutterhead, and clamshell dredging activities and placement of dredged material do not cause substantial changes to salinity, temperature, or pH (USACE 1976a, 1976b, 1977, 1990), and any associated minor changes would be localized and short-lived.	Not significant

Technical Evaluation Factors for the Proposed Action	Evaluation	Impact Level
Potential Impacts on Biological Characteristics of the Aquatic Ecosystem (Subpart D) (Section 230.30-230.32)		
Threatened and endangered species Sections 3.3.4.1, 3.3.4.2, 3.3.4.3, 3.3.4.4, 3.3.4.8 of the Draft EA/EIR	Impacts on most fish caused by entrainment would be considered less than significant through the implementation of the long-term management strategy for dredged material windows and other standard practices intended to reduce the potential for entrainment. Beneficial use of the dredged material for wetland restoration would provide habitat for longfin smelt and other species. No negative effects are expected on the leatherback turtle from the project. In the unlikely event that a leatherback turtle is sighted near the dredging or disposal area, all dredging and disposal activities would be suspended until the animal leaves the area. The work windows for portions of San Francisco Bay are intended to minimize potential impacts from turbidity effects on foraging success during the California least tern nesting season when prey species are at critical life states. The project is not expected to directly affect the western snowy plover due to avoidance and minimization measures. The project not expected to directly affect the salt marsh harvest mouse because placement of dredged material in its habitat area is closely monitored and will not be allowed if the animals are present. Restoration of tidal salt marsh habitat will also create additional habitat for salt marsh harvest mouse and Ridgway's rail.	Not significant
Fish, crustaceans, mollusks, and other aquatic organisms in the food web Sections 3.3.4.1, 3.3.4.2, 3.3.4.3, 3.3.4.4, and 3.3.4.7 of the Draft EA/EIR	None of the commercially or recreationally important fish would be significantly affected by the proposed maintenance dredging. Temporary affects to food supply and foraging success would be minor, and there would be no significant long-term effects to pelagic-based food resources because of the rapid recovery predicted in these communities, the small area affected, and the brief time in which they would be affected.	Not significant

Technical Evaluation Factors for the Proposed Action	Evaluation	Impact Level
Other wildlife Sections 3.3.4.8 and 3.3.4.3 of the Draft EA/EIR	Impacts on avian roosting, nesting, and foraging caused by dredging activities would be less than significant. Temporary increases in noise levels from dredging could constitute harassment of marine mammals. However, levels would be similar to ambient noise associated with commercial shipping and recreational boating within the study area, and there would be no adverse impacts on wildlife.	Not significant
Potential Impacts on Special Aquatic Sites (Subpart E) (Section 230.40-230.45)		
Sanctuaries and refuges	The resource is not present or there would be no adverse impact.	Not applicable
Wetlands Section 3.7.4.1 of the Draft EA/EIR	Beneficial use of dredge material placement could directly result in beneficial effects to water quality by augmenting the local supply of sediment available to support accretion in mudflats and tidal wetlands, which in turn may provide water quality benefits.	Not significant
Mud flats Section 3.3.4.9 of the Draft EA/EIR	Activities related to placement and dredging for maintenance would not result in the loss of mudflat land. Past surveys indicate that the size and health of special aquatic sites, including eelgrass beds and mudflats, are not negatively impacted by ongoing maintenance dredging. Activities related to placement and dredging for maintenance would not result in the loss of mudflat land.	No impact
Vegetated shallows Section 3.3.4.9 of the Draft EA/EIR	There would be no disturbance to sensitive ecosystems (such marshes and mud flats) that are close to federal navigation channels.	No impact
Coral reefs	The resource is not present or there would be no adverse impact.	Not applicable
Riffle and pool complexes	The resource is not present or there would be no adverse impact.	Not applicable
Potential Effects on Human Use Characteristics (Subpart F) (Section 230.50-230.55)		
Municipal and private water supplies	The resource is not present or there would be no adverse impact.	Not applicable
Recreational and commercial fisheries Section 3.3.4.1 of the Draft EA/EIR	Impacts on most fish caused by entrainment would be considered less than significant through the implementation of the long-term management strategy for dredged material windows and other standard practices intended to reduce the potential for entrainment.	Not significant

Technical Evaluation Factors for the Proposed Action	Evaluation	Impact Level
Water-related recreation Section 3.1.1 of the Draft EA/EIR	The project alternatives may occasionally delay or temporarily impede recreational watercraft during dredging and placement activities. In most locations, there would be sufficient room for recreational vessels to maneuver around dredge equipment, and therefore, impacts are expected to be negligible.	Not significant
Aesthetics	The resource is not present or there would be no adverse impact.	Not applicable
Parks, national and historic monuments, national seashores, wilderness areas, research sites, and similar preserves	The resource is not present or there would be no adverse impact.	Not applicable
Cultural Resources Section 3.4.4 of the Draft EA/EIR	Although historical dredging has occurred in the navigation channels, there is the potential that cultural resources could be inadvertently uncovered by project activities. Such inadvertently discovered resources could represent historical resources or unique archaeological resources, and their disturbance could adversely change their condition. Through implementation of mitigation measures CT1-1, CT1-2, and CT2-1, project activities would not result in impacts on known historical resources or Native American sacred sites.	Not significant

Notes:
EA/EIR = Environmental Assessment/Environmental Impact Report
USACE = US Army Corps of Engineers

4.1 Evaluation and Testing

This section evaluates the potential biological availability of possible contaminants in dredged material pursuant to Subpart G of the Section 404(b)(1) Guidelines. This analysis is based on past sediment testing results for the federal navigation channels and known sources of contamination in or near the channels. Section 1.2.7 of the Draft EA/EIR provides a description of the sediment testing requirements.

The Draft EA/EIR (Section 3.5.4.2) concluded that potential impacts and benefits of placing sediment at the alternative beneficial use sites (listed in Section 2.3.1.3 of the Draft EA/EIR) would be similar to those at the current beneficial use sites.

This evaluation addresses maintenance dredging of the federal channels for a period of 10 years. Therefore, sediment testing will be conducted in this period, pursuant to the Section 404(b)(1) sediment testing guidelines (Subpart G), per approved sediment sampling and analysis plans.

4.2 Actions Taken to Minimize Potential Impacts

Proposed measures to minimize potential impacts include the observance of dredging windows, standard dredging practices designed to reduce the risk of entrainment, and increased hopper dredging, compensatory mitigation for which could take the form of either increased upland beneficial use and/or contribution to an approved mitigation bank (see also Section 2.3.1.4 in the Draft EA/EIR). Other measures to avoid or reduce potential entrainment impacts include set up of a pilot study to assess the potential for directing fish away from the hopper dredge during operations to reduce entrainment, and application of eDNA sampling and use of an echosounder in conjunction with hopper dredging activities to prioritize the order of dredging based on fish community conditions. Additionally, USACE will comply with the terms and conditions of the 2015 biological opinion for the Long Term Management Strategy for Dredged Material (LTMS) Program for federally listed species under the National Marine Fisheries Service's (NMFS) jurisdiction (NMFS 2015), the programmatic biological opinion for the LTMS program for federally listed species under the US Fish and Wildlife Service's (USFWS) jurisdiction (USFWS 1999), and the biological opinion for effects on California least tern from USACE maintenance dredging activities in Oakland Harbor (USFWS 2023).

The Proposed Action includes BUDM as a minimization measure to reduce the impacts to longfin smelt from hopper dredging. Additionally, to compensate for potential entrainment impacts to longfin smelt associated with hopper dredging at any in-Bay location, USACE shall annually purchase mitigation credits from an approved mitigation bank or in-lieu fee program or place an equivalent amount of sediment at a permitted upland tidal wetland beneficial use site that would provide habitat for longfin smelt within San Francisco Bay.

4.2.1 Compliance with Applicable Water Quality Standards

The Proposed Action or its alternative would be implemented in accordance with all applicable federal and California water quality standards. The following measures are part of the Proposed Action and would help ensure compliance with these standards:

- Implementation of the Spill Prevention, Containment, and Cleanup Plan for the Portland District of USACE.
- Implementation of compensatory mitigation measures including increased BUDM and/or purchase of mitigation bank credits for alternatives that include increased reliance on hopper dredging.
- Adherence to dredging work windows and other standard dredging mitigation practices to reduce impacts as detailed in Chapter 2 of the Draft EA/EIR.
- Monitoring to ensure compliance with water quality certification/waste discharge requirement permit conditions, with adaptive management to address any in-water conditions that approach permit conditions.
- USACE continued participation in San Francisco Estuary Institute monitoring programs for tracking maintenance dredging impacts.
- USACE participation in a pilot study to assess deterrent methods such as light, sound, and air jets for hopper dredging.

4.3 Determination of Cumulative Effects on the Aquatic Environment

For a detailed discussion of the potential cumulative effects of the Proposed Action on aquatic habitat and aquatic species, please refer to the cumulative effects discussions that are included in each of the resource impacts and mitigation measures discussions contained in Sections 3.2 through 3.9 the Draft EA/EIR. None of the project alternatives including the No Action Alternative are expected to result in significant cumulative effects on any aquatic ecosystem or aquatic species.

5.0 Findings

The following evaluation is undertaken to demonstrate compliance with the Section 404(b)(1) guidelines (restrictions on discharge, 40 CFR 230.10). No adaptations of the Section 404(b)(1) guidelines were made relative to this evaluation. USACE has determined that there are no other available practicable alternatives that would have less adverse impact on the aquatic ecosystem that do not involve discharges into waters of the United States or at other locations within these waters.

Based on the technical evaluation as provided in Section 4.0 above, under the proposed action there is minimal potential for short- or long-term environmental effects of the proposed discharge as related to:

Physical substrate	YES
Water circulation, fluctuation, and salinity	YES
Suspended particulates/turbidity	YES
Contaminant availability	YES
Aquatic ecosystem structure, function, and organisms	YES
Proposed placement site	YES
Cumulative effects on the aquatic ecosystem	YES
Secondary effects on the aquatic ecosystem	YES

5.1 Special Restrictions

The proposed action will not violate state water quality or toxic effluent standards, jeopardize endangered or threatened species or critical habitat, or violate standards set by the Department of Commerce to protect marine sanctuaries. There are no known contaminated areas within the action area.

5.1.1 Water Quality Standards

Will the discharge:

Violate state water quality standards?	NO
Violate toxic effluent standards (under Section 307 of the CWA)?	NO
Jeopardize endangered or threatened species or their critical habitat?	NO
Violate standards set by the Department of Commerce to protect marine sanctuaries?	NO

5.1.2 Contamination and Sediment Testing

Evaluation of the information in Section 4.1 above indicates that the proposed discharge material meets testing exclusions criteria for the following reasons:

- (X) Based on the above information, the material is not a carrier of contaminants.
- (X) The levels of contamination are substantially similar at the extraction and disposal sites.
- (X) The discharge is not likely to result in degradation of the disposal site and pollutants will not be transported to less contaminated areas.
- (X) Acceptable constraints are available and will be implemented to reduce contamination to acceptable levels within the disposal site and to prevent contaminants from being transported beyond the boundaries of upland BUDM sites (i.e., sediment testing).

5.1.3 Other Restrictions

Will the discharge contribute to significant degradation of waters of the United States through adverse impacts to:

Human health or welfare, through pollution of municipal water supplies, fish, shellfish, wildlife and special aquatic sites?	NO
Life states of aquatic life and other wildlife?	NO
Diversity, productivity and stability of the aquatic ecosystem, such as the loss of fish or wildlife habitat, or loss of capacity of wetland to assimilate nutrients, purify water, or reduce wave energy?	NO
Recreational, aesthetic or economic values?	NO

5.2 Findings of Compliance or Non-Compliance

The proposed maintenance dredging of federal navigation channels in San Francisco Bay and the associated placement of dredged material for a roughly 10-year period complies with the Section 404(b)(1) guidelines.	YES

DATE

DISTRICT COMMANDER

6.0 References

NMFS (National Marine Fisheries Service). 2015. Endangered Species Act (ESA) Section 7(a)(2) Biological Opinion Long Term Management Strategy for the Placement of Dredged Material in the San Francisco Bay Region Revised Incidental Take Statement. NMFS Consultation Number: WCR-2014-1599.

Regional Water Board (San Francisco Bay Regional Water Quality Control Board). 2020. Reissued Waste Discharge Requirements and Water Quality Certifications for U.S. Army Corps of Engineers, San Francisco District, San Francisco Bay Federal Channel Maintenance Dredging Program, 2020 through 2024. Order No. R2-2020-0011. Available at: https://www.waterboards.ca.gov/rwqcb2/board_info/agendas/2020/February/7_final_to.pdf

USACE (US Army Corps of Engineers). 1976a. Dredge Disposal Study, San Francisco Bay and Estuary, Appendix C, Water Column.

USACE. 1976b. Dredge Disposal Study, San Francisco Bay and Estuary, Appendix I, Pollutant Availability Study.

USACE. 1977. Dredge Disposal Study, San Francisco Bay and Estuary; Main Report. US Army Engineer District, San Francisco, San Francisco, CA

USACE. 1990. Assessment of Dredged Material Toxicity in San Francisco Bay. Army Corps of Engineers. 1977. Dredge Disposal Study, San Francisco Bay. Environmental Laboratory, Department of the Army, Waterways Experiment Station, Vicksburg, Mississippi. Prepared by Thomas M. Dillon and David W. Moore. November 1990.

USACE. 2024. San Francisco Bay Federal Channels Operation and Maintenance Dredging and Sediment Placement Activities, Dredging Years 2025-2034, Draft Environmental Assessment/ Environmental Impact Report.

USFWS (US Fish and Wildlife Service). 1999. Programmatic Formal Endangered Species Consultation on the Proposed Long-Term Management Strategy for the Placement of Dredged Material in the San Francisco Bay Region, California, Sacramento.

USFWS. 2023. Formal Section 7 Consultation on the Oakland Harbor Maintenance Dredging Project for Years 2023-2029, Alameda and San Francisco Counties, California

APPENDIX B

Relevant Laws and Regulations

Table B-1. Federal Laws and Regulations

Law/Regulation	Administering Agency	Summary and Context
Abandoned Shipwreck Act (43 U.S.C. §§ 210§1–2106)	SHPO	The Abandoned Shipwreck Act is a federal legislative act that affirms the authority of state governments to manage abandoned shipwrecks on state submerged lands.
Clean Air Act (federal) (42 U.S.C. Chapter 85)	BAAQMD (federal authority delegated to the State). USEPA (General Conformity Regulations)	The federal CAA required the USEPA to establish primary and secondary NAAQS. The CAA also required each state to prepare an air quality control plan, referred to as a SIP. The CAA Amendments of 1990 added requirements for states with nonattainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution. The BAAQMD implements programs and regulations required by the CAA, CAA amendments, and the CCAA. This proposed maintenance dredging program is subject to the General Conformity Regulations adopted by USEPA to implement Section 176(c) of the CAA. Under the General Conformity Regulations, federal agencies must work with state, tribal, and local governments in a nonattainment or maintenance area to ensure that federal actions conform to the air quality plans established in the applicable state or tribal implementation plan. USACE has determined the proposed agency action is exempt from the requirement to prepare a conformity determination with the SIP under the CAA because the project consists of maintenance dredging, no new depths are required, and placement would be at approved placement sites. Air emissions created by the proposed program are estimated in this Draft EA/EIR, however, in accordance with CCAA requirements.

Law/Regulation	Administering Agency	Summary and Context
Clean Water Act (33 U.S.C. §§ 1257 et seq.)	San Francisco Bay Regional Water Quality Control Board and USEPA	The federal CWA (33 U.S.C. § 1257 et seq.) requires states to set standards to protect water quality. The objective of the federal CWA is to restore and maintain the chemical, physical, and biological integrity of the nation's waters. Specific sections of the CWA control discharge of pollutants and wastes into marine and aquatic environments, as further discussed in Section 3.4.1. After public review of the Draft EA/EIR, USACE applies to the Regional Water Board for a Section 401 WQC for the continuation of its San Francisco Bay Maintenance Dredging Program for the region.
Clean Water Act Section 303—Impaired Water Bodies and Total Maximum Daily Loads (33 U.S.C. § 303(d))	Regional Water Board (federal authority delegated to the State)	Under Section 303(d) of the CWA, each state is required to identify those waters within its boundaries for which effluent limits required by Section 301 are not stringent enough to meet water quality standards. The state must establish priority rankings for these waters and develop TMDLs to maintain beneficial uses and improve water quality. Seasonal variations in loading and a margin of safety are considered when TMDLs are established. In California, the SWRCB and Regional Water Boards prepare the CWA Section 303(d) List of Water Quality Limited Segments Requiring TMDLs. San Francisco Bay is listed as impaired for pesticides (e.g., chlordane, DDT, dieldrin, dioxin, and furan compounds), mercury, invasive species, polychlorinated biphenyls, selenium, and trash. In greater San Francisco Bay, Suisun Bay and San Pablo Bay are listed for these same parameters, except for trash. The Napa River is listed as impaired for pathogens and sedimentation/siltation. The tidal portion of the Petaluma River is listed as impaired for diazinon, nutrients, pathogens, and nickel.

Law/Regulation	Administering Agency	Summary and Context
Clean Water Act Section 303 – Water Quality Standards and Implementation Plans (33 U.S.C. § 1313)	Regional Water Board (federal authority delegated to the State; standards adopted in the San Francisco Bay Basin Plan)	CWA Section 303, Water Quality Standards and Implementation Plans, describes water quality standards as the water quality goals for a particular water body. These water quality goals are for the designated uses for the water and the criteria to protect those uses. The Water Board is responsible for the implementation of CWA Section 303 and has adopted the Basin Plan as the main regulatory guidance document under the CWA. Basin Plan standards consider the use and value of public water supplies, propagation of fish, shellfish, and wildlife, recreation in and on the water, and agricultural, industrial, and other uses including navigation. Protections under the Basin Plan for endangered species are generally the same as those for protection of fish and wildlife habitats generally. The Basin Plan includes fish migration as a beneficial use.
Clean Water Act Section 313(a)—Federal Facilities Pollution Control (33 U.S.C. § 13230)	USEPA	Congress expressly authorizes state regulation of federal activities that result in discharge or water pollution.
Clean Water Act Section 401 WQC (33 U.S.C. § 1341)	Regional Water Board (federal authority delegated to the State)	Under Section 401 of the CWA, WQC is required for any activity that requires a federal permit or license, and that may result in discharge into navigable waters. USACE must obtain a Section 401 certification for this project. To receive certification under Section 401, an application must demonstrate that activities or discharges into waters are consistent with state effluent limitations (CWA Section 301), water quality effluent limitations (CWA Section 302), water quality standards and implementation plans (CWA Section 303), national standards of performance (CWA Section 306), toxic and pretreatment effluent standards (CWA Section 307), and “any other appropriate requirements of State law set forth in such certification” (CWA Section 401). In California, the authority to grant WQCs is delegated to the SWRCB; in the San Francisco Bay area, applications for certification under CWA Section 401 are processed by the Regional Water Board.

Law/Regulation	Administering Agency	Summary and Context
Clean Water Act Section 402—National Pollutant Discharge Elimination System (33 U.S.C. § 1342)	USEPA	The 1972 amendments to the CWA established the NPDES permit program to control discharges of pollutants from point sources. The 1987 amendments to the CWA created a new section of the CWA devoted to stormwater permitting (Section 402[p]). USEPA has delegated administering and enforcing the provisions of CWA and NPDES to the State of California. NPDES is the primary federal program that regulates point-source and non-point source discharges to waters of the United States. Projects disturbing areas 1 acre or greater in size are effectively prohibited unless the discharge complies with an NPDES Permit. SWRCB Order No. 2022-0057, NPDES General Permit No. CAS000002, General Permit for Stormwater Discharges Associated with Construction Activity (Construction General Permit), is the active general stormwater construction activity permit for the State of California and the Regional Water Board.
Clean Water Act Section 404—Discharge of Dredged or Fill Material (33 U.S.C. § 1344)	USACE/USEPA	Under Section 404 of the CWA, USACE regulates the discharge of dredged and fill materials into waters of the United States, which include intrastate lakes, rivers, streams (including intermittent streams), bayflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, and wetlands adjacent to any water of the United States [33 C.F.R. pt. 328]. In areas subject to tidal influence, Section 404 jurisdiction extends to the high tide line or boundary of any adjacent wetlands. USACE implements Section 404 of the CWA, and USEPA has oversight authority (under Section 404c). Section 404(b)(1) of the CWA establishes procedures for the evaluation of permits, typically by states, for discharge of dredged or fill material into waters of the United States.

Law/Regulation	Administering Agency	Summary and Context
Coastal Zone Management Act (16 U.S.C. § 1456)	BCDC (federal CZMA is administered by the State)	The federal CZMA, established in 1972, provides for management of the nation's coastal resources through a state and federal partnership. Under the federal consistency provisions of the CZMA, federal projects need to be consistent with the state's coastal zone management program and policies to the maximum extent practicable. This determination is made by the lead federal agency, and concurrence is requested from the state or local agency responsible for implementing the CZMA. For San Francisco Bay, BCDC is the state's coastal zone management agency responsible for issuing concurrence with consistency determinations under the CZMA. The San Francisco Bay Plan is BCDC's policy document specifying goals, objectives, and policies for BCDC jurisdictional areas. For portions of the study area outside of San Francisco Bay, concurrence with consistency determinations is issued by the CCC. USACE requests consistency determination concurrence from BCDC and/or CCC prior to commencing dredging activities. Following public review of the Draft EA/EIR, USACE will submit a CZMA federal consistency determination to BCDC for its concurrence.
Commerce Clause of the US Constitution	USACE	"Navigable servitude" is a US constitutional doctrine that allows the federal government the right to regulate navigable waterways as an extension of the Commerce Clause of the US Constitution. The federal navigational servitude entitles the government to exert a dominant servitude in all lands below the ordinary high-water mark of navigable waters. Navigable waters of the United States are those waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce (33 C.F.R. § 329.4).
Superfund Amendments and Reauthorization Act of 1986 (42 U.S.C. §§ 9601 et. seq.)	USEPA	SARA imposes requirements to ensure that hazardous materials are properly handled, used, stored, and disposed of, and to prevent or mitigate injury to human health or the environment if such materials are accidentally released.

Law/Regulation	Administering Agency	Summary and Context
Endangered Species Act (16 U.S.C. §§ 1531-1544)	USFWS and NMFS	Under the ESA, all federal agencies must ensure that any action authorized, funded, or carried out by their agency is not likely to jeopardize the continued existence of any endangered or threatened species, or result in the destruction or adverse modification of critical habitat as defined under the ESA. NMFS is responsible for protection of ESA-listed marine species and anadromous fishes, while other species are under the jurisdiction of USFWS. Under the ESA, USFWS and NMFS must authorize the take of listed species, and the federal action agency must implement all reasonable and prudent measures necessary to minimize the impacts of take. ESA consultation is currently ongoing for this project.
Energy Independence and Security Act of 2007 (42 U.S.C. §§ 17001 et. seq.)	USDOT	The Energy Independence and Security Act of 2007 established the America's Marine Highway Program, a USDOT initiative to expand the use of waterborne transportation to relieve landside congestion and reduce carbon emissions. The Energy Independence and Security Act defines America's Marine Highways as navigable waterways that can relieve congested landside routes serving freight and passenger movement. The study area includes the Marine Highway 580 Connector, which includes the San Joaquin River, Sacramento River, and connecting commercial navigation channels, ports, and harbors in Central California from Sacramento to Oakland. The Marine Highway 580 Connector also connects to the Marine Highway 5 Corridor at Oakland, which spans Washington, Oregon, and California along the West Coast.

Law/Regulation	Administering Agency	Summary and Context
Executive Order 14008: Tackling the Climate Crisis at Home and Abroad (Federal Register Vol. 86, No. 19, pp. 7619–7633, 2021)	USACE, federal agencies	Instructs agency heads to prepare climate action plans for their agency operations. Plans delineate the goals and actions needed to meet the requirements of EO 14008 and EO 14057, Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability (Federal Register Vol. 86, No. 236 pp. 70935–70943, 2021), specifically: • 50% reduction in Army net GHG pollution by 2030, compared to 2005 levels, and • Attain net-zero GHG emissions by 2050.
Executive Order 11988 of May 24, 1977: Flood Plain Management Decision Making Process (42 Federal Register 26951, 3 C.F.R., 1977 Comp., p. 117)	USACE, federal agencies	Requires federal agencies to avoid long and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development whenever there is a practicable alternative. This EO relates primarily to the placement of dredged material and the appropriate management of lands that received dredged material for beneficial use.
Executive Order 11990: Protection of Wetlands (42 Federal Register 26961, 3 C.F.R., 1977 Comp., p. 121)	USACE, federal agencies	This EO requires federal agencies to minimize destruction of wetlands when managing lands, administering federal programs, and undertaking construction. Agencies are also required to consider the effects of federal actions on the health and quality of wetlands.
Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (59 Federal Register 7629; February 16, 1994)	USACE, federal agencies	The purpose of this EO is to focus federal attention on the environmental and human health effects of federal actions on minority and low-income populations with the goal of achieving environmental protection for all communities.
Executive Order 13112: Invasive Species (64 Federal Register 6183, pp. 6183–6186, 1999)	National Invasive Species Council	The purpose of EO 13112 is to prevent the introduction of invasive species and to provide control for the spread of invasive species that have already been introduced.

Law/Regulation	Administering Agency	Summary and Context
Executive Order 14096: Revitalizing Our Nation's Commitment to Environmental Justice for All (88 Federal Register 25251, pp. 25251–25261, 2023)	USACE, federal agencies	The policy of this EO is to pursue a whole-of-government approach to environmental justice. This order builds on the policies in EO 12898.
Hazardous Materials Transportation (49 C.F.R.)	USDOT and US Postal Service	USDOT has the regulatory responsibility for the safe transportation of hazardous materials. USDOT regulations govern all means of transportation except packages shipped by mail.
Federal Hazardous and Solid Waste Amendments (42 U.S.C. §§ 6901 et seq.)	USEPA	Amended the RCRA in 1984, affirming and extending the "cradle to grave" system of regulating hazardous wastes. The amendments specifically prohibit the use of certain techniques for the disposal of some hazardous wastes.
Inland Navigational Rules Act of 1980 (Public Law 96-591, 94 Stat. 3415, 33 C.F.R. pt. 83)	USCG	The Inland Navigational Rules Act of 1980, more commonly known as the Inland Rules, governs many rivers, lakes, harbors, and inland waterways including San Francisco Bay. Rule 27, Vessels Not Under Command or Restricted in Their Ability to Maneuver, specifies lighting and safety requirements for vessels engaged in dredging or underwater operations that are restricted in their ability to maneuver. In addition, Title 33 C.F.R. § 88.15 contains requirements for lighting on floating or supported dredge pipelines.
International Convention for the Prevention of Pollution from Ships (33 U.S.C. §§ 1901-1911)	USCG	MARPOL is the primary international convention covering pollution prevention in the marine environment by ships from operational or accidental causes. The MARPOL Convention was adopted in 1973 and modified by the Protocol of 1978 (referred to as MARPOL 73/78). The regulations cover the prevention of pollution by oil, noxious liquids, harmful substances, and garbage from operational measures, as well as from accidental discharges. USCG is the responsible enforcement agency.

Law/Regulation	Administering Agency	Summary and Context
Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. Chapter 38 §§ 1801 et. seq.)	NMFS	The Magnuson-Stevens Act establishes a management system for national marine and estuarine fishery resources. This legislation mandates the identification, conservation, and enhancement of EFH, which is defined as "waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity," for all managed species. Federal agencies consult with NMFS on proposed actions that may adversely affect EFH. The main purpose of the EFH provisions of the act is to avoid loss of fisheries due to disturbance and degradation of the fisheries habitat.
Marine Mammal Protection Act (16 U.S.C. §§ 1361-1421(h))	NOAA	The Marine Mammal Protection Act, adopted in 1972, makes it unlawful to take or import any marine mammals and/or their products.
Marine Protection, Resources, and Sanctuaries Act (33 U.S.C. §§ 1401 et. seq.)	USEPA	MPRSA is the United States' implementation of an international treaty, the Convention on the Prevention of Marine Pollution by Dumping of Waste and Other Matter (also known as the "London Convention"). Section 102 of the MPRSA authorizes USEPA to establish criteria for evaluating all dredged material proposed for ocean dumping. These criteria are published separately in the Ocean Dumping Regulations at 40 C.F.R. pt. 220-228. Section 102 also authorizes USEPA to designate permanent ocean-dredged material placement sites in accordance with specific site selection criteria designed to minimize the adverse effects of ocean placement of dredged material. Although USACE does not issue permits to itself, USACE and USEPA apply these standards to USACE projects.
Migratory Bird Treaty Act (16 U.S.C. §§ 703-712)	USFWS	The Migratory Bird Treaty Act established special protection for migratory birds by regulating hunting or trade of migratory birds. Furthermore, this act prohibits anyone taking, possessing, buying, selling, purchasing, or bartering any migratory bird listed in 50 C.F.R. pt. 10, including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 C.F.R. pt. 21).

Law/Regulation	Administering Agency	Summary and Context
National Environmental Policy Act (42 U.S. Code § 4321)	CEQ (USACE acting as lead agency)	NEPA (42 U.S.C. § 4331 et seq.), enacted by Congress and signed into law in 1970, was the first major environmental law in the United States. Under NEPA, federal agencies must assess the environmental effects of proposed major federal actions. The CEQ, which was established within the Executive Office of the President, oversees NEPA implementation by issuing guidance, reviewing procedures, and resolving disputes. NEPA outlines a process of environmental analysis and documentation to facilitate decision-making that is better informed and includes public involvement. Under NEPA, the lead federal agency, in this case USACE, is the agency that proposes an action and supervises the preparation of an environmental document.
National Historic Preservation Act (54 U.S.C. §§ 100101 et. seq.)	SHPO (federal authority delegated to the State)	The National Historic Preservation Act declares federal policy to protect historic sites and values, in cooperation with other nations, states, and local governments. Subsequent amendments designated the SHPO as the individual responsible for administering state-level programs.
Native American Graves Protection and Repatriation Act of 1990 (33 U.S.C. § 3001 et. seq.)	USACE, federal agencies, museums	This law applies on federal and tribal lands and provides a process for museums and federal agencies to return certain Native American cultural items to lineal descendants and culturally affiliated Indian tribes and Native Hawaiian organizations.
Occupational Safety and Health Act of 1970 (29 C.F.R. § 1910).	OSHA	The federal Occupational Safety and Health Act sets standards for safe workplaces and work practices, including the reporting of accidents and occupational injuries.

Law/Regulation	Administering Agency	Summary and Context
Oil or Hazardous Material Pollution Prevention Regulations for Vessels (3 U.S.C. 301 through 303; 33 U.S.C. 1321(j), 1903(b), 2735; 46 U.S.C. 70011; 70034; Executive Order 56 FR 54757, 3 CFR, 1991 Comp., p. 351; Department of Homeland Security Delegation No. 00170.1, Revision No. 01.3. Section 155.1020 also issued under section 316 of Public Law 114-120. Section 155.480 also issued under section 4110(b) of Public Law 101-380)	USCG	To operate in US waters and ports, applicable vessels regulated by the USCG are required to provide a vessel response plan to the USCG for review and approval. A vessel response plan serves as an oil spill response plan for vessels and would include, at a minimum, a contact list, including the spill removal contractor and contacts for spill notifications; procedures for spill notifications; shipboard spill mitigation procedures to mitigate or prevent discharge or threat of discharge resulting from operations, accidents, or emergencies; and shore-based response activities, including notification, coordination actions, and organization structure for response. A vessel response plan would be consistent with both the National Oil and Hazardous Substances Pollution Contingency Plan and the California Office of Spill Prevention and Response Area Contingency Plan.
Oil Pollution Act (Title 33 U.S.C. §§ 2701 et seq.)	USEPA	OPA establishes a liability system for oil spills into navigable waters or adjacent shorelines that injure or are likely to injure natural resources, and/or the services that those resources provide to the ecosystem or humans. Pursuant to the OPA, federal and state agencies and Indian tribes may act as trustees on behalf of the public to assess the injuries, scale restoration to compensate for those injuries, and implement restoration.

Law/Regulation	Administering Agency	Summary and Context
Operation and Maintenance of Army Corps of Engineers Civil Works Projects Involving the Discharge of Dredged or Fill Material into Waters of the US or Ocean Waters (33 C.F.R. pt. 335-338)	USACE	USACE's maintenance dredging program, including discharge of dredged or fill material into waters of the United States and transportation of dredged material for the purpose of disposal into ocean waters, is regulated under 33 C.F.R. pt. 335-338. Part 335 identifies applicable laws and provides relevant definitions, including the Federal Standard. Part 336 describes factors to be considered in the evaluation of USACE dredging projects involving the discharge of dredged material into waters of the United States and ocean waters, including compliance with Section 404(b)(1) of the CWA and Section 103 of the MPRSA. Part 337 addresses practice and procedures to be followed in implementing state requirements, responding to emergency actions, and notifying the public of disposal sites.
Resource Conservation and Recovery Act (40 C.F.R. §§ 239-282).	USEPA	Under RCRA, USEPA regulates the generation, transportation, treatment, storage, and disposal of hazardous waste from "cradle to grave." Transportation of hazardous materials and hazardous waste is carried out by individuals or entities that move hazardous materials and waste from one site to another by highway, rail, water, or air (40 C.F.R. § 260.10).
Rivers and Harbors Act (33 U.S.C. § 401 et seq.)	USACE	The Rivers and Harbors Act refers to a conglomeration of many pieces of legislation and appropriations passed by Congress since the first such legislation in 1824. The Rivers and Harbors Act of 1899 was the first federal water pollution act in the United States. It focuses on protecting navigation, protecting waters from pollution, and acted as a precursor to the CWA of 1972. Section 10 of the Rivers and Harbors Act of 1899 regulates alteration of navigable waters and prohibits unauthorized obstruction of navigable waters of the United States. Original construction of the federal navigation channels was authorized under the Rivers and Harbors Act, and USACE's maintenance dredging maintains the navigability of the channels in accordance with their authorized dimensions. No permit is required for projects sponsored and executed by USACE.

Law/Regulation	Administering Agency	Summary and Context
Submerged Lands Act of 1953 (43 U.S.C. §§ 1301 et seq.)	CSLC	The Submerged Lands Act established state jurisdiction over offshore lands within 3 miles of shore. In compliance with this act, the CSLC will receive a copy of this EA/EIR and will have the opportunity to comment on the project's potential impacts on submerged lands.
International Regulations for Preventing Collision at Sea (Public Law 95-75, 91 Stat. 308, 33 U.S.C. §§ 1-8)	International Maritime Organization	The International Regulations for Preventing Collision at Sea, also known as the Rules of the Road or International Navigation Rules, or 72 COLREGS, govern open bodies of water, including San Francisco Bay, in which foreign shipping traffic is possible. The regulations are designed to promote navigational safety.
United States Department of Commerce, National Oceanic and Atmospheric Administration, Office of Response and Restoration	NOAA Office of Response and Restoration	The NOAA OR&R is charged with responding to oil spills, chemical accidents, and other emergencies in coastal areas. Under the National Contingency Plan, NOAA is responsible for providing scientific support to the Federal On-Scene Coordinator for oil and hazardous material spills. To support this mandate, OR&R provides 24-hour, 7-day-a-week response to spills. During an oil spill in coastal waters, OR&R's role is to provide scientific support to the USCG officers in charge of response operations. In addition to spill response software and mapping tools, OR&R provides standard techniques and publishes guidelines for observing oil, assessing shoreline impact, and evaluating accepted cleanup technologies.
United States Marine Highway Program, Energy Independence and Security Act of 2007 §§ 1121 and 1123	USDOT, Maritime Administration	This program is intended to expand the use of inland, Great Lakes–Saint Lawrence Seaway System, intracoastal, and coastal waterways for the transportation of freight and passengers to mitigate landside congestions, reduce GHG emissions per ton-mile moved, and accomplish other objectives.

Notes: BAAQMD = Bay Area Air Quality Management District
BCDC = San Francisco Bay Conservation and Development Commission
CAA = Clean Air Act
CCA = California Coastal Act
CCAA = California Clean Air Act
CCC = California Coastal Commission
CEQ = Council on Environmental Quality

C.F.R. = Code of Federal Regulations
CSLC = California State Lands Commission
CWA = Clean Water Act
CZMA = Coastal Zone Management Act
EFH = Essential Fish Habitat
EO = Executive Order
ESA = Endangered Species Act
GHG = greenhouse gas
Magnuson-Stevens Act = Magnuson-Stevens Fishery Conservation and Management Act
MPRSA = Marine Protection, Resources, and Sanctuaries Act
NAAQS = National Ambient Air Quality Standards
NEPA = National Environmental Policy Act
NMFS = National Marine Fisheries Service
NOAA = National Oceanic and Atmospheric Administration
NPDES = National Pollutant Discharge Elimination System
OPA = Oil Pollution Act
OPR = Office of Planning and Research
OR&R = Office of Response and Restoration
RCRA = Resource Conservation and Recovery Act
SARA = Superfund Amendments and Reauthorization Act
SHPO = State Historic Preservation Officer
SIP = State Implementation Plan
SWRCB = State Water Resources Control Board
TMDL = Total Maximum Daily Load
USACE = US Army Corps of Engineers
U.S.C. = United States Code
USCG = US Coast Guard
USDOT = US Department of Transportation
USEPA = US Environmental Protection Agency
USFWS = US Fish and Wildlife Service
WQC = Water Quality Certification

Table B-2. State and Regional Laws and Regulations

Law/Regulation	Administering Agency	Summary and Context
State		
California Administrative Code, Title 14, Section 4307	SHPO	Under this state preservation law, no person shall remove, injure, deface, or destroy any object of paleontological, archaeological, or historical interest or value. In addition to the administration of specific state laws concerning historic preservation, the SHPO is responsible for review of applications for entry on the National Register of Historic Places.
Assembly Bill 32 and the California Climate Change Scoping Plan. Accessed at: 2022 Scoping Plan for Achieving Carbon Neutrality - Executive Summary	CARB	The California Global Warming Solutions Act of 2006 and AB 32 establish a cap on statewide GHG emissions and set forth the regulatory framework to achieve the corresponding reduction in statewide emission levels. Under AB 32, GHG are defined as CO_2, CH_4, N_2O, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.
Assembly Bill 52 and the California Water Resources Control Board Tribal Consultation Policy, 2019. Accessed at: California Water Board Tribal Consultation Policy 2019	SWRCB as CEQA lead agency	AB 52 requires public agencies to consult with Native American tribes about tribal cultural resources during the CEQA process.
Bay-Delta Plan. Accessed at: Bay-Delta Watershed | California State Water Resources Control Board	SWRCB	The Bay-Delta Plan establishes water quality control measures and flow requirements needed to provide reasonable protection of beneficial uses in the watershed.

Law/Regulation	Administering Agency	Summary and Context
Clean Air Act (federal) (42 U.S.C. Chapter 85) and California Clean Air Act (California Code of Regulations, Title 13, Div. 3 and California Code of Regulations, Title 17, Div. 3)	CARB	CARB is the agency responsible for coordination and oversight of federal, state, and local air pollution control programs in California, and for implementing the CCAA and the federal CAA. The CCAA requires that all air districts in the state endeavor to achieve and maintain the CAAQS by the earliest practical date. CARB is primarily responsible for the development and maintenance of the SIP under the federal CAA, which requires final approval by USEPA. The SIP is the primary mechanism for the implementation of CAAQS and NAAQS. In some cases, CAAQS are more stringent than NAAQS. Local air districts provide additional strategies for regulating air pollution sources under their jurisdiction. Other CARB duties include monitoring air quality (in conjunction with air monitoring networks maintained by air pollution control and air quality management districts), determining and updating area designations and maps, and setting emissions standards for new mobile sources, consumer products, small utility engines, and off-road vehicles.
California Coastal Act (California Public Resources Code, Div. 20)	CCC	The CCA includes specific policies (Division 20 of the PRC) for planning and regulatory decisions made by the CCC and local governments, once those local governments adopt Local Coastal Programs that are approved by the CCC. The CCA covers dredging and placement activities along with many other development activities within the coastal zone.

Law/Regulation	Administering Agency	Summary and Context
California Endangered Species Act (Fish and Game Code, Chapter 1.5, sections 2050-2115.5 and California Code of Regulations, title 14, chapter 6, sections 783.0-787.9)	CDFW	CESA (California Fish and Game Code 2050-2116) operates like the federal ESA but is administered by CDFW. Certain species that are federally listed may not be listed on the CESA or may have a different listing status. Like the federal ESA, CESA and the Native Plant Protection Act authorize CDFW to designate, protect, and regulate the taking of protected species in the State of California. USACE must consider special-status species and whether the action threatens to violate federal, state, or local law or requirements imposed for the protection of the environment (40 C.F.R. § 1508.27[b][9-10]). For these reasons, this document analyzes impacts on species listed under CESA to facilitate issuance of a WQC.
California Environmental Quality Act (California Public Resources Code § 21000 et. seq.)	Regional Water Board as lead CEQA agency	CEQA was signed into law in 1970, about eight months after the signing of NEPA. Similar to NEPA, CEQA requires public agencies to consider and disclose to the public the environmental implications of proposed actions, supporting informed decision-making on projects and operations that may affect the environment. In addition, under CEQA, agencies are to minimize significant adverse environmental effects to the extent feasible.
California Harbors and Navigation Code (California Harbors & Navigation Code § 652)	CADBW	The California Harbors and Navigation Code vests authority with CADBW to regulate matters of navigational safety for the state's boating public. CADBW was formed in 1979 through the consolidation of functions previously held by several divisions in the Departments of Natural Resources, Motor Vehicles, and Parks and Recreation. The code established a comprehensive set of state laws and regulations governing the equipment and operation of vessels on all waters of the state.
California Hazardous Materials Release Response Plan and Inventory Law of 1985 (Health and Safety Code, Div. 20, Chapter 6.95)	CUPA	The California Hazardous Materials Release Response Plan and Inventory Law of 1985 (Business Plan Act) requires that businesses that store hazardous materials on site prepare an Hazardous Materials Business Plan and submit it to the local CUPA.

Law/Regulation	Administering Agency	Summary and Context
California Hazardous Waste Control Act (California Health and Safety Code, Division 20, Chapter 6.5, Article 2, Section 25100 et seq.) and California Hazardous Substance Account Act (California Health and Safety Code, Division 20, Chapter 6.8, Section 25300 et seq.)	DTSC	Under the California Hazardous Waste Control Act, DTSC regulates the generation, transportation, treatment, storage, and disposal of hazardous waste in California. The hazardous waste regulations establish criteria for identifying, packaging, and labeling hazardous wastes; dictate the management of hazardous waste; establish permit requirements for hazardous waste treatment, storage, disposal, and transportation; and identify hazardous wastes that cannot be disposed of in landfills. DTSC is also the administering agency for the California Hazardous Substance Account Act, also known as the State Superfund Law, which provides for the investigation and remediation of hazardous substances pursuant to state law.
California Native American Graves Protection and Repatriation Act of 2001 (California Public Resources Code, Section 5097.9)	SHPO	PRC Section 5097.9 details procedures to be followed whenever Native American remains are discovered. It states that no public agency or private party using or occupying public property, or operating on public property, under a public license, permit, grant, lease, or contract made on or after July 1, 1977, shall interfere with the free expression or exercise of Native American religion as provided in the US Constitution and the California Constitution. It further states that no such agency or party shall cause severe or irreparable damage to any Native American sanctified cemetery, place of worship, religious or ceremonial site, or sacred shrine on public property, except on a clear and convincing showing that the public interest and necessity so require. This document recognizes the potential for inadvertent discovery of such resources and proposes mitigation for the treatment of human remains and associated or unassociated funerary objects discovered during any soil-disturbing activity.
Consultation and Coordination with Indian Tribal Governments, Executive Order 13175	USACE, federal agencies	Requires regular, meaningful consultation and collaboration with tribal officials in the development of tribal policies that have tribal implications, to strengthen the United States government-to-government relationships with Indian tribes, and to reduce the imposition of unfunded mandates upon Indian tribes.

Law/Regulation	Administering Agency	Summary and Context
Human Remains (California Public Resources Code, Section 7050.5)	SHPO and local law enforcement	PRC Section 7050.5 specifies that anyone who knowingly mutilates or disinters, wantonly disturbs, or willfully removes any human remains in or from any location other than a dedicated cemetery without authority of law is guilty of a misdemeanor unless one of the exceptions applies. In the event of discovery or recognition of any human remains in any location other than a dedicated cemetery, the PRC states that there shall be no further excavation or disturbance of the site until the coroner of the county in which the human remains are discovered has determined the remains to be archaeological. If the coroner determines that the remains are not subject to his or her authority, and if the coroner recognizes or has reason to believe that the human remains are those of a Native American, he or she must contact the Native American Heritage Commission by telephone within 24 hours. This document recognizes the potential for inadvertent discovery of human remains and proposes mitigation for the treatment of human remains discovered during any soil-disturbing activity.
Human Remains, Criminal Penalties (California Public Resources Code, Section 7051)	SHPO and local law enforcement	PRC Section 7051 states that it is a public offense to remove any part of any human remains from any place where it has been interred, or from any place where it is deposited while awaiting interment or cremation, with intent to sell it or to dissect it, without authority of law, or written permission of the person or persons having the right to control the remains under Section 7100, or with malice or wantonness. This document recognizes the potential for inadvertent discovery of human remains and proposes mitigation for the treatment of human remains discovered during any soil-disturbing activity.

Law/Regulation	Administering Agency	Summary and Context
Emergency Response	California OES and local government partners	The State of California and local governments throughout the Bay Area, including Alameda County, have made investments in the planning and resources necessary to respond to natural and human-caused emergencies and disasters. California OES and its local government partners developed the Bay Area Regional Emergency Coordination Plan (RECP) with support from the Department of Homeland Security to provide a framework for collaboration and coordination during regional events. The RECP has been prepared in accordance with national and state emergency management systems and plans. The RECP provides an all-hazards framework for collaboration among responsible entities and coordination during emergencies in the Bay Area. The RECP defines procedures for regional coordination, collaboration, decision-making, and resource sharing among emergency response agencies in the Bay Area.
California Executive Order S-1-07	CARB	California EO S-1-07 established a goal of reducing the carbon intensity of transportation fuels sold in California by 10 percent by 2020. CARB determined that a low carbon fuel standard could be adopted as a discrete, early-action measure to meet the mandates in AB 32. CARB adopted the Low Carbon Fuel Standard on April 23, 2009.
California Executive Order S-3-05	CARB	This California EO requires California GHG emissions be reduced to 80% below 1990 levels by the year 2050.
Hazardous Materials Transportation Emergency Response	CHP and Caltrans	Caltrans and the CHP have primary responsibility for enforcing federal and state regulations and responding to hazardous materials transportation emergencies.

Law/Regulation	Administering Agency	Summary and Context
Lempert-Keene-Seastrand Oil Spill Prevention and Response Act (Government Code Title 2, Division 1, Chapter 7, Article 3.5)	CDFW (Office of Oil Spill Prevention and Response)	Passed in 1990 in response to lessons learned from the 1989 Exxon Valdez oil spill off the Alaskan coast and the 1990 American Trader oil spill offshore of Orange County, California, the Lempert-Keene-Seastrand Oil Spill Prevention and Response Act sets forth a comprehensive oil spill prevention and response program that requires all marine facilities and vessels to comply with an integrated system of statewide regulations, operation manuals, inspections, and training and drill programs in order to provide the “best achievable protection” of the state’s coastal and marine resources through the use of “best achievable technologies” and practices.
McAteer-Petris Act (California Government Code 66600-66682)	San Francisco BCDC	The McAteer-Petris Act, first enacted in 1965, created BCDC, with a mandate to prepare a plan to protect San Francisco Bay and its shoreline, and to provide for appropriate development and public access. The McAteer-Petris Act directs BCDC to exercise its authority to issue or deny permit applications for placing fill, dredging, or changing the use of any land, water, or structure in its jurisdiction (San Francisco Bay waters and 100 feet above the shoreline). BCDC also reviews determinations of consistency with the CZMA for federally sponsored projects in San Francisco Bay. The San Francisco Bay Plan, first adopted in 1969, and most recently amended in 2019, is BCDC’s policy document specifying goals, objectives, and policies for BCDC jurisdictional areas. Pursuant to the federal CZMA, USACE is required to be consistent, to the maximum extent practicable, with the enforceable policies of the San Francisco Bay Plan.

Law/Regulation	Administering Agency	Summary and Context
Occupational Safety (Title 8 California Code of Regulations)	Cal/OSHA	Cal/OSHA has primary responsibility for developing and enforcing workplace safety regulations in California. Because California has a federally approved OSHA program, it is required to adopt regulations that are at least as stringent as those found in Title 29 of the C.F.R. Cal/OSHA standards are generally more stringent than federal regulations. The use of hazardous materials in the workplace requires employee safety training, safety equipment, accident and illness prevention programs, hazardous substance exposure warnings, and emergency action and fire prevention plan preparation.
Porter-Cologne Water Quality Control Act (California Statutes 1942, Chapter 368)	Regional Water Board	The Porter-Cologne Water Quality Control Act, also known as the California Water Code, was established in 1969 and last amended in 2019. The act is a comprehensive program that addresses protection of water quality and the beneficial uses of waters of the state, including drinking water supply, recreation, and wildlife habitat. It provides protection from pollution and contamination to both surface and ground waters. The SWRCB and the nine California Regional Quality Control Boards have primary responsibility for implementing and enforcing the act. The Basin Plan is the San Francisco Bay Water Board's master policy document for water quality regulation in San Francisco Bay, including fulfilling the requirements of the Porter-Cologne Act. The act described WDR requirements for activities that may affect water quality as well as compliance with federal water quality control laws, including WQC. The basis for these permits is established in the Basin Plan. As a federal agency, USACE does not believe it is required to apply for WDRs; however, the Water Board may issue WDRs with the WQC.

Law/Regulation	Administering Agency	Summary and Context
Public Trust Doctrine	CSLC	CSLC manages lands in California according to the Public Trust Doctrine. Several of the guiding principles of the Public Trust are: I. Lands under the ocean and under navigable streams are owned by the public and held in trust for the people by government. These are referred to as public trust lands and include filled lands formerly under water. Public trust lands cannot be bought and sold like other state-owned lands, but they may be leased for uses consistent with the public trust. II. Uses of trust lands, whether granted to a local agency or administered by the state directly, are generally limited to those that are water dependent. III. Because public trust lands are held in trust for all citizens of California, they must be used to serve statewide, as opposed to purely local, public purposes.
Senate Bill 97	CNRA, OPR, and Regional Water Board as CEQA lead agency	Senate Bill 97 acknowledges that climate change is an important environmental issue that requires analysis under CEQA. Senate Bill 97 required OPR, in consultation with CNRA, to adopt amendments to the CEQA guidelines to address the analysis and mitigation of GHG emissions.
Hazardous Waste Transportation (Titles 13, 22, and 26 of the California Code of Regulations)	California State Agencies	Regulates the transportation of hazardous waste originating in and passing through the state, including requirements for shipping, containers, and labeling.
Unified Program; Certified Unified Program Agency (Health and Safety Code Sections 25404 et seq.)	CUPA	In January 1996, the California Environmental Protection Agency adopted regulations that implemented a Unified Program at the local level. The agency responsible for implementation of the Unified Program is the CUPA.

Law/Regulation	Administering Agency	Summary and Context
Regional		
Bay Area Air Quality Management District Air Quality Regulations	BAAQMD	The BAAQMD manages air quality conditions in the San Francisco Bay Area Air Basin through a comprehensive program of planning, regulation, enforcement, technical innovation, and promotion of the understanding of air quality issues. The BAAQMD is a regional arm of the state agency CARB. The BAAQMD's function is described in detail under the CARB section above.
San Francisco Bay Area Seaport Plan	MTC and BCDC	The San Francisco Bay Area Seaport Plan, first adopted in 1996 and last amended in 2021, is the product of a cooperative planning effort of the MTC and BCDC. The Seaport Plan is incorporated into BCDC's San Francisco Bay Plan, where it is the basis of the Bay Plan port policies. The MTC uses the Seaport Plan to assist in making project funding decisions and managing the metropolitan transportation system. BCDC uses the Seaport Plan to help guide its regulatory decisions on permit applications, consistency determinations, and related matters.

Notes: AB = Assembly Bill
BAAQMD = Bay Area Air Quality Management District
BCDC = San Francisco Bay Conservation and Development Commission
CAA = Clean Air Act
CAAQS = California Ambient Air Quality Standards
CADBW = California Department of Boating and Waterways
Cal/OSHA = California Division of Occupational Safety and Health
Caltrans = California Department of Transportation
CARB = California Air Resources Board
CCA = California Coastal Act
CCAA = California Clean Air Act
CCC = California Coastal Commission
CDFW = California Department of Fish and Wildlife
CEQ = Council on Environmental Quality
CEQA = California Environmental Quality Act
CESA = California Endangered Species Act
C.F.R. = Code of Federal Regulations

CHP = California Highway Patrol
CNRA = California Natural Resources Agency
CSLC = California State Lands Commission
CUPA = Certified Unified Program Agency
CZMA = Coastal Zone Management Act
DTSC = Department of Toxic Substances Control
EA = environmental assessment
EO = Executive Order
ESA = Endangered Species Act
GHG = greenhouse gas
MTC = Metropolitan Transportation Commission
NAAQS = National Ambient Air Quality Standards
NEPA = National Environmental Policy Act
OES = Office of Emergency Services
PRC = California Public Resources Code
RECP = Bay Area Regional Emergency Coordination Plan
SHPO = State Historic Preservation Officer
SIP = State Implementation Plan
SWRCB = State Water Resources Control Board
USACE = US Army Corps of Engineers
U.S.C. = United States Code
USEPA = US Environmental Protection Agency
WDR = Waste Discharge Requirements
WQC = Water Quality Certification

APPENDIX C

Census Tracts with Environmental Justice Concerns

Appendix C – Census Tracts with Environmental Justice Concerns

NAME	TRACTID_x
Block Group 4, Census Tract 3770, Contra Costa County, California	06013377000
Block Group 3, Census Tract 4251.04, Alameda County, California	06001425104
Block Group 1, Census Tract 2527.07, Solano County, California	06095252707
Block Group 1, Census Tract 4016, Alameda County, California	06001401600
Block Group 4, Census Tract 4332, Alameda County, California	06001433200
Block Group 1, Census Tract 4059.02, Alameda County, California	06001405902
Block Group 3, Census Tract 4279, Alameda County, California	06001427900
Block Group 1, Census Tract 101.02, San Francisco County, California	06075010102
Block Group 2, Census Tract 612, San Francisco County, California	06075061200
Block Group 1, Census Tract 3760, Contra Costa County, California	06013376000
Block Group 3, Census Tract 3072.02, Contra Costa County, California	06013307202
Block Group 2, Census Tract 4058, Alameda County, California	06001405800
Block Group 2, Census Tract 4053.01, Alameda County, California	06001405301
Block Group 3, Census Tract 4088, Alameda County, California	06001408800
Block Group 3, Census Tract 3100, Contra Costa County, California	06013310000
Block Group 1, Census Tract 4090, Alameda County, California	06001409000
Block Group 1, Census Tract 4273, Alameda County, California	06001427300
Block Group 3, Census Tract 1506.09, Sonoma County, California	06097150609
Block Group 1, Census Tract 3120, Contra Costa County, California	06013312000
Block Group 2, Census Tract 3060.03, Contra Costa County, California	06013306003
Block Group 1, Census Tract 6102.01, San Mateo County, California	06081610201
Block Group 2, Census Tract 3820, Contra Costa County, California	06013382000
Block Group 1, Census Tract 4072, Alameda County, California	06001407200
Block Group 2, Census Tract 2510, Solano County, California	06095251000
Block Group 2, Census Tract 4075, Alameda County, California	06001407500
Block Group 1, Census Tract 105, San Francisco County, California	06075010500
Block Group 2, Census Tract 2518.03, Solano County, California	06095251803
Block Group 2, Census Tract 226, San Francisco County, California	06075022600
Block Group 2, Census Tract 3141.02, Contra Costa County, California	06013314102
Block Group 4, Census Tract 4063, Alameda County, California	06001406300
Block Group 1, Census Tract 231.03, San Francisco County, California	06075023103
Block Group 1, Census Tract 231.02, San Francisco County, California	06075023102
Block Group 3, Census Tract 2504, Solano County, California	06095250400
Block Group 1, Census Tract 4055, Alameda County, California	06001405500
Block Group 2, Census Tract 3100, Contra Costa County, California	06013310000

Appendix C – Census Tracts with Environmental Justice Concerns

NAME	TRACTID_x
Block Group 4, Census Tract 4088, Alameda County, California	06001408800
Block Group 1, Census Tract 4325.01, Alameda County, California	06001432501
Block Group 2, Census Tract 4031, Alameda County, California	06001403100
Block Group 2, Census Tract 4335, Alameda County, California	06001433500
Block Group 2, Census Tract 2515, Solano County, California	06095251500
Block Group 2, Census Tract 6118, San Mateo County, California	06081611800
Block Group 1, Census Tract 2002.02, Napa County, California	06055200202
Block Group 1, Census Tract 2524.02, Solano County, California	06095252402
Block Group 2, Census Tract 4062.01, Alameda County, California	06001406201
Block Group 1, Census Tract 4403.04, Alameda County, California	06001440304
Block Group 2, Census Tract 4025, Alameda County, California	06001402500
Block Group 1, Census Tract 1122.04, Marin County, California	06041112204
Block Group 5, Census Tract 1212, Marin County, California	06041121200
Block Group 1, Census Tract 1110.01, Marin County, California	06041111001
Block Group 2, Census Tract 1122.03, Marin County, California	06041112203
Block Group 2, Census Tract 3800.02, Contra Costa County, California	06013380002
Block Group 1, Census Tract 4025, Alameda County, California	06001402500
Block Group 3, Census Tract 4057, Alameda County, California	06001405700
Block Group 2, Census Tract 4063, Alameda County, California	06001406300
Block Group 2, Census Tract 4065, Alameda County, California	06001406500
Block Group 3, Census Tract 4074, Alameda County, California	06001407400
Block Group 1, Census Tract 4324, Alameda County, California	06001432400
Block Group 3, Census Tract 4282, Alameda County, California	06001428200
Block Group 1, Census Tract 4333, Alameda County, California	06001433300
Block Group 3, Census Tract 4060, Alameda County, California	06001406000
Block Group 2, Census Tract 4016, Alameda County, California	06001401600
Block Group 1, Census Tract 5048.05, Santa Clara County, California	06085504805
Block Group 2, Census Tract 4280, Alameda County, California	06001428000
Block Group 1, Census Tract 4232, Alameda County, California	06001423200
Block Group 1, Census Tract 4279, Alameda County, California	06001427900
Block Group 2, Census Tract 4094, Alameda County, California	06001409400
Block Group 4, Census Tract 4273, Alameda County, California	06001427300
Block Group 1, Census Tract 4231, Alameda County, California	06001423100
Block Group 1, Census Tract 4233, Alameda County, California	06001423300
Block Group 3, Census Tract 4058, Alameda County, California	06001405800

Appendix C – Census Tracts with Environmental Justice Concerns

NAME	TRACTID_x
Block Group 4, Census Tract 4058, Alameda County, California	06001405800
Block Group 1, Census Tract 4030, Alameda County, California	06001403000
Block Group 2, Census Tract 4334, Alameda County, California	06001433400
Block Group 2, Census Tract 3750, Contra Costa County, California	06013375000
Block Group 3, Census Tract 3790, Contra Costa County, California	06013379000
Block Group 2, Census Tract 3110, Contra Costa County, California	06013311000
Block Group 1, Census Tract 6120.01, San Mateo County, California	06081612001
Block Group 4, Census Tract 6119.02, San Mateo County, California	06081611902
Block Group 2, Census Tract 6119.01, San Mateo County, California	06081611901
Block Group 3, Census Tract 6121.01, San Mateo County, California	06081612101
Block Group 2, Census Tract 4034.01, Alameda County, California	06001403401
Block Group 2, Census Tract 614.01, San Francisco County, California	06075061401
Block Group 1, Census Tract 615.04, San Francisco County, California	06075061504
Block Group 1, Census Tract 614.01, San Francisco County, California	06075061401
Block Group 2, Census Tract 101.01, San Francisco County, California	06075010101
Block Group 2, Census Tract 6117, San Mateo County, California	06081611700
Block Group 1, Census Tract 6105, San Mateo County, California	06081610500
Block Group 1, Census Tract 1290, Marin County, California	06041129000
Block Group 2, Census Tract 354, San Francisco County, California	06075035400
Block Group 2, Census Tract 232, San Francisco County, California	06075023200
Block Group 2, Census Tract 2007.05, Napa County, California	06055200705
Block Group 2, Census Tract 4059.01, Alameda County, California	06001405901
Block Group 2, Census Tract 4059.02, Alameda County, California	06001405902
Block Group 2, Census Tract 4333, Alameda County, California	06001433300
Block Group 3, Census Tract 1090.01, Marin County, California	06041109001
Block Group 2, Census Tract 1290, Marin County, California	06041129000
Block Group 1, Census Tract 4054.01, Alameda County, California	06001405401
Block Group 2, Census Tract 4054.01, Alameda County, California	06001405401
Block Group 2, Census Tract 4071.01, Alameda County, California	06001407101
Block Group 3, Census Tract 4325.01, Alameda County, California	06001432501
Block Group 3, Census Tract 332.04, San Francisco County, California	06075033204
Block Group 1, Census Tract 612, San Francisco County, California	06075061200
Block Group 2, Census Tract 3760, Contra Costa County, California	06013376000
Block Group 1, Census Tract 3132.06, Contra Costa County, California	06013313206
Block Group 2, Census Tract 2509, Solano County, California	06095250900

Appendix C – Census Tracts with Environmental Justice Concerns

NAME	TRACTID_x
Block Group 1, Census Tract 2510, Solano County, California	06095251000
Block Group 2, Census Tract 2512, Solano County, California	06095251200
Block Group 2, Census Tract 2516, Solano County, California	06095251600
Block Group 3, Census Tract 2506.01, Solano County, California	06095250601
Block Group 2, Census Tract 2527.03, Solano County, California	06095252703
Block Group 2, Census Tract 2527.02, Solano County, California	06095252702
Block Group 2, Census Tract 2525.01, Solano County, California	06095252501
Block Group 1, Census Tract 2525.02, Solano County, California	06095252502
Block Group 2, Census Tract 2526.07, Solano County, California	06095252607
Block Group 2, Census Tract 2526.08, Solano County, California	06095252608
Block Group 3, Census Tract 2002.02, Napa County, California	06055200202
Block Group 4, Census Tract 2008.04, Napa County, California	06055200804
Block Group 3, Census Tract 1506.01, Sonoma County, California	06097150601
Block Group 1, Census Tract 6102.02, San Mateo County, California	06081610202
Block Group 2, Census Tract 4064, Alameda County, California	06001406400
Block Group 3, Census Tract 2524.01, Solano County, California	06095252401
Block Group 2, Census Tract 4231, Alameda County, California	06001423100
Block Group 4, Census Tract 3760, Contra Costa County, California	06013376000
Block Group 2, Census Tract 6015.01, San Mateo County, California	06081601501
Block Group 4, Census Tract 4061, Alameda County, California	06001406100
Block Group 1, Census Tract 4285, Alameda County, California	06001428500
Block Group 2, Census Tract 3170, Contra Costa County, California	06013317000
Block Group 1, Census Tract 4276, Alameda County, California	06001427600
Block Group 1, Census Tract 6121.02, San Mateo County, California	06081612102
Block Group 3, Census Tract 1122.02, Marin County, California	06041112202
Block Group 2, Census Tract 3141.05, Contra Costa County, California	06013314105
Block Group 4, Census Tract 6030, San Mateo County, California	06081603000
Block Group 2, Census Tract 106, San Francisco County, California	06075010600
Block Group 1, Census Tract 230.03, San Francisco County, California	06075023003
Block Group 1, Census Tract 2527.04, Solano County, California	06095252704
Block Group 2, Census Tract 1110.02, Marin County, California	06041111002
Block Group 2, Census Tract 4017, Alameda County, California	06001401700
Block Group 1, Census Tract 6028, San Mateo County, California	06081602800
Block Group 2, Census Tract 6121.01, San Mateo County, California	06081612101
Block Group 3, Census Tract 1506.11, Sonoma County, California	06097150611

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NAME	TRACTID_x
Block Group 2, Census Tract 2518.02, Solano County, California	06095251802
Block Group 1, Census Tract 2512, Solano County, California	06095251200
Block Group 1, Census Tract 3060.03, Contra Costa County, California	06013306003
Block Group 3, Census Tract 4065, Alameda County, California	06001406500
Block Group 3, Census Tract 1509.01, Sonoma County, California	06097150901
Block Group 1, Census Tract 4053.02, Alameda County, California	06001405302
Block Group 1, Census Tract 4071.02, Alameda County, California	06001407102
Block Group 3, Census Tract 4063, Alameda County, California	06001406300
Block Group 3, Census Tract 329.01, San Francisco County, California	06075032901
Block Group 2, Census Tract 2524.01, Solano County, California	06095252401
Block Group 3, Census Tract 4276, Alameda County, California	06001427600
Block Group 3, Census Tract 1508, Sonoma County, California	06097150800
Block Group 4, Census Tract 4277, Alameda County, California	06001427700
Block Group 1, Census Tract 1507.01, Sonoma County, California	06097150701
Block Group 4, Census Tract 4062.01, Alameda County, California	06001406201
Block Group 1, Census Tract 3770, Contra Costa County, California	06013377000
Block Group 1, Census Tract 3110, Contra Costa County, California	06013311000
Block Group 2, Census Tract 4324, Alameda County, California	06001432400
Block Group 2, Census Tract 4221, Alameda County, California	06001422100
Block Group 4, Census Tract 4278, Alameda County, California	06001427800
Block Group 2, Census Tract 1050.01, Marin County, California	06041105001
Block Group 3, Census Tract 4287, Alameda County, California	06001428700
Block Group 4, Census Tract 4087, Alameda County, California	06001408700
Block Group 4, Census Tract 4065, Alameda County, California	06001406500
Block Group 2, Census Tract 2003.01, Napa County, California	06055200301
Block Group 2, Census Tract 3050, Contra Costa County, California	06013305000
Block Group 1, Census Tract 615.07, San Francisco County, California	06075061507
Block Group 2, Census Tract 4033.01, Alameda County, California	06001403301
Block Group 3, Census Tract 4278, Alameda County, California	06001427800
Block Group 3, Census Tract 2512, Solano County, California	06095251200
Block Group 1, Census Tract 4026, Alameda County, California	06001402600
Block Group 1, Census Tract 4277, Alameda County, California	06001427700
Block Group 5, Census Tract 1506.03, Sonoma County, California	06097150603
Block Group 2, Census Tract 6121.02, San Mateo County, California	06081612102
Block Group 2, Census Tract 1041.04, Marin County, California	06041104104

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NAME	TRACTID_x
Block Group 2, Census Tract 3141.06, Contra Costa County, California	06013314106
Block Group 1, Census Tract 3141.06, Contra Costa County, California	06013314106
Block Group 2, Census Tract 3131.04, Contra Costa County, California	06013313104
Block Group 1, Census Tract 9806, San Francisco County, California	06075980600
Block Group 1, Census Tract 4033.01, Alameda County, California	06001403301
Block Group 3, Census Tract 230.03, San Francisco County, California	06075023003
Block Group 1, Census Tract 4028.02, Alameda County, California	06001402802
Block Group 2, Census Tract 4204.02, Alameda County, California	06001420402
Block Group 3, Census Tract 4030, Alameda County, California	06001403000
Block Group 2, Census Tract 4074, Alameda County, California	06001407400
Block Group 3, Census Tract 4055, Alameda County, California	06001405500
Block Group 1, Census Tract 4054.02, Alameda County, California	06001405402
Block Group 1, Census Tract 1122.02, Marin County, California	06041112202
Block Group 1, Census Tract 2005.04, Napa County, California	06055200504
Block Group 3, Census Tract 4054.01, Alameda County, California	06001405401
Block Group 2, Census Tract 4403.33, Alameda County, California	06001440333
Block Group 4, Census Tract 354, San Francisco County, California	06075035400
Block Group 1, Census Tract 604, San Francisco County, California	06075060400
Block Group 2, Census Tract 1506.03, Sonoma County, California	06097150603
Block Group 2, Census Tract 2511, Solano County, California	06095251100
Block Group 4, Census Tract 2527.04, Solano County, California	06095252704
Block Group 2, Census Tract 2526.06, Solano County, California	06095252606
Block Group 2, Census Tract 2003.02, Napa County, California	06055200302
Block Group 3, Census Tract 4071.02, Alameda County, California	06001407102
Block Group 3, Census Tract 6117, San Mateo County, California	06081611700
Block Group 2, Census Tract 4056, Alameda County, California	06001405600
Block Group 2, Census Tract 4251.02, Alameda County, California	06001425102
Block Group 1, Census Tract 4272, Alameda County, California	06001427200
Block Group 2, Census Tract 4105, Alameda County, California	06001410500
Block Group 2, Census Tract 614.02, San Francisco County, California	06075061402
Block Group 2, Census Tract 6120.02, San Mateo County, California	06081612002
Block Group 3, Census Tract 3750, Contra Costa County, California	06013375000
Block Group 3, Census Tract 2517.02, Solano County, California	06095251702
Block Group 3, Census Tract 2008.04, Napa County, California	06055200804
Block Group 2, Census Tract 2002.03, Napa County, California	06055200203

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NAME	TRACTID_x
Block Group 1, Census Tract 6106.02, San Mateo County, California	06081610602
Block Group 2, Census Tract 4053.02, Alameda County, California	06001405302
Block Group 4, Census Tract 329.01, San Francisco County, California	06075032901
Block Group 3, Census Tract 2524.02, Solano County, California	06095252402
Block Group 2, Census Tract 3072.02, Contra Costa County, California	06013307202
Block Group 4, Census Tract 6016.05, San Mateo County, California	06081601605
Block Group 1, Census Tract 1122.03, Marin County, California	06041112203
Block Group 5, Census Tract 4076, Alameda County, California	06001407600
Block Group 1, Census Tract 607.02, San Francisco County, California	06075060702
Block Group 2, Census Tract 1250, Marin County, California	06041125000
Block Group 3, Census Tract 2008.02, Napa County, California	06055200802
Block Group 2, Census Tract 3060.02, Contra Costa County, California	06013306002
Block Group 2, Census Tract 611.01, San Francisco County, California	06075061101
Block Group 2, Census Tract 330.01, San Francisco County, California	06075033001
Block Group 3, Census Tract 3760, Contra Costa County, California	06013376000
Block Group 1, Census Tract 2509, Solano County, California	06095250900
Block Group 1, Census Tract 2527.02, Solano County, California	06095252702
Block Group 2, Census Tract 4052, Alameda County, California	06001405200
Block Group 3, Census Tract 6027, San Mateo County, California	06081602700
Block Group 2, Census Tract 4073, Alameda County, California	06001407300
Block Group 3, Census Tract 2509, Solano County, California	06095250900
Block Group 1, Census Tract 615.02, San Francisco County, California	06075061502
Block Group 2, Census Tract 1050.02, Marin County, California	06041105002
Block Group 2, Census Tract 3142, Contra Costa County, California	06013314200
Block Group 2, Census Tract 4018, Alameda County, California	06001401800
Block Group 3, Census Tract 3820, Contra Costa County, California	06013382000
Block Group 3, Census Tract 2003.01, Napa County, California	06055200301
Block Group 3, Census Tract 3141.02, Contra Costa County, California	06013314102
Block Group 4, Census Tract 4415.03, Alameda County, California	06001441503
Block Group 4, Census Tract 2524.01, Solano County, California	06095252401
Block Group 1, Census Tract 4056, Alameda County, California	06001405600
Block Group 2, Census Tract 615.03, San Francisco County, California	06075061503
Block Group 4, Census Tract 4272, Alameda County, California	06001427200
Block Group 1, Census Tract 1121, Marin County, California	06041112100
Block Group 3, Census Tract 2002.01, Napa County, California	06055200201

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NAME	TRACTID_x
Block Group 2, Census Tract 4013, Alameda County, California	06001401300
Block Group 1, Census Tract 2521.02, Solano County, California	06095252102
Block Group 4, Census Tract 3050, Contra Costa County, California	06013305000
Block Group 4, Census Tract 4055, Alameda County, California	06001405500
Block Group 2, Census Tract 231.03, San Francisco County, California	06075023103
Block Group 1, Census Tract 4204.02, Alameda County, California	06001420402
Block Group 1, Census Tract 2005.05, Napa County, California	06055200505
Block Group 1, Census Tract 4064, Alameda County, California	06001406400
Block Group 1, Census Tract 4334, Alameda County, California	06001433400
Block Group 1, Census Tract 3072.01, Contra Costa County, California	06013307201
Block Group 1, Census Tract 101.01, San Francisco County, California	06075010101
Block Group 1, Census Tract 4220, Alameda County, California	06001422000
Block Group 1, Census Tract 6103.02, San Mateo County, California	06081610302
Block Group 2, Census Tract 352.01, San Francisco County, California	06075035201
Block Group 2, Census Tract 3141.03, Contra Costa County, California	06013314103
Block Group 1, Census Tract 3141.03, Contra Costa County, California	06013314103
Block Group 2, Census Tract 1192.01, Marin County, California	06041119201
Block Group 1, Census Tract 5048.07, Santa Clara County, California	06085504807
Block Group 5, Census Tract 4333, Alameda County, California	06001433300
Block Group 3, Census Tract 4090, Alameda County, California	06001409000
Block Group 2, Census Tract 231.02, San Francisco County, California	06075023102
Block Group 2, Census Tract 4060, Alameda County, California	06001406000
Block Group 3, Census Tract 2515, Solano County, California	06095251500
Block Group 2, Census Tract 604, San Francisco County, California	06075060400
Block Group 1, Census Tract 2526.07, Solano County, California	06095252607
Block Group 1, Census Tract 4029, Alameda County, California	06001402900
Block Group 3, Census Tract 4072, Alameda County, California	06001407200
Block Group 3, Census Tract 612, San Francisco County, California	06075061200
Block Group 2, Census Tract 4029, Alameda County, California	06001402900
Block Group 2, Census Tract 3790, Contra Costa County, California	06013379000
Block Group 1, Census Tract 1509.01, Sonoma County, California	06097150901
Block Group 1, Census Tract 4057, Alameda County, California	06001405700
Block Group 5, Census Tract 3050, Contra Costa County, California	06013305000
Block Group 2, Census Tract 4033.02, Alameda County, California	06001403302
Block Group 4, Census Tract 3580, Contra Costa County, California	06013358000

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NAME	TRACTID_x
Block Group 1, Census Tract 615.03, San Francisco County, California	06075061503
Block Group 2, Census Tract 1506.09, Sonoma County, California	06097150609
Block Group 4, Census Tract 4060, Alameda County, California	06001406000
Block Group 4, Census Tract 4072, Alameda County, California	06001407200
Block Group 4, Census Tract 3132.06, Contra Costa County, California	06013313206
Block Group 1, Census Tract 3100, Contra Costa County, California	06013310000
Block Group 1, Census Tract 6119.01, San Mateo County, California	06081611901
Block Group 4, Census Tract 6102.01, San Mateo County, California	06081610201
Block Group 1, Census Tract 6120.02, San Mateo County, California	06081612002
Block Group 3, Census Tract 1506.12, Sonoma County, California	06097150612
Block Group 3, Census Tract 6119.01, San Mateo County, California	06081611901
Block Group 1, Census Tract 3570, Contra Costa County, California	06013357000
Block Group 3, Census Tract 3090, Contra Costa County, California	06013309000
Block Group 2, Census Tract 4403.06, Alameda County, California	06001440306
Block Group 1, Census Tract 4052, Alameda County, California	06001405200
Block Group 1, Census Tract 4058, Alameda County, California	06001405800
Block Group 2, Census Tract 4062.02, Alameda County, California	06001406202
Block Group 1, Census Tract 4074, Alameda County, California	06001407400
Block Group 3, Census Tract 4075, Alameda County, California	06001407500
Block Group 3, Census Tract 4335, Alameda County, California	06001433500
Block Group 4, Census Tract 4336, Alameda County, California	06001433600
Block Group 2, Census Tract 4072, Alameda County, California	06001407200
Block Group 1, Census Tract 4024, Alameda County, California	06001402400
Block Group 1, Census Tract 5048.02, Santa Clara County, California	06085504802
Block Group 1, Census Tract 4095, Alameda County, California	06001409500
Block Group 5, Census Tract 3770, Contra Costa County, California	06013377000
Block Group 1, Census Tract 4060, Alameda County, California	06001406000
Block Group 2, Census Tract 4030, Alameda County, California	06001403000
Block Group 2, Census Tract 4284, Alameda County, California	06001428400
Block Group 3, Census Tract 4231, Alameda County, California	06001423100
Block Group 2, Census Tract 4232, Alameda County, California	06001423200
Block Group 3, Census Tract 3141.03, Contra Costa County, California	06013314103
Block Group 1, Census Tract 3050, Contra Costa County, California	06013305000
Block Group 3, Census Tract 3110, Contra Costa County, California	06013311000
Block Group 1, Census Tract 3131.02, Contra Costa County, California	06013313102

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NAME	TRACTID_x
Block Group 2, Census Tract 3132.06, Contra Costa County, California	06013313206
Block Group 3, Census Tract 3142, Contra Costa County, California	06013314200
Block Group 1, Census Tract 3150, Contra Costa County, California	06013315000
Block Group 3, Census Tract 4222, Alameda County, California	06001422200
Block Group 1, Census Tract 4073, Alameda County, California	06001407300
Block Group 1, Census Tract 4089, Alameda County, California	06001408900
Block Group 2, Census Tract 4057, Alameda County, California	06001405700
Block Group 1, Census Tract 4062.01, Alameda County, California	06001406201
Block Group 3, Census Tract 4062.01, Alameda County, California	06001406201
Block Group 1, Census Tract 4063, Alameda County, California	06001406300
Block Group 3, Census Tract 4076, Alameda County, California	06001407600
Block Group 1, Census Tract 179.03, San Francisco County, California	06075017903
Block Group 2, Census Tract 607.01, San Francisco County, California	06075060701
Block Group 1, Census Tract 102.02, San Francisco County, California	06075010202
Block Group 2, Census Tract 615.02, San Francisco County, California	06075061502
Block Group 2, Census Tract 615.04, San Francisco County, California	06075061504
Block Group 3, Census Tract 105, San Francisco County, California	06075010500
Block Group 1, Census Tract 104.01, San Francisco County, California	06075010401
Block Group 1, Census Tract 607.01, San Francisco County, California	06075060701
Block Group 1, Census Tract 5050.14, Santa Clara County, California	06085505014
Block Group 2, Census Tract 5050.14, Santa Clara County, California	06085505014
Block Group 3, Census Tract 4053.01, Alameda County, California	06001405301
Block Group 2, Census Tract 4203.02, Alameda County, California	06001420302
Block Group 1, Census Tract 4204.01, Alameda County, California	06001420401
Block Group 2, Census Tract 105, San Francisco County, California	06075010500
Block Group 1, Census Tract 230.01, San Francisco County, California	06075023001
Block Group 3, Census Tract 232, San Francisco County, California	06075023200
Block Group 3, Census Tract 331, San Francisco County, California	06075033100
Block Group 1, Census Tract 352.01, San Francisco County, California	06075035201
Block Group 5, Census Tract 354, San Francisco County, California	06075035400
Block Group 3, Census Tract 354, San Francisco County, California	06075035400
Block Group 3, Census Tract 1101, Marin County, California	06041110100
Block Group 1, Census Tract 6117, San Mateo County, California	06081611700
Block Group 4, Census Tract 6105, San Mateo County, California	06081610500
Block Group 1, Census Tract 6101, San Mateo County, California	06081610100

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NAME	TRACTID_x
Block Group 2, Census Tract 6102.01, San Mateo County, California	06081610201
Block Group 2, Census Tract 4037.02, Alameda County, California	06001403702
Block Group 3, Census Tract 4062.02, Alameda County, California	06001406202
Block Group 1, Census Tract 4071.01, Alameda County, California	06001407101
Block Group 4, Census Tract 4071.02, Alameda County, California	06001407102
Block Group 1, Census Tract 3072.02, Contra Costa County, California	06013307202
Block Group 2, Census Tract 1122.02, Marin County, California	06041112202
Block Group 6, Census Tract 4334, Alameda County, California	06001433400
Block Group 3, Census Tract 4333, Alameda County, California	06001433300
Block Group 2, Census Tract 4285, Alameda County, California	06001428500
Block Group 2, Census Tract 4287, Alameda County, California	06001428700
Block Group 2, Census Tract 6104, San Mateo County, California	06081610400
Block Group 1, Census Tract 2010.03, Napa County, California	06055201003
Block Group 1, Census Tract 2506.04, Solano County, California	06095250604
Block Group 4, Census Tract 3790, Contra Costa County, California	06013379000
Block Group 2, Census Tract 4055, Alameda County, California	06001405500
Block Group 1, Census Tract 1506.03, Sonoma County, California	06097150603
Block Group 1, Census Tract 6104, San Mateo County, California	06081610400
Block Group 2, Census Tract 4061, Alameda County, California	06001406100
Block Group 2, Census Tract 4024, Alameda County, California	06001402400
Block Group 1, Census Tract 5046.01, Santa Clara County, California	06085504601
Block Group 3, Census Tract 4049, Alameda County, California	06001404900
Block Group 1, Census Tract 2507.01, Solano County, California	06095250701
Block Group 3, Census Tract 2510, Solano County, California	06095251000
Block Group 1, Census Tract 2515, Solano County, California	06095251500
Block Group 1, Census Tract 2517.01, Solano County, California	06095251701
Block Group 5, Census Tract 2527.04, Solano County, California	06095252704
Block Group 3, Census Tract 2526.04, Solano County, California	06095252604
Block Group 2, Census Tract 2526.05, Solano County, California	06095252605
Block Group 2, Census Tract 2005.03, Napa County, California	06055200503
Block Group 1, Census Tract 2008.03, Napa County, California	06055200803
Block Group 5, Census Tract 1509.01, Sonoma County, California	06097150901
Block Group 3, Census Tract 2005.01, Napa County, California	06055200501
Block Group 4, Census Tract 1507.01, Sonoma County, California	06097150701
Block Group 3, Census Tract 2527.02, Solano County, California	06095252702

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NAME	TRACTID_x
Block Group 2, Census Tract 2524.02, Solano County, California	06095252402
Block Group 3, Census Tract 2526.06, Solano County, California	06095252606
Block Group 2, Census Tract 2517.01, Solano County, California	06095251701
Block Group 3, Census Tract 1121, Marin County, California	06041112100
Block Group 2, Census Tract 1262, Marin County, California	06041126200
Block Group 3, Census Tract 3770, Contra Costa County, California	06013377000
Block Group 2, Census Tract 3071.02, Contra Costa County, California	06013307102
Block Group 2, Census Tract 2525.02, Solano County, California	06095252502
Block Group 4, Census Tract 3820, Contra Costa County, California	06013382000
Block Group 1, Census Tract 332.01, San Francisco County, California	06075033201
Block Group 3, Census Tract 3050, Contra Costa County, California	06013305000
Block Group 4, Census Tract 1241, Marin County, California	06041124100
Block Group 1, Census Tract 232, San Francisco County, California	06075023200
Block Group 4, Census Tract 4251.04, Alameda County, California	06001425104
Block Group 1, Census Tract 1192.01, Marin County, California	06041119201
Block Group 2, Census Tract 4028.02, Alameda County, California	06001402802
Block Group 2, Census Tract 4028.01, Alameda County, California	06001402801
Block Group 1, Census Tract 6118, San Mateo County, California	06081611800
Block Group 1, Census Tract 3141.02, Contra Costa County, California	06013314102
Block Group 2, Census Tract 2005.01, Napa County, California	06055200501
Block Group 3, Census Tract 3131.05, Contra Costa County, California	06013313105
Block Group 1, Census Tract 3790, Contra Costa County, California	06013379000
Block Group 4, Census Tract 3810, Contra Costa County, California	06013381000
Block Group 1, Census Tract 4280, Alameda County, California	06001428000
Block Group 2, Census Tract 3072.01, Contra Costa County, California	06013307201
Block Group 2, Census Tract 4022, Alameda County, California	06001402200
Block Group 1, Census Tract 4027, Alameda County, California	06001402700
Block Group 3, Census Tract 4061, Alameda County, California	06001406100
Block Group 2, Census Tract 1122.04, Marin County, California	06041112204
Block Group 2, Census Tract 4089, Alameda County, California	06001408900
Block Group 2, Census Tract 3090, Contra Costa County, California	06013309000
Block Group 1, Census Tract 4061, Alameda County, California	06001406100
Block Group 1, Census Tract 4037.01, Alameda County, California	06001403701
Block Group 1, Census Tract 3160, Contra Costa County, California	06013316000
Block Group 1, Census Tract 4105, Alameda County, California	06001410500

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NAME	TRACTID_x
Block Group 1, Census Tract 2010.05, Napa County, California	06055201005
Block Group 2, Census Tract 5050.15, Santa Clara County, California	06085505015
Block Group 1, Census Tract 2003.01, Napa County, California	06055200301
Block Group 2, Census Tract 2506.01, Solano County, California	06095250601
Block Group 4, Census Tract 2005.04, Napa County, California	06055200504
Block Group 1, Census Tract 2524.01, Solano County, California	06095252401
Block Group 2, Census Tract 4204.01, Alameda County, California	06001420401
Block Group 2, Census Tract 4276, Alameda County, California	06001427600
Block Group 3, Census Tract 4014, Alameda County, California	06001401400
Block Group 2, Census Tract 4071.02, Alameda County, California	06001407102
Block Group 3, Census Tract 5050.14, Santa Clara County, California	06085505014
Block Group 1, Census Tract 3830, Contra Costa County, California	06013383000
Block Group 2, Census Tract 2002.01, Napa County, California	06055200201
Block Group 3, Census Tract 4324, Alameda County, California	06001432400
Block Group 3, Census Tract 6102.01, San Mateo County, California	06081610201
Block Group 3, Census Tract 607.01, San Francisco County, California	06075060701
Block Group 2, Census Tract 353, San Francisco County, California	06075035300
Block Group 2, Census Tract 615.08, San Francisco County, California	06075061508
Block Group 5, Census Tract 3580, Contra Costa County, California	06013358000
Block Group 1, Census Tract 3090, Contra Costa County, California	06013309000
Block Group 2, Census Tract 2010.05, Napa County, California	06055201005
Block Group 1, Census Tract 4062.02, Alameda County, California	06001406202
Block Group 2, Census Tract 6119.02, San Mateo County, California	06081611902
Block Group 5, Census Tract 4273, Alameda County, California	06001427300
Block Group 2, Census Tract 3770, Contra Costa County, California	06013377000
Block Group 2, Census Tract 6120.01, San Mateo County, California	06081612001
Block Group 1, Census Tract 4022, Alameda County, California	06001402200
Block Group 1, Census Tract 4031, Alameda County, California	06001403100
Block Group 1, Census Tract 3892, Contra Costa County, California	06013389200
Block Group 2, Census Tract 2507.01, Solano County, California	06095250701
Block Group 4, Census Tract 4334, Alameda County, California	06001433400
Block Group 1, Census Tract 5046.02, Santa Clara County, California	06085504602
Block Group 1, Census Tract 2511, Solano County, California	06095251100
Block Group 1, Census Tract 2516, Solano County, California	06095251600
Block Group 1, Census Tract 3142, Contra Costa County, California	06013314200

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NAME	TRACTID_x
Block Group 1, Census Tract 4059.01, Alameda County, California	06001405901
Block Group 2, Census Tract 4088, Alameda County, California	06001408800
Block Group 3, Census Tract 4034.01, Alameda County, California	06001403401
Block Group 1, Census Tract 2008.02, Napa County, California	06055200802
Block Group 3, Census Tract 353, San Francisco County, California	06075035300
Block Group 1, Census Tract 353, San Francisco County, California	06075035300
Block Group 2, Census Tract 230.01, San Francisco County, California	06075023001
Block Group 1, Census Tract 103, San Francisco County, California	06075010300
Block Group 2, Census Tract 117, San Francisco County, California	06075011700
Block Group 1, Census Tract 6033, San Mateo County, California	06081603300
Block Group 4, Census Tract 117, San Francisco County, California	06075011700
Block Group 3, Census Tract 3810, Contra Costa County, California	06013381000
Block Group 1, Census Tract 9809, San Francisco County, California	06075980900
Block Group 1, Census Tract 2525.01, Solano County, California	06095252501
Block Group 3, Census Tract 6015.02, San Mateo County, California	06081601502
Block Group 1, Census Tract 3922.01, Contra Costa County, California	06013392201
Block Group 3, Census Tract 4059.01, Alameda County, California	06001405901
Block Group 1, Census Tract 1060.01, Marin County, California	06041106001

APPENDIX D

Air Quality Calculations

Tab A. Summary

Comparison of Alternatives	VOC	NOx	PM10	PM2.5	CO2	CH4	N2O	CO2e
Baseline (No Action) Alternative	**9.40**	**175.63**	**6.08**	**5.83**	**18634.21**	**0.74**	**0.77**	**18,881**
Alternative 1	9.46	145.83	4.97	4.75	16337.56	0.78	0.66	16,553
Alternative 1 Net Change	**0.06**	**-29.81**	**-1.11**	**-1.07**	**-2296.65**	**0.05**	**-0.11**	**-2,327**
Alternative 2	8.18	166.63	5.86	5.63	16880.58	0.62	0.70	17,104
Alternative 2 Net Change	**-1.23**	**-9.00**	**-0.22**	**-0.19**	**-1753.63**	**-0.12**	**-0.07**	**-1,777**
Alternative 3	9.20	148.99	5.14	4.93	16162.33	0.75	0.65	16,376
Alternative 3 Net Change	**-0.20**	**-26.65**	**-0.94**	**-0.90**	**-2471.88**	**0.01**	**-0.11**	**-2,505**
Alternative 4	10.83	123.40	4.05	3.85	15463.58	0.96	0.60	15,637
Alternative 4 Net Change	**1.42**	**-52.23**	**-2.03**	**-1.98**	**-3170.63**	**0.22**	**-0.16**	**-3,244**

Tab B. Dredge Data

1 KW = 1.34102 HP, 453.59 g/lb

Sources: Federal Navigation Channels EA/EIR, Appendix B; 2015
CHC_CARB_Reported_Vessel_Data_2024-02-07
Appendix H 2021 Update to the Emission Inventory for CommercialHarbor Craft: Methodology and Results
Port Oakland 2020 Emissions Inventory Final Report
2020 Seaport Emissions Inventory: Update of Commercial Harbor Craft Emissions Memoranda, Ramboll, 2023
USACE DREDGE ESSAYONS _ Philadelphia District & Marine Design Center _ Fact Sheet Article View, 2012

Vessel Characteristics

Vessel	Engine Type	Number of Engines	Marine/Offroad Tier	HP (ea)	Load Factor	Emissions Factors (g/bhp-hr)								
						VOC	CO	NOx	PM10	PM2.5	CO_2	CH4	N_2O	BSFC
Essayons (Hopper)	Propulsion	2	Marine 2	4,640	0.4	0.11	1.49	6.21	0.23	0.22	506.68	0.002	0.02	159
	Ship Service	3	Marine 2	1,381	0.6	0.11	1.49	6.21	0.23	0.22	506.68	0.002	0.02	159
	600V Generators	4	Marine 2	4,358	0.6	0.11	1.49	6.21	0.23	0.22	506.68	0.002	0.02	159
Njord (Clamshell)	Main	1	Marine 1	2,934	0.4	0.28	1.09	4.28	0.125	0.115	529	0.026	0.02	159
	Aux	1	Offroad 4	280	0.6	0.07	1.00	0.27	0.01	0.009	531	0.007	0.02	159
	Aux	1	Offroad 4	280	0.6	0.07	1.00	0.27	0.01	0.009	531	0.007	0.02	159
Tender (Becky T) (Tugboat - Escort/Ship Assist)	Propulsion	2	Marine 3	350	0.2	0.82	3.73	3.99	0.08	0.078	670	0.073	0.02	159
	Aux	1	Offroad 3	162	0.3	0.81	3.73	3.8	0.09	0.087	670	0.073	0.02	159
	Aux	1	Offroad 1	25	0.3	0.81	2.78	7.31	0.319	0.31	587	0.073	0.02	185
Heidi Brusco (Disposal Trips) (Tugboat - Push/Tow)	Main	2	Marine 2	1,500	0.3	0.68	3.73	5.53	0.2	0.194	587	0.061	0.02	159
	Aux	1	Marine 3	161	0.4	0.81	3.73	5.1	0.22	0.213	670	0.073	0.02	159

NOTES: Essayons and Njord N20 emission factor from EPA Port Inventory (2020) equation 4.3
Essayons emission factors from EPA Port Inventory Appendix H
Njord used to represent clamshell dredging
Scow assumed for dredge material transport for clamshell dredging with 4500 CY capacity
Becky T represents tender for both dredging scenarios
Heidi Brusco is the tugboat used for scow transport for clamshell dredging

Disposal Transit and Tendering Time

For 1-hr Transit time	Emissions lb							
	VOC	CO	NOx	PM10	PM2.5	CO_2	CH4	N_2O
Essayons (Hopper)—main	0.94	13.30	55.41	2.06	1.99	4519.66	0.02	0.20
Essayons (Hopper)—SS	0.54	7.72	32.17	1.19	1.16	2624.03	0.01	0.12
Essayons (Hopper)—gens	2.29	32.50	135.36	5.02	4.87	11040.83	0.04	0.49
Working Total	**3.78**	**53.53**	**222.93**	**8.27**	**8.02**	**18184.53**	**0.07**	**0.80**
Transit Total	**1.48**	**21.03**	**87.58**	**3.25**	**3.15**	**7143.70**	**0.03**	**0.32**
Njord (Clamshell)—main	0.79	3.07	12.07	0.35	0.32	1491.90	0.07	0.06
Njord (Clamshell)—aux	0.02	0.35	0.09	0.00	0.00	185.85	0.00	0.01
Njord (Clamshell)—aux	0.02	0.35	0.09	0.00	0.00	185.85	0.00	0.01
Working Total	**0.84**	**3.77**	**12.26**	**0.36**	**0.33**	**1863.61**	**0.08**	**0.08**
Tender (Becky T)—main	0.21	0.94	1.00	0.02	0.02	168.54	0.02	0.01
Tender (Becky T)—aux	0.10	0.45	0.46	0.01	0.01	80.88	0.01	0.00
Tender (Becky T)—aux	0.02	0.05	0.14	0.01	0.01	10.94	0.00	0.00
Working/Transit Total	**0.32**	**1.44**	**1.60**	**0.04**	**0.04**	**260.35**	**0.03**	**0.01**
Heidi Brusco (Disposal Trips)	1.50	8.24	12.22	0.44	0.43	1296.71	0.13	0.04
Heidi Brusco (Disposal Trips)—aux	0.11	0.49	0.67	0.03	0.03	87.99	0.01	0.00
Transit Total	**1.61**	**8.73**	**12.89**	**0.47**	**0.46**	**1384.70**	**0.14**	**0.05**

NOTES: Disposal transit time for Essayons, Becky T, and Heidi Brusco. Tender time applies to Becky T (representative for both clamshell and hopper dredging).

Dredging Activity

Vessel	Dredge Rate Average	Units	max load CY
Essayons (Hopper)	2,688	CY/hr	6,423
Njord (Clamshell)	257	CY/hr	

NOTES: 43,000 CY/day
2,688 CY/hr for a 16-hr day excluding disposal transit time

Engine use during dredging activity — 100,000 CY basis

Vessel	Engine Type	Number of Engines	MY/Tier	HP	Load Factor[1]	Hrs of Operation
Essayons (Hopper)	Propulsion	2	Tier 2	4640	0.44	–
Essayons (Hopper)	Ship Service	3	Tier 2	1207	0.57	–
Essayons (Hopper)	Pump	2	Tier 2	4640	0.57	–
Essayons (Hopper)	600 V	2	Tier 2	–	–	–
Paula Lee (Clamshell)	Dredge	1	–	1200	0.42	–
Paula Lee (Clamshell)	Generator	1	–	890	0.1	–
Paula Lee (Clamshell)	Deck	1	–	300	0.8	–
Paula Lee (Clamshell)	Deck winch	4	–	300	0.31	–
Tugboat (Becky T)	Propulsion	2	2017/3	1800	0.1	–
Tugboat (Becky T)	Aux	1	2018/3	–	–	–
Tugboat (Becky T)	Aux	1	2003/1	–	–	–

1. updated with CARB values 2021

Engine use during transits — 100,000 CY basis

Vessel	Engine Type	Number of Engines	HP	Load Factor[1]	Hrs of Operation
Essayons (Hopper)	Propulsion	2	4640	0.1	–
Essayons (Hopper)	Ship Service	3	1207	0.6	–
Essayons (Hopper)	Pump	2	4640	0.8	–
Paula Lee (Clamshell)	Dredge	1	1200	0.42	–
Paula Lee (Clamshell)	Generator	1	890	0.1	–
Paula Lee (Clamshell)	Deck	1	300	0.8	–
Paula Lee (Clamshell)	Deck winch	4	300	0.31	–
Tugboat (Becky T)	Propulsion	2	1800	0.1	–
Tugboat (Becky T)	Aux	1	–	–	–
Tugboat (Becky T)	Aux	–	–	–	–

1. updated with CARB values 2021

Tab C. Alternatives Calculations

Baseline Alternative—No Action

Analyzed dredge CY for this Alternative:	2,650,000	
% Clamshell Contribution:	69%	1,835,000 CY
% Hopper Contribution:	31%	815,000 CY

Placement Sites	In-bay Placement [1]		Nearshore Strategic Placement [2]		Potential Future Nearshore Strategic Placement [3]		Ocean Placement [2]		Deep Ocean Disposal [1]		Upland (sponsor provided) [3]		Upland Direct Placement [3]	
	30%	40%	5%	15%	0%	0%	0%	10%	45%	55%	0%	10%	0%	0%
Average	35%	899,500	12%	308,400	0%	–	4%	102,800	48%	1,233,600	1%	25,700	0%	0
max transit distance one-way	41.2	–	5.2	–	4.8	–	1.5	–	63.5	–	3.2	–	64.3	–

Dredging Type
1. Both
2. Hopper only
3. Clamshell only

Dredge Method	Volume Dredged (CY)	Dredging Duration hrs	Emissions Tons								
			VOC	CO	NOx	PM10	PM2.5	CO_2	CH4	N_2O	CO2e
Clamshell	1,835,000	7,140	4.13	18.62	49.47	1.42	1.31	7582.61	0.38	0.31	7,684
Hopper	815,000	303	0.62	8.33	34.05	1.26	1.22	2796.76	0.02	0.12	2,834
–	–	**Total Baseline Dredging Emissions**	**4.75**	**26.95**	**83.52**	**2.67**	**2.53**	**10,379.37**	**0.40**	**0.43**	**10,518**

Placement Site	Dredge Volume CY	Max Distance nm	RT Distance nm	Speed knots	Time hours	Number of Trips	Emissions Tons								
							VOC	CO	NOx	PM10	PM2.5	CO_2	CH4	N_2O	CO2e
In-Bay placement - clamshell	622,861	41.2	82.4	8	10.3	138	1.15	6.22	9.19	0.34	0.33	987.06	0.10	0.03	1,000
In-Bay placement - hopper	276,639	41.2	82.4	8	10.3	43	0.33	4.66	19.43	0.72	0.70	1584.55	0.01	0.07	1,606
Nearshore strategic placement	308,400	5.2	10.4	8	1.3	48	0.05	0.66	2.73	0.10	0.10	222.95	0.00	0.01	226
Potential future nearshore strategic placement	0	4.8	9.6	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
Ocean placement	102,800	1.5	3	8	0.4	16	0.00	0.06	0.26	0.01	0.01	21.44	0.00	0.00	22
Deep Ocean Disposal - clamshell	854,210	63.5	127	8	15.9	190	2.42	13.15	19.42	0.71	0.69	2086.37	0.22	0.07	2,113
Deep Ocean Disposal - hopper	379,390	63.5	127	8	15.9	59	0.70	9.86	41.06	1.52	1.48	3349.31	0.01	0.15	3,394
Upland (sponsor provided)	25,700	3.2	6.4	8	0.8	6	0.00	0.02	0.03	0.00	0.00	3.16	0.00	0.00	3
Upland direct placement	0	64.3	128.6	8	16.1	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
Total transit emissions for Baseline	–	–	–	–	–		**4.65**	**34.64**	**92.11**	**3.40**	**3.30**	**8254.83**	**0.34**	**0.33**	**8,363**

Total Baseline Dredging Envelope Emissions

VOC	CO	NOx	PM10	PM2.5	CO_2	CH4	N_2O	CO2e
9.40	61.59	175.63	6.08	5.83	18,634.21	0.74	0.77	18,881

Alternative 1. Beneficial Use–Diversion from Deep Ocean Disposal

Analyzed dredge CY for this Alternative	2,570,000	
% Clamshell Contribution	71%	1,835,000 CY
% Hopper Contribution	29%	735,000 CY

Placement Sites	In-Bay Placement[1]		Nearshore Strategic Placement[2]		Potential Future Nearshore Strategic Placement[3]		Ocean Placement[2]		Deep Ocean Disposal[1]		Upland (Sponsor Provided)[3]		Upland Direct Placement[3]	
Alt 1	35%	55%	5%	15%	0%	0%	0%	10%	10%	40%	0%	10%	5%	20%
Average	42%	1,079,400	12%	308,400	0%		4%	102,800	35%	899,500	1%	25,700	6%	154,200
max transit distance one-way	41.2		5.2		4.8		1.5		63.5		3.2		64.3	

Dredging Type
1. Both
2. Hopper only
3. Clamshell only

Dredge Method	Volume Dredged (CY)	Dredging Duration hrs	Emissions Tons								
			VOC	CO	NOx	PM10	PM2.5	CO_2	CH4	N_2O	CO2e
Clamshell	1,835,000	7,140	4.13	18.62	49.47	1.42	1.31	7582.61	0.38	0.31	7,684
Hopper	735,000	273	0.56	7.52	30.70	1.14	1.10	2522.23	0.01	0.11	2,556
Total Alternative 1 Dredging Emissions			**4.69**	**26.13**	**80.18**	**2.55**	**2.41**	**10,104.84**	**0.39**	**0.42**	**10,240**

Placement Site	Dredge Volume CY	Max Distance nm	RT Distance nm	Speed knots	Time hours	Number of Trips	Emissions Tons								
							VOC	CO	NOx	PM10	PM2.5	CO_2	CH4	N_2O	CO2e
In-Bay placement - clamshell	887,089	41.2	82.4	8	10.3	197	1.63	8.86	13.08	0.48	0.46	1405.78	0.15	0.05	1,424
In-Bay placement - hopper	192,311	41.2	82.4	8	10.3	30	0.23	3.24	13.50	0.50	0.49	1101.53	0.00	0.05	1,116
Nearshore strategic placement	308,400	5.2	10.4	8	1.3	48	0.05	0.66	2.73	0.10	0.10	222.95	0.00	0.01	226
Potential future nearshore strategic placement	0	4.8	9.6	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
Ocean placement	102,800	1.5	3	8	0.4	16	0.00	0.06	0.26	0.01	0.01	21.44	0.00	0.00	22
Deep Ocean Disposal - clamshell	758,639	63.5	127	8	15.9	169	2.15	11.68	17.24	0.63	0.61	1852.94	0.19	0.06	1,876
Deep Ocean Disposal - hopper	140,861	63.5	127	8	15.9	22	0.26	3.66	15.25	0.57	0.55	1243.54	0.00	0.05	1,260
Upland (sponsor provided)	25,700	3.2	6.4	8	0.8	6	0.00	0.02	0.03	0.00	0.00	3.16	0.00	0.00	3
Upland direct placement	154,200	64.3	128.6	8	16.1	34	0.44	2.40	3.55	0.13	0.13	381.37	0.04	0.01	386
Total transit emissions for Alternative 1							**4.77**	**30.59**	**65.65**	**2.42**	**2.34**	**6232.71**	**0.39**	**0.24**	**6,313**

Total Alternative 1 Dredging Envelope Emissions

VOC	CO	NOx	PM10	PM2.5	CO_2	CH4	N_2O	CO2e
9.46	56.72	145.83	4.97	4.75	16,337.56	0.78	0.66	16,553

Alternative 2. Beneficial Use—Regional Optimization

Analyzed dredge CY for this Alternative	2,570,000	
% Clamshell Contribution	52%	1,325,000
% Hopper Contribution	48%	1,245,000

Placement Sites	In-Bay Placement[1]		Nearshore Strategic Placement[2]		Potential Future Nearshore Strategic Placement[3]		Ocean Placement[2]		Deep Ocean Disposal[1]		Upland (Sponsor Provided)[3]		Upland Direct Placement[3]	
Alt 2	50%	60%	5%	15%	0%	0%	0%	10%	0%	10%	0%	10%	20%	30%
Average	56%	1,439,200	12%	308,400	–	—	4%	102,800	0%	0	1%	25,700	27%	693,900
max transit distance one-way	41.2	–	5.2	–	4.8		1.5	–	63.5	–	3.2	–	64.3	–

Dredging Type
1. Both
2. Hopper only
3. Clamshell only

Dredge Method	Volume Dredged (CY)	Dredging Duration hrs	Emissions Tons								
			VOC	CO	NOx	PM10	PM2.5	CO_2	CH4	N_2O	CO2e
Clamshell	1,325,000	5,156	2.98	13.44	35.72	1.02	0.94	5475.18	0.28	0.22	5,549
Hopper	1,245,000	463	0.95	12.73	52.01	1.92	1.86	4272.35	0.02	0.19	4,329
Total Alternative 2 Dredging Emissions			**3.93**	**26.17**	**87.73**	**2.95**	**2.81**	**9,747.53**	**0.30**	**0.41**	**9,878**

Placement Site	Dredge Volume CY	Max Distance nm	RT Distance nm	Speed knots	Time hours	Number of Trips	Emissions Tons								
							VOC	CO	NOx	PM10	PM2.5	CO_2	CH4	N_2O	CO2e
In-Bay placement - clamshell	742,000	41.2	82.4	8	10.3	165	1.37	7.41	10.94	0.40	0.39	1175.86	0.12	0.04	1,191
In-Bay placement - hopper	697,200	41.2	82.4	8	10.3	109	0.83	11.75	48.96	1.82	1.76	3993.46	0.02	0.18	4,046
Nearshore strategic placement	308,400	5.2	10.4	8	1.3	48	0.05	0.66	2.73	0.10	0.10	222.95	0.00	0.01	226
Potential future nearshore strategic placement	0	4.8	9.6	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
Ocean placement	102,800	1.5	3	8	0.4	16	0.00	0.06	0.26	0.01	0.01	21.44	0.00	0.00	22
Deep Ocean Disposal - clamshell	0	63.5	127	8	15.9	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
Deep Ocean Disposal - hopper	0	63.5	127	8	15.9	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
Upland (sponsor provided)	25,700	3.2	6.4	8	0.8	6	0.00	0.02	0.03	0.00	0.00	3.16	0.00	0.00	3
Upland direct placement	693,900	64.3	128.6	8	16.1	154	1.99	10.82	15.97	0.58	0.57	1716.17	0.18	0.06	1,738
Total transit emissions for Alternative 2	–	–	–	–	–	–	**4.24**	**30.73**	**78.90**	**2.91**	**2.82**	**7133.05**	**0.32**	**0.29**	**7,226**

Total Alternative 2 Dredging Envelope Emissions

VOC	CO	NOx	PM10	PM2.5	CO2	CH4	N2O	CO2e
8.18	56.90	166.63	5.86	5.63	16,880.58	0.62	0.70	17,104

Alternative 3 . Beneficial Used—Cost Sharing

Analyzed dredge CY for this Alternative	2,570,000	
% Clamshell Contribution	62%	1,595,000
% Hopper Contribution	38%	975,000

Placement Sites	In-Bay Placement[1]		Nearshore Strategic Placement[2]		Potential Future Nearshore Strategic Placement[3]		Ocean Placement[2]		Deep Ocean Disposal[1]		Upland (Sponsor Provided)[3]		Upland Direct Placement[3]	
Alt 3	35%	45%	5%	15%	0%	0%	0%	10%	0%	10%	0%	10%	35%	45%
Average	40%	1,028,000	12%	308,400	–	–	4%	102,800	0%	0	1%	25,700	43%	1,105,100
max transit distance one-way	41.2	–	5.2	–	4.8	–	1.5	–	63.5	–	3.2	–	64.3	–

Dredging Type
1. Both
2. Hopper only
3. Clamshell only

Dredge Method	Volume Dredged (CY)	Dredging Duration hrs	Emissions Tons								
			VOC	CO	NOx	PM10	PM2.5	CO_2	CH4	N_2O	CO2e
Clamshell	1,595,000	6,206	3.59	16.18	43.00	1.23	1.14	6590.88	0.33	0.27	6,679
Hopper	975,000	363	0.74	9.97	40.73	1.51	1.46	3345.82	0.02	0.15	3,390
Total Alternative 3 Dredging Emissions			**4.34**	**26.15**	**83.73**	**2.74**	**2.60**	**9,936.70**	**0.35**	**0.42**	**10,069**

Placement Site	Dredge Volume CY	Max Distance nm	RT Distance nm	Speed knots	Time hours	Number of Trips	Emissions Tons								
							VOC	CO	NOx	PM10	PM2.5	CO_2	CH4	N_2O	CO2e
In-Bay placement - clamshell	638,000	41.2	82.4	8	10.3	142	1.17	6.37	9.41	0.34	0.33	1011.05	0.11	0.03	1,024
In-Bay placement - hopper	390,000	41.2	82.4	8	10.3	61	0.46	6.58	27.39	1.02	0.98	2233.87	0.01	0.10	2,264
Nearshore strategic placement	308,400	5.2	10.4	8	1.3	48	0.05	0.66	2.73	0.10	0.10	222.95	0.00	0.01	226
Potential future nearshore strategic placement	0	4.8	9.6	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
Ocean placement	102,800	1.5	3	8	0.4	16	0.00	0.06	0.26	0.01	0.01	21.44	0.00	0.00	22
Deep Ocean Disposal - clamshell	0	63.5	127	8	15.9	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
Deep Ocean Disposal - hopper	0	63.5	127	8	15.9	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
Upland (sponsor provided)	25,700	3.2	6.4	8	0.8	6	0.00	0.02	0.03	0.00	0.00	3.16	0.00	0.00	3
Upland direct placement	1,105,100	64.3	128.6	8	16.1	246	3.17	17.23	25.43	0.93	0.90	2733.16	0.28	0.09	2,768
Total transit emissions for alternative 3	–	–	–	–	–	–	**4.87**	**30.92**	**65.25**	**2.40**	**2.33**	**6225.63**	**0.40**	**0.24**	**6,306**

Total Alternative 3 Dredging Envelope Emissions

VOC	CO	NOx	PM10	PM2.5	CO2	CH4	N2O	CO2e
9.20	57.07	148.99	5.14	4.93	16,162.33	0.75	0.65	16,376

Alternative 4. Beneficial Use—Maximized

Analyzed dredge CY for this Alternative	2,570,000	
% Clamshell Contribution	85%	2,195,000
% Hopper Contribution	15%	375,000

Placement Sites	In-Bay Placement[1]		Nearshore Strategic Placement[2]		Potential Future Nearshore Strategic Placement[3]		Ocean Placement[2]		Deep Ocean Disposal[1]		Upland (Sponsor Provided)[3]		Upland Direct Placement[3]	
Alt 4	0%	10%	5%	15%	5%	15%	0%	10%	0%	10%	0%	10%	65%	75%
Average	6%	154,200	12%	308,400	9%	231,300	0%	0	0%	0	1%	25,700	71%	1,824,700
max transit distance one-way	41.2		5.2		4.8		1.5		63.5		3.2		64.3	

Dredging Type
1. Both
2. Hopper only
3. Clamshell only

Dredge Method	Volume Dredged (CY)	Dredging Duration hrs	Emissions Tons								
			VOC	CO	NOx	PM10	PM2.5	CO_2	CH4	N_2O	CO2e
Clamshell	2,195,000	8,541	4.94	22.27	59.18	1.69	1.57	9070.21	0.46	0.37	9,192
Hopper	375,000	140	0.29	3.83	15.67	0.58	0.56	1286.85	0.01	0.06	1,304
		Total Alt 4 Dredging Emissions	**5.23**	**26.10**	**74.85**	**2.27**	**2.13**	**10,357.06**	**0.46**	**0.43**	**10,496**

Placement Site	Dredge Volume CY	Max Distance nm	RT Distance nm	Speed Knots	Time Hours	Number of Trips	Emissions Tons								
							VOC	CO	NOx	PM10	PM2.5	CO_2	CH4	N_2O	CO2e
In-Bay placement - clamshell	131,700	41.2	82.4	8	10.3	29	0.24	1.32	1.94	0.07	0.07	208.71	0.02	0.01	211
In-Bay placement - hopper	22,500	41.2	82.4	8	10.3	4	0.03	0.38	1.58	0.06	0.06	128.88	0.00	0.01	131
Nearshore strategic placement	308,400	5.2	10.4	8	1.3	48	0.05	0.66	2.73	0.10	0.10	222.95	0.00	0.01	226
Potential future nearshore strategic placement	231,300	4.8	9.6	8	1.2	36	0.03	0.19	0.28	0.01	0.01	29.92	0.00	0.00	0.00
Ocean placement	0	1.5	3	8	0.4	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
Deep Ocean Disposal - clamshell	0	63.5	127	8	15.9	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
Deep Ocean Disposal - hopper	0	63.5	127	8	15.9	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
Upland (sponsor provided)	25,700	3.2	6.4	8	0.8	6	0.00	0.02	0.03	0.00	0.00	3.16	0.00	0.00	3
Upland direct placement	1,824,700	64.3	128.6	8	16.1	405	5.24	28.45	42.00	1.53	1.49	4512.90	0.47	0.15	4,570
Total transit emissions for Alternative 4	–	–	–	–	–	–	**5.60**	**31.01**	**48.56**	**1.78**	**1.72**	**5106.52**	**0.50**	**0.18**	**5,141**

Total Alternative 4 Dredging Envelope Emissions

VOC	CO	NOx	PM10	PM2.5	CO_2	CH4	N_2O	CO2e
10.83	57.11	123.40	4.05	3.85	15,463.58	0.96	0.60	15,637

Tab D. Baseline (No Action) Summary

Channel	Likely Dredge Method	Typical Dredging Cycle (years)	Average Volume Dredged per Episode (CY)
Inner Richmond Harbor	Clamshell	1	300,000
Napa River	Cutterhead-pipeline	6-11	110,000
Oakland – Inner and Outer Harbor	Clamshell	1	750,000
Petaluma River- across the flats	Clamshell	3	70,000
Petaluma River	Cutterhead-pipeline	4-7	150,000
Redwood City	Clamshell	1	180,000
San Rafael Creek	Clamshell	4-6	110,000
Suisun Bay Channel	Clamshell	Variable	165,000
Outer Richmond Harbor	Hopper	1	250,000
San Bruno	Hopper	23	30,000
San Francsico Harbor	Hopper	Variable	90,000 255,000
San Pablo Bay (Pinole Shoal)	Hopper	Variable	190,000

Tab E. Alternative 1. Beneficial Use—Richmond Inner Split Summary

Channel	Likely Dredge Method	Typical Dredging Cycle (years)	Average Volume Dredged per Episode (CY)
Inner Richmond Harbor	Clamshell	1	300,000
Napa River	Cutterhead-pipeline	6-11	110,000
Oakland – Inner and Outer Harbor	Clamshell	1	750,000
Petaluma River- across the flats	Clamshell	3	70,000
Petaluma River	Cutterhead-pipeline	4-7	150,000
Redwood City	Clamshell	1	180,000
San Rafael Creek	Clamshell	4-6	110,000
Suisun Bay Channel	Clamshell	1	165,000
Outer Richmond Harbor	Hopper	1	210,000
San Bruno	Hopper	23	30,000
San Francsico Harbor	Hopper	1	345,000
San Pablo Bay (Pinole Shoal)	Hopper	1	150,000

Tab F. Alternative 2. Beneficial Use—Optimized Alternative Summary

Channel	Likely Dredge Method	Typical Dredging Cycle (years)	Average Volume Dredged per Episode (CY)
Napa River	Cutterhead-Pipeline	6-11	110,000
Oakland – Inner and Outer Harbor	Clamshell	1	540,000
Petaluma across the flats	Clamshell	3	70,000
Petaluma River	Cutterhead-pipeline	4-7	150,000
Redwood City	Clamshell	1	180,000
San Rafael Creek	Clamshell	4-6	110,000
Suisun Bay Channel (Suisun*, NY Slough, Bulls Head)	Clamshell	1	165,000
Inner Richmond Harbor	Hopper	1	300,000
Outer Richmond Harbor	Hopper	1	210,000
San Bruno	Hopper	23	30,000
San Francsico Harbor	Hopper	1	345,000
San Pablo Bay (Pinole Shoal)	Hopper	1	150,000
Oakland – Inner and Outer Harbor	Hopper	1	210,000

Likely Dredge Method	Average Volume Dredged per Episode (CY)	Percent of Total
clamshell	**1,325,000**	**52%**
Hopper	**1,245,000**	**48%**
Total	**2,570,000**	**100%**

Tab G. Alternative 3. Beneficial Use—Cost Share Opportunity Summary

Channel	Likely Dredge Method	Typical Dredging Cycle (years)	Average Volume Dredged per Episode (CY)
Napa River	Cutterhead-Pipeline	6-11	110,000
Oakland – Inner and Outer Harbor	Clamshell	1	750,000
Petaluma Across the Flats	Clamshell	3	70,000
Petaluma River	Cutterhead-Pipeline	4-7	150,000
Redwood City	Clamshell	1	180,000
San Rafael Creek	Clamshell	4-6	110,000
Suisun Bay Channel (Suisun*, NY Slough, Bulls Head)	Clamshell	1	165,000
Inner Richmond Harbor	Clamshell	1	35,000
Outer Richmond Harbor	Clamshell	1	15,000
San Pablo Bay (Pinole Shoal)	Clamshell	1	10,000
Inner Richmond Harbor	Hopper	1	265,000
Outer Richmond Harbor	Hopper	1	195,000
San Bruno	Hopper	23	30,000
San Francsico Harbor	Hopper	1	345,000
San Pablo Bay (Pinole Shoal)	Hopper	1	140,000

Likely Dredge Method	Average Volume Dredged per Episode (CY)	Percent of Total
clamshell	**1,595,000**	**62%**
Hopper	**975,000**	**38%**
Total	**2,570,000**	**100%**

Tab H. Alternative 4. Maximized Beneficial Use

Channel	Likely Dredge Method	Typical Dredging Cycle (years)	Average Volume Dredged per Episode (CY)
Inner Richmond Harbor	Clamshell	1	300,000
Napa River	Cutterhead-Pipeline	6-11	110,000
Oakland – Inner and Outer Harbor	Clamshell	1	750,000
Outer Richmond Harbor	Clamshell	1	210,000
Petaluma Across the Flats	Clamshell	3	70,000
Petaluma River	Cutterhead-Pipeline	4-7	150,000
Redwood City	Clamshell	1	180,000
San Pablo Bay (Pinole Shoal)	Clamshell	1	150,000
San Rafael Creek	Clamshell	4-6	110,000
Suisun Bay Channel (Suisun*, NY Slough, Bulls Head)	Clamshell	1	165,000
San Bruno	Hopper	23	30,000
San Francsico Harbor	Hopper	1	345,000

Likely Dredge Method	Average Volume Dredged per Episode (CY)	Percent of Total
clamshell	**2,195,000**	**85%**
Hopper	**375,000**	**15%**
Total	**2,570,000**	**100%**

Tab I. Transit Distances Provided By USACE

Placement Site	Distance (nm)
Channel: Inner Richmond (clamshell)	
SF-DODS	59.2 Deep water ocean disposal sites
Montezuma	42.0 Upland BU
SF-11	8.5 In-bay
SF-9	18.9 In-bay
SF-10	11.0 In-bay
SF-11	12.1 In-bay
Channel: Napa River	
SF-9	17.0 In-bay
Imola Avenue	3.2 Upland site
Montezuma	37.1 Upland BU
Channel: Oakland (Inner and Outer)	
SF-DODS	57.1 Deep water ocean disposal sites
Montezuma	47.4 Upland BU
SF-11	5.4 In-bay
SF-9	24.3 In-bay
Emeryville Crescent nearshore	4.8 In-water nearshore
SF-10	16.5 In-bay
Channel: Petaluma River	
SF-10	18.9 In-bay
Shollenberger	3.2 Upland site
Montezuma	44.9 Upland BU
SF-11	21.6 In-bay
Channel: Redwood City	
Montezuma	64.3 Upland BU
Whale's Tail nearshore	2.8 In-water nearshore
SF-9	41.2 In-bay
SF-DODS	105.0 Deep water ocean disposal sites
SF-10	33.4 In-bay
Channel: San Rafael Creek	
SF-11	14.4 In-bay
Montezuma	37.0 Upland BU
SF-9	13.9 In-bay
SF-10	6.0 In-bay
SF-16	4.7 In-bay

Placement Site	Distance (nm)
Channel: Suisun Bay	
Montezuma	9.6 Upland BU
SF-11	37.6 In-bay
SF-10	22.0 In-bay
SF-11	9.4 In-bay
Channel: Outer Richmond	
Montezuma	38.9 Upland BU
SF-9	15.8 In-bay
SF-10	7.9 In-bay
Channel: San Bruno	
SF-DODS	63.5 Deep water ocean disposal sites
Montezuma	54.6 Upland BU
SF-11	11.8 In-bay
SF-9	31.5 In-bay
SF-10	23.6 In-bay
Channel: San Francisco Main Ship Channel	
SF-8	1.5 In-water ocean sites
SF-17	5.2 In-water ocean BU
Ocean Beach onshore	6.3
SF-10	4.7 In-bay
SF-9	3.2 In-bay
Channel: San Pablo Bay (Pinole Shoal)	
Montezuma	26.3 Upland BU
SF-11	20.3 In-bay

In-bay	SF-9, SF-10, SF-11, SF-16
In-water ocean BU	SF-17
In-water ocean sites	SF-8
Deep water ocean disposal sites	SF-DODs
Upland	Shollenberger Park (Petaluma River), Imola Avenue (Napa River)
Upland BU	Montezuma Wetlands, Cullinan Ranch
In-water nearshore strategic placement beneficial use sites	den Landing (Whale's Tail) Nearshore, Emeryville Crescent Nearshore

Tab J. Changes in Placement Percent and Volume by Alternative

	In-bay Placement		Nearshore Strategic Placement		Potential Future Nearshore Strategic Placement		Ocean Placement		Deep Ocean Disposal Sites		Upland (Sponsor-Provided)		Upland Direct Placement	
Baseline	35%	899,500	12%	308,400	0%	–	4%	102,800	48%	1,233,600	1%	25,700	0%	–
Alt 1	42%	1,079,400	12%	308,400	0%	–	4%	102,800	35%	899,500	1%	25,700	6%	154,200
Change	**7%**	**179,900**	**0%**	–	**0%**	–	**0%**	–	**-13%**	**(334,100)**	**0%**	–	**6%**	**154,200**
Alt 2	56%	1,439,200	12%	308,400	0%	–	4%	102,800	0%	–	1%	25,700	27%	693,900
Change	**21%**	**539,700**	**0%**	–	**0%**	–	**0%**	–	**-48%**	**(1,233,600)**	**0%**	–	**27%**	**693,900**
Alt 3	40%	1,028,000	12%	308,400	0%	–	4%	102,800	0%	–	1%	25,700	43%	1,105,100
Change	**5%**	**128,500**	**0%**	–	**0%**	–	**0%**	–	**-48%**	**(1,233,600)**	**0%**	–	**43%**	**1,105,100**
Alt 4	6%	154,200	12%	308,400	9%	231,300	0%	–	0%	–	1%	25,700	71%	1,824,700
Change	**-29%**	**(745,300)**	**0%**	–	**9%**	**231,300**	**-4%**	**(102,800)**	**-48%**	**(1,233,600)**	**0%**	–	**71%**	**1,824,700**

Tab K. Conversion of Total GHG Emissions from Short Tons to Metric Tonnes

Alternative	CO_2e	METRIC
Baseline (No Action) Alternative	**18,881**	**17,128**
Alternative 1 – Dredge Operation Emissions	10,240	9,290
Alternative 1 – Transit Emissions	6,313	5,727
Subtotal	16,553	15,017
Alternative 1 Net Change	**-2,327**	**-2,111**
Alternative 2 – Dredge Operation Emissions	9,878	8,961
Alternative 2 – Transit Emissions	7,226	6,555
Subtotal	17,104	15,516
Alternative 2 Net Change	**-1,777**	**-1,612**
Alternative 3 – Dredge Operation Emissions	10,069	9,135
Alternative 3 – Transit Emissions	6,306	5,721
Subtotal	16,376	14,856
Alternative 3 Net Change	**-2,505**	**-2,273**
Alternative 4– Dredge Operation Emissions	10,496	9,522
Alternative 4 – Transit Emissions	5,141	4,664
Subtotal	15,637	14,186
Alternative 4 Net Change	**-3,244**	**-2,943**

SCC-GHG Alternative 1

	2020 Dollars per Metric Ton			Metric ton/yr			Total Cost
Emission Year	SC-CO2 2.5%	SC-CH4 2.5%	SC-N2O 2.5%	CO2	CH4	N2O	CO2e
2025	$130.00	$1,590.00	$39,972.00	-3170.63	0.22	-0.16	($418,319)
2026	$133.00	$1,657.00	$40,920.00	-3170.63	0.22	-0.16	($427,970)
2027	$136.00	$1,724.00	$41,868.00	-3170.63	0.22	-0.16	($437,621)
2028	$139.00	$1,791.00	$42,816.00	-3170.63	0.22	-0.16	($447,272)
2029	$141.00	$1,857.00	$43,764.00	−3170.63	0.22	−0.16	($453,753)
2030	$144.00	$1,924.00	$44,712.00	−3170.63	0.22	−0.16	($463,404)
2031	$147.00	$2,002.00	$45,693.00	−3170.63	0.22	−0.16	($473,057)
2032	$150.00	$2,080.00	$46,674.00	−3170.63	0.22	−0.16	($482,711)
2033	$153.00	$2,157.00	$47,655.00	−3170.63	0.22	−0.16	($492,365)
2034	$155.00	$2,235.00	$48,636.00	−3170.63	0.22	−0.16	($498,849)
						10−Year Total Estimated Cost Reduction	**($4,595,322)**

SCC−GHG Alternative 2

	2020 Dollars Per Metric Ton			Metric ton/yr			Total Cost
Emission Year	SC−CO2 2.5%	SC−CH4 2.5%	SC−N2O 2.5%	CO2	CH4	N2O	CO2e
2025	130.00	1,590.00	39,972.00	−1753.63	−0.12	−0.07	($230,912)
2026	$133.00	$1,657.00	$40,920.00	−1753.63	−0.12	−0.07	($236,246)
2027	$136.00	$1,724.00	$41,868.00	−1753.63	−0.12	−0.07	($241,580)
2028	$139.00	$1,791.00	$42,816.00	−1753.63	−0.12	−0.07	($246,914)
2029	$141.00	$1,857.00	$43,764.00	−1753.63	−0.12	−0.07	($250,495)
2030	$144.00	$1,924.00	$44,712.00	−1753.63	−0.12	−0.07	($255,829)
2031	$147.00	$2,002.00	$45,693.00	−1753.63	−0.12	−0.07	($261,166)
2032	$150.00	$2,080.00	$46,674.00	−1753.63	−0.12	−0.07	($266,504)
2033	$153.00	$2,157.00	$47,655.00	−1753.63	−0.12	−0.07	($271,842)
2034	$155.00	$2,235.00	$48,636.00	−1753.63	−0.12	−0.07	($275,426)
						10−Year Total Estimated Cost Reduction	**($2,536,913)**

APPENDIX E
Cultural Resources and Tribal Consultations

San Francisco Bay Regional Dredged Material Management Plan:

Overview and Summary of Coordination and Consultation for NHPA, AB-52, and NEPA

October 2024

1.0 Tribal Coordination and Consultation for NHPA, AB-52, and NEPA

In December 2023, the United States Army Corps of Engineers (USACE), San Francisco District, in collaboration with the San Francisco Bay Regional Water Quality Control Board (Regional Water Board), initiated Tribal consultation regarding the development of the Regional Dredged Material Management Plan (RDMMP) to engage with Tribal communities in our Area of Responsibility (AOR) and ensure their perspectives and concerns are integrated into the environmental and cultural review process.

On February 6, 2024, a consultation meeting was held with representatives from the Federated Indians of Graton Rancheria. The primary focus of this meeting was to identify and address potential inadvertent impacts on Tribal Cultural Resources associated with the RDMMP. In response to the feedback received during this meeting, the USACE has since developed a suite of mitigation measures aimed at minimizing impacts to cultural and tribal resources.

Included with this summary are the letter that formally initiated the Tribal consultation and a comprehensive list of the Tribes that have been consulted in relation to the RDMMP.

Ongoing consultation with the Federated Indians of Graton Rancheria and the Confederated Villages of Lisjan Nation continues, with a focus on the findings of effect related to our environmental assessments. This engagement is essential for identifying any additional Tribal resources, sacred sites, or areas of traditional cultural or religious significance that require further consideration within the RDMMP.

2.0 The Sacred Lands File (SLF) Results

A Sacred Lands File (SLF) search was conducted in March 2024 with the Native American Heritage Commission (NAHC). The results of this search were positive, indicating the presence of potential cultural resources that necessitate additional consultation. As a result, over 60 California Tribes were contacted to identify any concerns to sacred sites and tribal resources.

NATIVE AMERICAN HERITAGE COMMISSION

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nahc@nahc.ca.gov
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March 1, 2024

Ruzel Benedicto Ednalino
U.S. Army Corps of Engineers

Via Email to: ruzel.b.ednalino@usace.army.mil

Re: USACE Regional Dredge Material Management Plan (RDMMP) Project, Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma Counties

To Whom It May Concern:

A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information submitted for the above referenced project. The results were positive. Please contact the tribes on the attached list for information. Please note that tribes do not always record their sacred sites in the SLF, nor are they required to do so. A SLF search is not a substitute for consultation with tribes that are traditionally and culturally affiliated with a project's geographic area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites, such as the appropriate regional California Historical Research Information System (CHRIS) archaeological Information Center for the presence of recorded archaeological sites.

Attached is a list of Native American tribes who may also have knowledge of cultural resources in the project area. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. Please contact all of those listed; if they cannot supply information, they may recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call or email to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from tribes, please notify the NAHC. With your assistance, we can assure that our lists contain current information.

If you have any questions or need additional information, please contact me at my email address: Cody.Campagne@nahc.ca.gov.

Sincerely,

Cody Campagne

Cody Campagne
Cultural Resources Analyst

Attachment

DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, CORPS OF ENGINEERS
450 GOLDEN GATE AVENUE, 4TH FLOOR, SUITE 0134
SAN FRANCISCO, CA 94102-3406

CALIFORNIA Water Boards

December 12, 2023

SUBJECT: Initiating Tribal Consultation for the San Francisco Bay Regional Dredged Material Management Plan 2025-2034 Federal Operations & Maintenance Dredging Program

Chairperson Katherine Perez
North Valley Yokuts Tribe
P.O. Box 717
Linden, CA 952367

Honorable Chairperson Perez:

The U.S. Army Corps of Engineers San Francisco District (USACE) and San Francisco Bay Regional Water Quality Control Board (Water Board) are reaching out to Tribes that may have interests in the project area associated with the USACE's San Francisco Bay Regional Dredged Material Management Plan (RDMMP), a long-range (20-year) plan for the placement of dredged material from the 11 federal navigation projects around the Bay (Figure 1). Implementation of dredge material placement under the RDMMP is anticipated starting in 2025. The RDMMP permitting process will include a joint National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) document to analyze environmental effects. The USACE will be the NEPA lead agency and the Regional Water Quality Control Board will be the CEQA lead agency. A Clean Water Act Section 401 water quality certification and waste discharge requirements (WQC/WDR) will also be required pursuant to the state Porter-Cologne Water Quality Control Act. We are initiating consultation to invite you to be a part of the planning process out of respect for your unique experience and knowledge, and to collaborate regarding any Tribal interests that may be affected by the Project.

USACE is mandated by Congress to maintain the navigability of federal transportation channels to authorized depths. Accumulation of sediment that settles in these channels can obstruct navigability and result in navigation safety hazards. Maintenance dredging removes excess sediment and restores channels to their approved depths in order to provide safe, reliable, and efficient navigation within channels, harbors, port turning basins and access areas for movement of commerce, recreation, and national security. The purpose of the USACE's project is to continue ongoing maintenance dredging of the federal navigation channels in San Francisco Bay consistent with the RDMMP and in light of the goals of the San Francisco Bay Long

Term Management Strategy for the Placement of Dredged Materials, while protecting the environment and listed species. The Water Board's overall project objective is to ensure USACE's consistency with the water quality objectives and beneficial uses adopted in the Water Quality Control Plan for the San Francisco Bay Basin, as addressed through the Section 401 WQC/WDR process.

The USACE and the Water Board are analyzing regional needs for beneficially using sediment from federal dredging projects to support nature-based solutions to adapt to climate change, particularly wetland restoration projects. At the same time our agencies are also analyzing potential areas to place dredged material in shallow water along the Bay's shoreline and utilize natural transportation processes to move that dredged material to mudflats and marshes with the intent of increasing their resiliency to sea level change. Currently, we are seeking your input on identifying potential impacts or benefits to cultural or natural resources that may be in the project area. Your Tribe's involvement will ensure that recommendations and concerns are addressed in our environmental reviews.

The Project study area extends from approximately 50 nautical miles offshore at the San Francisco Deep Ocean Disposal Site (SF-DODS), through the Golden Gate, covering the entire San Francisco Bay, to the border of the Sacramento-San Joaquin Delta (Delta); the Delta border being defined as the upstream limit of the Suisun Bay Channel Deep-Draft Federal Navigation Projects. The USACE would welcome your engagement on the RDMMP. Similarly, the Water Board would appreciate your involvement in advance of preparing a document to satisfy CEQA. The Water Board requested from the Native American Heritage Commission a list of Tribes in or associated with the project area. This Tribal consultation is sought in accordance with the Water Boards' Tribal Consultation Policy[35], Executive Order B-10-11[36], and AB2108[3,4]. The Water Board values Tribal input and aspires to educate both staff and Tribes, thus enhancing our activities, policies, and decision-making process and understand the unique Tribal interests that may be affected by the proposed project.

By expressing your interest in the project, you will be actively informed of the steps we are taking to identify and preserve important places in the San Francisco Bay Region. Your views and comments will ensure that our undertaking incorporates historic preservation when necessary and fulfills the spirit of public stewardship advocated through the National Historic Preservation Act and its implementing regulations at 36 C.F.R. § 800.4(a)(3).

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[35]https://www.waterboards.ca.gov/about_us/public_participation/tribal_affairs/docs/california_water_board_tribal_consultation_policy.pdf

[36]https://www.ca.gov/archive/gov39/2011/09/19/news17223/index.html

[3]https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?sectionNum=189.7.&lawCode=WAT

[4]https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?sectionNum=13149.2.&lawCode=WAT

The USACE and Water Board are available to consult with you on this project, either individually or jointly, at your convenience (e.g., one-on-one meeting or virtual workshops). If you have any comments or questions, please contact USACE's Lead Archaeologist, Stephanie Bergman Sahinoglu, at (415) 503-6844 (Stephanie.M.Bergman@usace.army.mil) or the Water Board's Engineering Geologist Jazzy Graham-Davis at (510) 622-2509 (Jazzy.Graham-Davis@waterboards.ca.gov). Thank you for your time and consideration; we look forward to hearing from you.

Sincerely,

Shantel K. Glass
Major, U.S. Army
Acting Commander

and

Eileen M. White
Executive Officer
Water Board

Enclosures
Figure 1: Project area, existing conditions

Additional Contacts

Sarafina Maraschino, USACE San Francisco Tribal Liaison,
Sarafina.S.Maraschino@usace.army.mil/ 415-503-6756

Samantha Harper, San Francisco Bay Water Board Tribal Coordinator,
Samantha.Harper@waterboards.ca.gov/ 510-622-2415

Adriana Renteria, Office of Public Participation State Water Resources Control Board,
Tribal-Liaison@Waterboards.ca.gov/ 916-341-5229

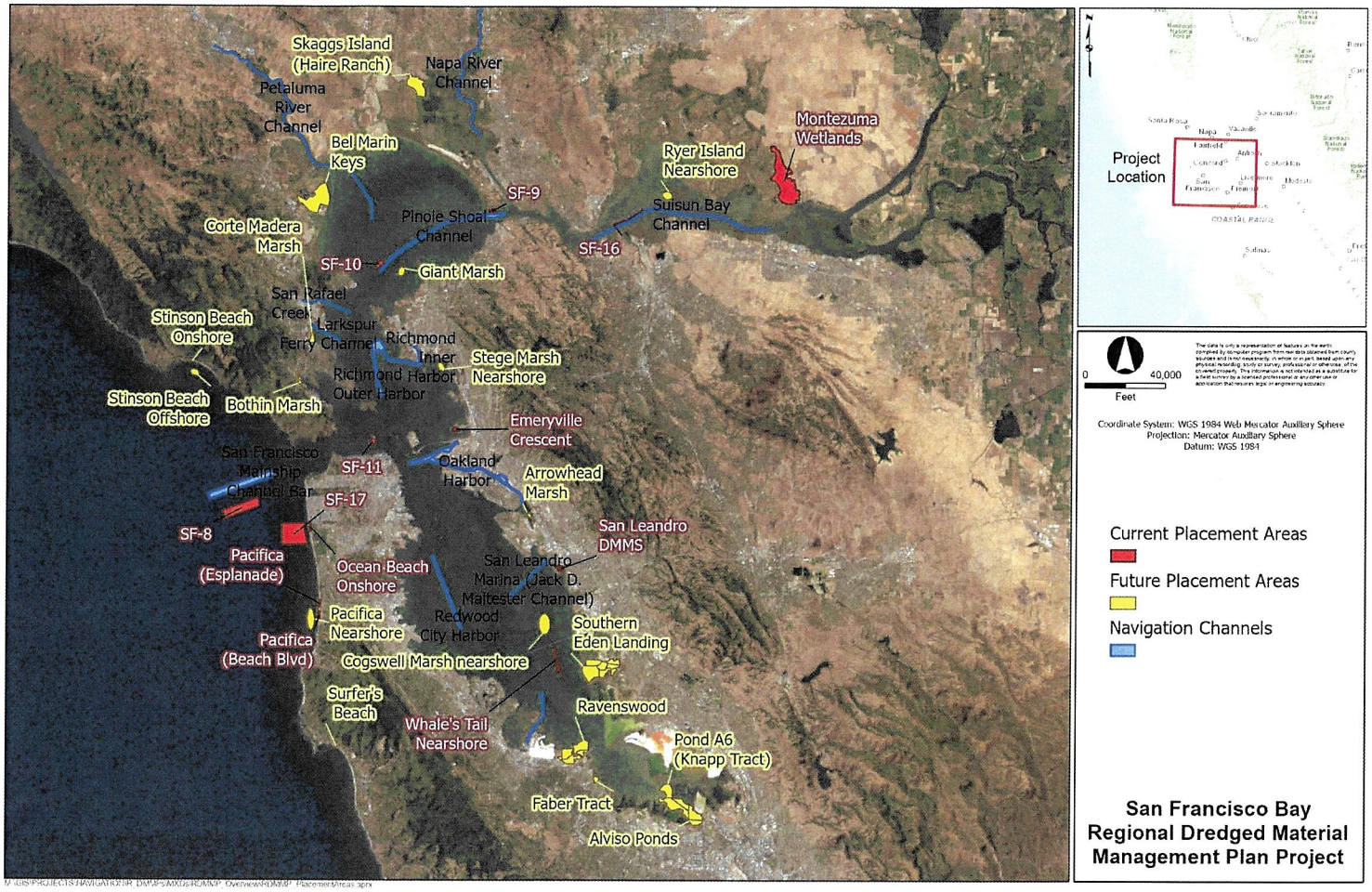


Figure 1. Project area showing existing conditions, including federal navigation channels (red), existing placement sites (purple) and where new placement sites are being considered along the Bay's shoreline (brown).

San Francisco Bay Regional Water Quality Control Board

November 8, 2023

Via Certified Mail and Electronic Mail

Greg Sarris, Chairman
Federated Indians of Graton Rancheria
6400 Redwood Drive, Ste 300
Rohnert Park, CA 94928
gbuvelot@gratonrancheria.com

Subject: Tribal Cultural Resources under the California Environmental Quality Act, AB52. Formal Notification of a San Francisco Regional Water Quality Control Board Project and Consultation Opportunity pursuant to Public Resources Code section 21080.3.1

Honorable Chairman Sarris,

The United States Army Corps of Engineers (USACE) proposes to continue maintenance dredging of the federal navigation channels in San Francisco Bay to maintain the navigability of the channels for 10 years starting in 2025. The San Francisco Bay Regional Water Quality Control Board (Water Board) proposes to issue two subsequent 5-year permits[1] for USACE's continued maintenance dredging operations in San Francisco Bay. The Water Board and USACE will jointly produce an Initial Study under the California Environmental Quality Act and an Environmental Assessment under the National Environmental Policy Act, with each as the lead agency, respectively.

Below please find a description of the proposed project, applicability (project location), and the name of our project point of contact, pursuant to PRC § 21080.3.1 (d).

Project Description

USACE, as mandated by Congress, is responsible for maintaining navigability of federal navigation channels to authorized depth or lesser regulatory depth. Accumulation of sediment that settles in these channels can impede navigability. Maintenance dredging removes this sediment and returns the channels to regulatory depths to provide safe, reliable, and efficient waterborne transportation systems (channels, harbors, and waterways) for the movement of commerce, national security needs, and recreation. Therefore, USACE's purpose of the project is to continue maintenance dredging of the federal navigation channels in San Francisco Bay consistent with the USACE's 20-year Regional Dredged Material Management Plan, and the

[1] Each permit will consist of a water quality certification pursuant to Section 401 of the Clean Water Act and waste discharge requirements pursuant to the state Porter-Cologne Water Quality Control Act.

goals and adopted plans of the San Francisco Bay Long Term Management Strategy for the Placement of Dredged Materials, while adequately protecting the environment, including listed species. The Water Board's overall project objective is to ensure USACE's consistency with the water quality objectives and beneficial uses adopted in the Water Quality Control Plan for the San Francisco Bay Basin, as will be addressed through the permitting process.

USACE and the Water Board recognize the regional need to beneficially use sediment from federal dredging projects to support nature-based solutions to adapt to climate change, particularly wetland restoration projects. This Project will also analyze potential areas to place dredged material in shallow water along the Bay's shoreline and utilize natural transport processes to move dredged material to mudflats and marshes. Currently, we are seeking your input on identifying potential impacts to any cultural or natural resources that may be in the project area. Your Tribe's involvement will ensure that recommendations and concerns are addressed in our environmental reviews.

Applicability (Project Location)

The federal navigation channels and associated placement sites are in the San Francisco Bay Area, which spans 11 counties along the Bay adjacent marshes, and some rivers. However, the geographic scope of potential impacts of the proposed project are limited to 11 federally authorized navigation channels and associated placement sites in the San Francisco Bay (Figure 1). Note that Suisun Slough Channel, marked "11" in Figure 1, will be included in the Project.

Lead Agency Point of Contact

Jazzy Graham-Davis
Engineering Geologist
San Francisco Bay Regional Water Quality Control Board
1515 Clay Street, Suite 1400
Oakland, CA 94612
Jazzy.Graham-Davis@waterboards.ca.gov

Pursuant to Public Resources Code section 21080.3.1, subdivision (b), you have 30 days from the receipt of this letter to request consultation, in writing, with the Water Board. Please address any requests for consultation or questions to Jazzy Graham-Davis. Additional comment opportunities will be available as part of the public review process, which will be announced later. We look forward to working together.

Sincerely,

Eileen M. White

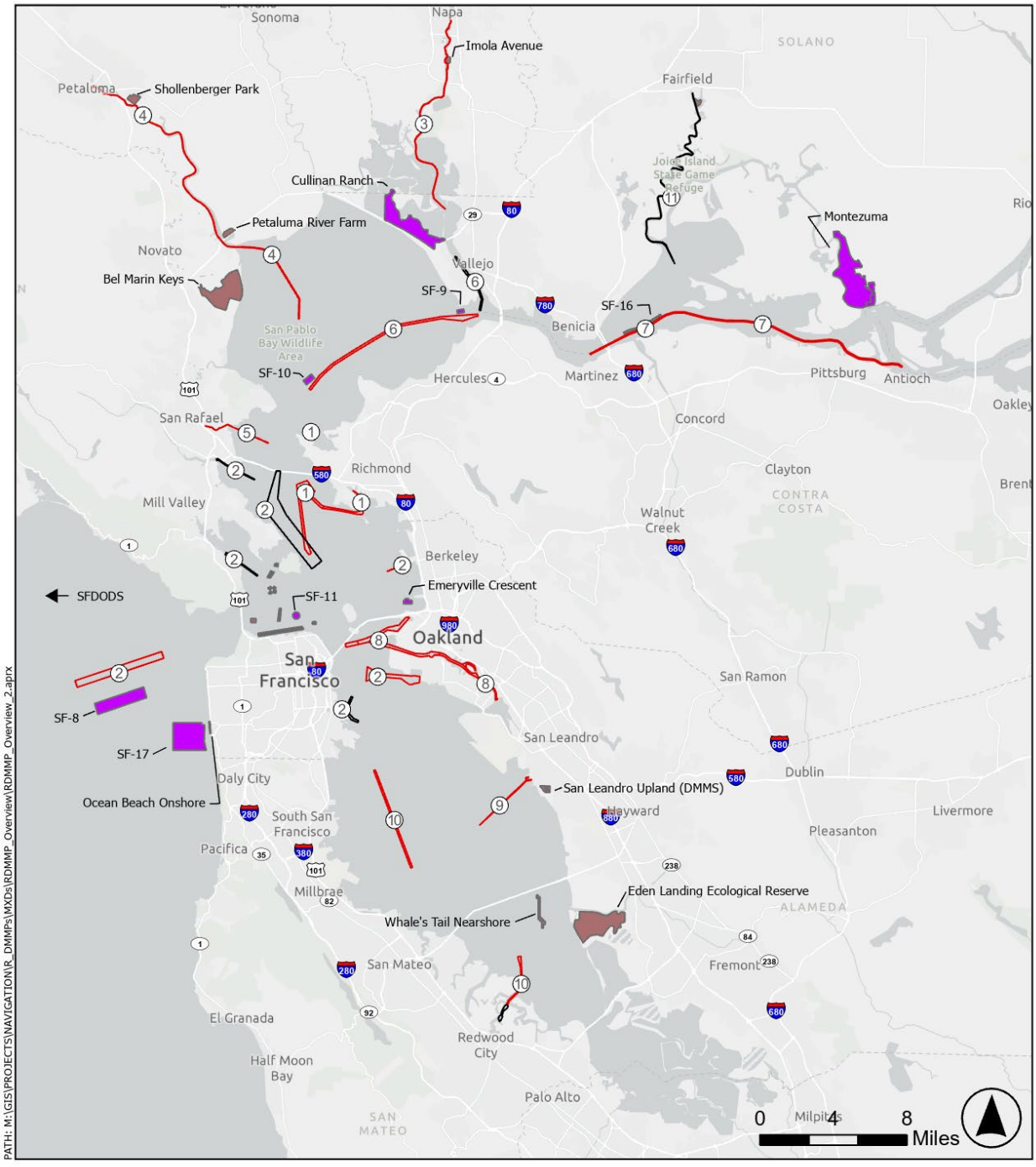
Eileen M. White
Executive Officer

Copy sent via email: gbuvelot@gratonrancheria.com

CC: via electronic mail only

Adriana Renteria, Office of Public Participation State Water Resources Control Board
Tribal-Liaison@Waterboards.ca.gov
Samantha Harper, San Francisco Bay Regional Water Board Tribal Coordinator
Samantha.harper@waterboards.ca.gov

Figure 1 Federal Navigation Projects and Dredged Material Placement Sites



2.4 SHPO Coordination and Consultation for NHPA, AB-52, and NEPA

Consultation for the Area of Potential Effects, Identification Efforts, and the Finding of Effect for the RDMMP will be sent in October 2024. Concurrence is expected by December 2024.

List of Tribes Contacted by USACE and the Regional Water Board for Consultation

Tribe Name	Fed (F) Non-Fed (N)	Contact Person
Alameda County		
Amah Mutsun Tribal Band of Mission San Juan Bautista	N	Irene Zwierlein, Chairperson
Confederated Villages of Lisjan Nation	N	Cheyenne Gould, Tribal Cultural Resource Manager
Confederated Villages of Lisjan Nation	N	Corrina Gould, Chairperson
Confederated Villages of Lisjan Nation	N	Deja Gould, Language Program Manager
Costanoan Rumsen Carmel Tribe	N	Carla Munoz, Tribal Council
Costanoan Rumsen Carmel Tribe	N	Desiree Munoz, Tribal Liaison
Guidiville Rancheria of California	F	Michael Derry, Historian
Guidiville Rancheria of California	F	Bunny Tarin, Tribal Administrator
Indian Canyon Mutsun Band of Costanoan	N	Kanyon Sayers-Roods, MLD Contact
Indian Canyon Mutsun Band of Costanoan	N	Ann Marie Sayers, Chairperson
Muwekma Ohlone Indian Tribe of the SF Bay Area	N	Monica Arellano, Vice Chairwoman
Northern Valley Yokut / Ohlone Tribe	N	Timothy Perez, Tribal Compliance Officer
Tamien Nation	N	Quirina Luna Geary, Chairperson
Tamien Nation	N	Johnathan Wasaka Costillas, THPO
Tamien Nation	N	Lillian Camarena, Secretary
The Ohlone Indian Tribe	N	Vincent Medina, Cultural Leader
The Ohlone Indian Tribe	N	Andrew Galvan, Chairperson
The Ohlone Indian Tribe	N	Desiree Vigil, THPO
Tule River Indian Tribe	F	Joey Garfield, Tribal Archaeologist
Tule River Indian Tribe	F	Neil Peyron, Chairperson
Tule River Indian Tribe	F	Kerri Vera, Environmental Department
Wilton Rancheria	F	Herbert Griffin, Executive Director of Cultural Preservation

Tribe Name	Fed (F) Non-Fed (N)	Contact Person
Wilton Rancheria	F	Dahlton Brown, Executive Director of Administration
Wilton Rancheria	F	Cultural Preservation Department,
Wuksachi Indian Tribe/Eshom Valley Band	N	Kenneth Woodrow, Chairperson
Contra Costa County		
Amah Mutsun Tribal Band of Mission San Juan Bautista	N	Irene Zwierlein, Chairperson
Chicken Ranch Rancheria of Me-Wuk Indians	F	Bailey Hunter, Environmental & Natural Resource Manager
Chicken Ranch Rancheria of Me-Wuk Indians	F	Lloyd Mathiesen, Chairperson
Chicken Ranch Rancheria of Me-Wuk Indians	F	Monica Fox, Tribal Administrator
Chicken Ranch Rancheria of Me-Wuk Indians	F	James Smith, Vice Chairman
Confederated Villages of Lisjan Nation	N	Cheyenne Gould, Tribal Cultural Resource Manager
Confederated Villages of Lisjan Nation	N	Corrina Gould, Chairperson
Confederated Villages of Lisjan Nation	N	Deja Gould, Language Program Manager
Guidiville Rancheria of California	F	Bunny Tarin, Tribal Administrator
Guidiville Rancheria of California	F	Michael Derry, Historian
Indian Canyon Mutsun Band of Costanoan	N	Kanyon Sayers-Roods, MLD Contact
Indian Canyon Mutsun Band of Costanoan	N	Ann Marie Sayers, Chairperson
Muwekma Ohlone Indian Tribe of the SF Bay Area	N	Monica Arellano, Vice Chairwoman
Nashville Enterprise Miwok-Maidu-Nishinam Tribe	N	Leland Valdez, Cultural Resources
Nashville Enterprise Miwok-Maidu-Nishinam Tribe	N	Cosme Valdez, Chairperson
Northern Valley Yokut / Ohlone Tribe	N	Timothy Perez, Tribal Compliance Officer
The Ohlone Indian Tribe	N	Desiree Vigil, THPO
The Ohlone Indian Tribe	N	Vincent Medina, Cultural Leader
The Ohlone Indian Tribe	N	Andrew Galvan, Chairperson
Tule River Indian Tribe	F	Neil Peyron, Chairperson
Tule River Indian Tribe	F	Kerri Vera, Environmental Department
Tule River Indian Tribe	F	Joey Garfield, Tribal Archaeologist
Wilton Rancheria	F	Cultural Preservation Department,
Wilton Rancheria	F	Dahlton Brown, Executive Director of Administration

Tribe Name	Fed (F) Non-Fed (N)	Contact Person
Wilton Rancheria	F	Herbert Griffin, Executive Director of Cultural Preservation
Wuksachi Indian Tribe/Eshom Valley Band	N	Kenneth Woodrow, Chairperson
Marin County		
Federated Indians of Graton Rancheria	F	Greg Sarris, Chairperson
Federated Indians of Graton Rancheria	F	Gene Buvelot,
Guidiville Rancheria of California	F	Bunny Tarin, Tribal Administrator
Guidiville Rancheria of California	F	Michael Derry, Historian
Muwekma Ohlone Indian Tribe of the SF Bay Area	N	Monica Arellano, Vice Chairwoman
Wuksachi Indian Tribe/Eshom Valley Band	N	Kenneth Woodrow, Chairperson
Napa County		
Cachil Dehe Band of Wintun Indians of the Colusa Indian Community	F	Wayne Mitchum Jr., Chairman
Cachil Dehe Band of Wintun Indians of the Colusa Indian Community	F	Jennie Mitchum, Cultural Preservation Director
Cortina Rancheria - Kletsel Dehe Band of Wintun Indians	F	Charlie Wright, Chairperson
Guidiville Rancheria of California	F	Michael Derry, Historian
Guidiville Rancheria of California	F	Bunny Tarin, Tribal Administrator
Middletown Rancheria of Pomo Indians of California	F	Tribal Historic Preservation Department,
Middletown Rancheria of Pomo Indians of California	F	Michael Rivera, Tribal Historic Preservation Officer
Middletown Rancheria of Pomo Indians of California	F	Jose Simon III, Tribal Chairman
Mishewal-Wappo Tribe of Alexander Valley	N	Scott Gabaldon, Chairperson
Mishewal-Wappo Tribe of Alexander Valley	N	Christi Gabaldon, Tribal Monitor
Muwekma Ohlone Indian Tribe of the SF Bay Area	N	Monica Arellano, Vice Chairwoman
Pinoleville Pomo Nation	F	Erica Carson, Tribal Historic Preservation Officer
Pinoleville Pomo Nation	F	Leona Willams, Chairperson
Yocha Dehe Wintun Nation	F	Yvonne Perkins, THPO, Cultural Resources Chairman
Yocha Dehe Wintun Nation	F	Leland Kinter, Tribal Treasurer
Yocha Dehe Wintun Nation	F	Anthony Roberts, Chairperson
Yocha Dehe Wintun Nation	F	James Kinter, Tribal Secretary

Tribe Name	Fed (F) Non-Fed (N)	Contact Person
San Francisco County		
Amah Mutsun Tribal Band of Mission San Juan Bautista	N	Irene Zwierlein, Chairperson
Costanoan Rumsen Carmel Tribe	N	Desiree Munoz, Tribal Liaison
Costanoan Rumsen Carmel Tribe	N	Carla Munoz, Tribal Council
Indian Canyon Mutsun Band of Costanoan	N	Ann Marie Sayers, Chairperson
Indian Canyon Mutsun Band of Costanoan	N	Kanyon Sayers-Roods, MLD Contact
Muwekma Ohlone Indian Tribe of the SF Bay Area	N	Monica Arellano, Vice Chairwoman
The Ohlone Indian Tribe	N	Andrew Galvan, Chairperson
The Ohlone Indian Tribe	N	Desiree Vigil, THPO
The Ohlone Indian Tribe	N	Vincent Medina, Cultural Leader
Wuksachi Indian Tribe/Eshom Valley Band	N	Kenneth Woodrow, Chairperson
San Mateo County		
Amah Mutsun Tribal Band of Mission San Juan Bautista	N	Irene Zwierlein, Chairperson
Costanoan Rumsen Carmel Tribe	N	Desiree Munoz, Tribal Liaison
Costanoan Rumsen Carmel Tribe	N	Carla Munoz, Tribal Council
Indian Canyon Mutsun Band of Costanoan	N	Kanyon Sayers-Roods, MLD Contact
Indian Canyon Mutsun Band of Costanoan	N	Ann Marie Sayers, Chairperson
Muwekma Ohlone Indian Tribe of the SF Bay Area	N	Monica Arellano, Vice Chairwoman
Tamien Nation	N	Quirina Luna Geary, Chairperson
Tamien Nation	N	Lillian Camarena, Secretary
Tamien Nation	N	Johnathan Wasaka Costillas, THPO
The Ohlone Indian Tribe	N	Desiree Vigil, THPO
The Ohlone Indian Tribe	N	Vincent Medina, Cultural Leader
The Ohlone Indian Tribe	N	Andrew Galvan, Chairperson
Wuksachi Indian Tribe/Eshom Valley Band	N	Kenneth Woodrow, Chairperson
Santa Clara County		
Amah Mutsun Tribal Band	N	Ed Ketchum, Vice-Chairperson
Amah Mutsun Tribal Band	N	Valentin Lopez, Chairperson
Amah Mutsun Tribal Band of Mission San Juan Bautista	N	Irene Zwierlein, Chairperson
Confederated Villages of Lisjan Nation	N	Deja Gould, Language Program Manager
Confederated Villages of Lisjan Nation	N	Corrina Gould, Chairperson

Tribe Name	Fed (F) Non-Fed (N)	Contact Person
Confederated Villages of Lisjan Nation	N	Cheyenne Gould, Tribal Cultural Resource Manager
Indian Canyon Mutsun Band of Costanoan	N	Kanyon Sayers-Roods, MLD Contact
Indian Canyon Mutsun Band of Costanoan	N	Ann Marie Sayers, Chairperson
Muwekma Ohlone Indian Tribe of the SF Bay Area	N	Monica Arellano, Vice Chairwoman
Northern Valley Yokut / Ohlone Tribe	N	Timothy Perez, Tribal Compliance Officer
Tamien Nation	N	Johnathan Wasaka Costillas, THPO
Tamien Nation	N	Lillian Camarena, Secretary
Tamien Nation	N	Quirina Luna Geary, Chairperson
The Ohlone Indian Tribe	N	Desiree Vigil, THPO
The Ohlone Indian Tribe	N	Andrew Galvan, Chairperson
The Ohlone Indian Tribe	N	Vincent Medina, Cultural Leader
Wuksachi Indian Tribe/Eshom Valley Band	N	Kenneth Woodrow, Chairperson
Solano County		
Cachil Dehe Band of Wintun Indians of the Colusa Indian Community	F	Wayne Mitchum Jr., Chairman
Cachil Dehe Band of Wintun Indians of the Colusa Indian Community	F	Jennie Mitchum, Cultural Preservation Director
Chicken Ranch Rancheria of Me-Wuk Indians	F	James Smith, Vice Chairman
Chicken Ranch Rancheria of Me-Wuk Indians	F	Bailey Hunter, Environmental & Natural Resource Manager
Chicken Ranch Rancheria of Me-Wuk Indians	F	Monica Fox, Tribal Administrator
Chicken Ranch Rancheria of Me-Wuk Indians	F	Lloyd Mathiesen, Chairperson
Confederated Villages of Lisjan Nation	N	Deja Gould, Language Program Manager
Confederated Villages of Lisjan Nation	N	Corrina Gould, Chairperson
Confederated Villages of Lisjan Nation	N	Cheyenne Gould, Tribal Cultural Resource Manager
Cortina Rancheria - Kletsel Dehe Band of Wintun Indians	F	Charlie Wright, Chairperson
Guidiville Rancheria of California	F	Bunny Tarin, Tribal Administrator
Guidiville Rancheria of California	F	Michael Derry, Historian
Muwekma Ohlone Indian Tribe of the SF Bay Area	N	Monica Arellano, Vice Chairwoman
Nashville Enterprise Miwok-Maidu-Nishinam Tribe	N	Cosme Valdez, Chairperson
Nashville Enterprise Miwok-Maidu-Nishinam Tribe	N	Leland Valdez, Cultural Resources

Tribe Name	Fed (F) Non-Fed (N)	Contact Person
Northern Valley Yokut / Ohlone Tribe	N	Timothy Perez, Tribal Compliance Officer
United Auburn Indian Community of the Auburn Rancheria	F	Matt Moore, Tribal Historic Preservation Officer
United Auburn Indian Community of the Auburn Rancheria	F	Gene Whitehouse, Chairperson
Wilton Rancheria	F	Dahlton Brown, Executive Director of Administration
Wilton Rancheria	F	Herbert Griffin, Executive Director of Cultural Preservation
Wilton Rancheria	F	Cultural Preservation Department,
Yocha Dehe Wintun Nation	F	James Kinter, Tribal Secretary
Yocha Dehe Wintun Nation	F	Leland Kinter, Tribal Treasurer
Yocha Dehe Wintun Nation	F	Yvonne Perkins, THPO, Cultural Resources Chairman
Yocha Dehe Wintun Nation	F	Anthony Roberts, Chairperson
Sonoma County		
Cloverdale Rancheria of Pomo Indians	F	Patricia Hermosillo, Chairperson
Dry Creek Rancheria of Pomo Indians	F	Sherrie Smith-Ferri, THPO
Federated Indians of Graton Rancheria	F	Greg Sarris, Chairperson
Federated Indians of Graton Rancheria	F	Gene Buvelot,
Guidiville Rancheria of California	F	Bunny Tarin, Tribal Administrator
Guidiville Rancheria of California	F	Michael Derry, Historian
Kashia Band of Pomo Indians of the Stewarts Point Rancheria	F	Dino Franklin, Chairperson
Kashia Band of Pomo Indians of the Stewarts Point Rancheria	F	Loren Smith, Tribal Historic Preservation Officer
Lytton Rancheria	F	Marjorie Mejia, Chairperson
Middletown Rancheria of Pomo Indians of California	F	Michael Rivera, Tribal Historic Preservation Officer
Middletown Rancheria of Pomo Indians of California	F	Tribal Historic Preservation Department,
Middletown Rancheria of Pomo Indians of California	F	Jose Simon III, Tribal Chairman
Mishewal-Wappo Tribe of Alexander Valley	N	Christi Gabaldon, Tribal Monitor
Mishewal-Wappo Tribe of Alexander Valley	N	Scott Gabaldon, Chairperson
Muwekma Ohlone Indian Tribe of the SF Bay Area	N	Monica Arellano, Vice Chairwoman

Tribe Name	Fed (F) Non-Fed (N)	Contact Person
Pinoleville Pomo Nation	F	Leona Willams, Chairperson
Pinoleville Pomo Nation	F	Erica Carson, Tribal Historic Preservation Officer
Robinson Rancheria of Pomo Indians	F	Beniakem Cromwell, Chairperson

APPENDIX F

Scoping Meeting Comment Summary

Scoping Meeting Comment Summary

October 2024

Prepared for:

US Army Corps of Engineers ®
San Francisco District

CALIFORNIA WATER BOARDS
San Francisco Bay

Prepared by:

SCOUT | Stantec
A MENTOR-PROTÉGÉ JOINT VENTURE

Project Name:

San Francisco Bay Federal Channels Operation and Maintenance
Dredging and Sediment Placement Activities
NEPA Identification Code:
CECWP_SPN_105059

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2.0 NOP ANNOUNCEMENT, DATE, & DISTRIBUTION 2.1

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4.0 PUBLIC COMMENTS 4.1

5.0 KEY ISSUES IDENTIFIED THROUGH PUBLIC COMMENTS 5.1

LIST OF APPENDICES

Attachment A. NOP

Attachment B. Scoping Meeting Transcript

Attachment C. Comment Matrix

ABBREVIATIONS

BCDC	San Francisco Bay Conservation and Development Commission
CEQA	California Environmental Quality Act
CMANC	California Marine Affairs and Navigation Conference
EA	Environmental Assessment
EIR	Environmental Impact Report
LTMS	Long-Term Management Strategy for Placement of Dredged Material in the San Francisco Bay Region
NEPA	National Environmental Policy Act
RDMMP	Regional Dredge Material Management Plan
USACE	United States Army Corps of Engineers
Regional Water Board	San Francisco Bay Regional Water Quality Control Board

1.0 Project Description

The United States Army Corps of Engineers (USACE), as mandated by Congress, has the authority to maintain navigability of federal navigation channels to their authorized depth. Accumulation of sediment that settles in these channels can impede navigability and represent navigation safety hazards. Maintenance dredging removes this sediment and returns the channels to authorized depths to provide safe, reliable, and efficient waterborne transportation systems (channels, harbors, and waterways) for the movement of commerce, national security needs, and recreation.

The San Francisco Bay Regional Water Quality Control Board (Regional Water Board) has authority under Clean Water Act Section 401 and the Porter-Cologne Act to issue permits governing dredge and fill activities. The Regional Water Board will consider USACE's application for a 5-year Water Quality Certification / Waste Discharge Requirements for continued maintenance dredging of San Francisco Bay federal channels and associated dredged materials placement.

The Proposed Project includes the operation and maintenance of 11 federal navigation channels and use of the associated federally-designated or alternate placement sites in and near San Francisco Bay for the next 10 years, anticipated to begin in 2025. The USACE proposes that each federal navigation channel would continue to be dredged as needed, depending on shoaling and available funding. The frequency of dredging would range from annual activities to those that may occur only once during the 10-year planning horizon. The Proposed Project and this Draft Environmental Assessment [EA]/Environmental Impact Report [EIR] build off the previous 2015-2024 EA/EIR and other approved management plans and where appropriate incorporates new information on dredging impacts, including those to newly listed species, and environmental benefits from beneficial use of dredged material (beneficial reuse).

The purpose of the public meeting and comment period identified in the Notice of Preparation (NOP) was to collect comments from the public, organizations, and government agencies on key issues to consider in preparation of the Draft EA/EIR.

2.0 NOP Announcement, Date, & Distribution

The NOP (Attachment A) was released on Tuesday, February 13, 2024, via the USACE and Regional Water Board websites. Additionally, it was distributed through the following email listservs:

Long-Term Management Strategy for Placement of Dredged Material in the San Francisco Bay Region (LTMS), Regional Dredge Material Management Plan (RDMMP), and the Regional Water Board's California Environmental Quality Act (CEQA) list.

The NOP included the project description and a figure of the study area. It provided the date and location of the public scoping meeting, and the methods and timeline for submitting public comments.

3.0 Public Scoping Meeting

The public scoping meeting took place on Tuesday, March 5, 2024, from 4:00-6:00 pm. The meeting was offered in a hybrid format using Zoom for the virtual component and the Regional Water Board office for the in-person option. A PowerPoint slideshow was presented through the Zoom application.

The meeting began with introductory remarks, a review of the National Environmental Policy Act (NEPA)/CEQA, and the meeting purpose by Dr. Tessa Beach, USACE. Khandriale Clark, from the contractor team, then provided an overview of logistics and the meeting agenda. Dr. Arye Janoff then continued with the project background, overview, purpose and need, goals, and project activities. Subsequently, Jazzy Graham-Davis described the Regional Water Board's role; an overview of the environmental analysis/resource areas; means to avoid or reduce impacts; and federal and state agency coordination. Finally, Khandriale Clark explained the NEPA/CEQA schedule and provided information on how to submit comments or find more information. The presentation was given twice, with an opportunity for attendees to ask clarifying questions and/or provide comments on the scope of the project after each run though.

A transcript of the meeting is provided in Attachment B.

Thirty-five participants attended the meeting. Of these, 14 represented the Project Development Team and 21 represented the public/outside agencies:

3.1 Project Development Team

- Regional Water Board: Xavier Fernandez, Jazzy Graham-Davis (in-person), Kevin Lunde (in-person)
- USACE: Tessa Beach (in-person), Ellie Covington, Christopher Eng, Jade Ishii, Arye Janoff (in-person), Jamie Yin
- Stantec: Khandriale Clark, Jamil Ibrahim (in-person), Cynthia Jones
- Scout: Becky Diaz, Ryan Pingree (in-person), Bob Wardwell

3.2 Public/Agency

- Jeff Thomas, AECOM
- Ava Lazor, Alameda County Water District
- Jim Haussener, California Marine Affairs and Navigation Conference (CMANC)
- Chris Huitt, California State Lands Commission
- Deborah Waller, County of Sonoma

- Jessica Blanchette, Haley & Aldrich, Inc.
- James McNally, Manson Construction Co.
- Khamly Chuop, Port of Oakland
- Edwin Draper, Port of Oakland
- Justin Taschek, Port of Oakland
- Fanny Yu, Port of Oakland
- Brenda Goeden, San Francisco Bay Conservation and Development Commission (BCDC)
- Jaime Lopez, BCDC
- Maya McInerney, BCDC
- Nicole Sasaki, San Francisco Baykeeper
- Allison Chan, San Francisco Public Utilities Commission (SFPUC)
- Russ Barnes, Wilshire Consulting Services, LLC
- Jennifer Schulte, unknown affiliation
- Unnamed caller
- Unnamed caller
- All public/agency attendees participated via the virtual meeting (Zoom); no public/agency attendees attended in-person.

4.0 Public Comments

A total of 21 comments were received during the public scoping period.

During the public meeting, eight comments were received from four attendees. Two attendees submitted written comments via the meeting chat; one submitted verbal comments; and one submitted a written comment via a previously-provided Survey Monkey link. An additional 13 comment letters were received via email following the meeting.

These comments are included in the comment matrix in Attachment C.

5.0 Key Issues Identified Through Public Comments

- Eden Landing, "alternative placement site," is in protected Niles Cove Groundwater Basin; Alameda County Water District expressed concerns regarding potential effects of dredged material placement to groundwater quality conditions at the site.
- State and federally listed species in the Bay include longfin and delta smelt, salmon, steelhead, sturgeon, and California least tern. The project may result in takes of state protected fish species. The California Department of Fish and Wildlife requested:
  - an assessment of effectiveness of previous mitigation measures for longfin smelt, and the inclusion of additional measures to further avoid take;
  - inclusion of potential impacts to white sturgeon in the EA/EIR;
  - an assessment of impacts on species, including Pacific herring, from maintenance dredging outside the approved environmental work window; and
  - description of different compensatory mitigation options to offset dredging impacts to listed species under the California Endangered Species Act and the Federal Endangered Species Act, and engagement with the resources agencies when determining options and amounts for compensatory mitigation.
- Galilee Harbor Community Association requested that Sausalito navigation channel be included in the EA/EIR.
- The BCDC provided the following recommendations:
  - BCDC and United States Environmental Protection Agency be included in development and selection of alternatives considered in the Draft EA/EIR.
  - BCDC prefers the use of the term "disposal sites" instead of "placement sites" for dredge material sites within the Bay and offshore.
  - EA/EIR should thoroughly examine the loss of sediment from disposal for both ecological and resilience projects under the no action alternative.
  - Bel Marin Keys Wetland Restoration Site and Eden Landing Wetland Restoration Site should be included in the Draft EA/EIR.
  - The Draft EA/EIR should assess dredging and disposal outside the work window for impacts on listed species and use of hydraulic and mechanic dredging equipment.
  - USACE and Regional Water Board should work with other agencies to maximize beneficial reuse of dredged sediment while minimizing disposal.

  - Include the advanced maintenance dredging at Bullshead Reach in the analysis, as well as investigate ways the USACE can work with others (sand miners) to reduce shoaling without having to widen or deepen Bullshead Reach.

  - Note that there are many factors involved in determining where sediment can be placed. Less than 5% of sediment has contaminant levels that prevent some form of beneficial reuse, either as surface sediment or foundation.

  - Explanation requested for why the Jack Maltester Channel is included and the Suisun City Channel is not included in the list of navigation channels shown in Study Area.

  - Cumulative impacts of the USACE maintenance dredging program together with other large projects in the Bay over the next ten years should be evaluated fully in the Draft EA/EIR.

- Blue Water Yacht Harbor, Clipper Yacht Harbor, Richardson Bay Marina, and Sausalito Working Waterfront Coalition requested that Richardson Bay Channel be included in the list of navigation channels covered in the Draft EA/EIR.

- California Department of Conservation, Geologic Energy Management Division, stressed the need to protect abandoned oil and gas wells in the project area.

- Jim Haussener (CMANC) requested that the following federally-authorized navigation projects be include in the EA/EIR, and that there is a mechanism to include any new projects that may be authorized and funded: Islais Creek, Mare Island Strait, Full Channel at Redwood City Creek, Full Channel at Richmond (inner harbor – Santa Fe Channel), and Suisun Slough.

- San Francisco Baykeeper requested that the EA/EIR include the following:

  - a thorough analysis of the impacts of changing the USACE O&M dredging program as compared to the last term, including but not limited to differences in dredged material disposal activities;

  - an assessment of the entrainment monitoring data collected between 2015 and 2024, and consideration of a revised work window;

  - assessment of adverse direct and indirect impacts to green and white sturgeon, and;

  - and a robust analysis of the navigational risks associated with deferring dredging in Pinole Shoal Channel and Richmond Outer Harbor.

- San Francisco Baykeeper requested clarification on whether the Proposed Project includes the Sacramento River Deep Water Ship Channel and/or the Stockton (John F. Baldwin and Stockton Ship Channels.
- California Geologic Energy Management Division requested a shapefile of the purple polygon (placement) sites.
- Manson Construction Co. commented that it is not practical to use turbidity curtains in deep water or water of significant current and that real-time monitoring of turbidity has been effective for reducing/avoiding turbidity impacts.

ATTACHMENT A

NOP

Notice of Preparation of a Draft Environmental Assessment/Environmental Impact Report

Date: February 13, 2024

Project Title: San Francisco Bay Federal Channels Operation and Maintenance Dredging and Sediment Placement Activities (Proposed Project)

CEQA Lead Agency: San Francisco Bay Regional Water Quality Control Board

Project Applicant: U.S. Army Corps of Engineers

The U.S. Army Corps of Engineers (USACE), as the lead federal agency, and the San Francisco Bay Regional Water Quality Control Board (Water Board) are preparing a joint Environmental Assessment (EA) and Environmental Impact Report (EIR) for Operations and Maintenance dredging of the federal navigational channels in San Francisco Bay, and for dredged material placement in the San Francisco Bay Region. Under CEQA, upon deciding to prepare an EIR, the Water Board, as the CEQA lead agency, must issue a Notice of Preparation (NOP) to inform responsible and trustee agencies and the public of its decision. This documentation will be consistent with the previously prepared Environmental Assessment/Environmental Impact Report for Maintenance Dredging of the Federal Navigation Channels in San Francisco Bay: Fiscal Years 2015-2024 (2015-2024 EA/EIR), and other approved management plans. The Water Board is requesting your agency's comments on the scope and content of the environmental information that is relevant to your agency's statutory responsibilities regarding the proposed project. Your agency may need to use the EIR when considering your permit or other approval for the project.

The project location, description, and the potential environmental impacts are described in the attached materials.

Due to the time limits mandated by State law, your response must be sent at the earliest possible date, but not later than 30 days after the notice date. Please send your response to Jazzy Graham-Davis (Jazzy.Graham-Davis@Waterboards.ca.gov), along with the name for a contact person in your agency.

COMMENTS AND SCOPING MEETING

Written comments on the scope of the EA/EIR should be sent to the Water Board, c/o Jazzy Graham-Davis (Jazzy.Graham-Davis@Waterboards.ca.gov). Comments must be received by 5:00 pm March 14, 2024. The scoping period will run from February 13, 2024 through March 14, 2024. A meeting will be held during the scoping period, the date, time, and meeting location are listed, as follows:

San Francisco Regional Water Quality Control Board
1515 Clay Street, Room 1505
Oakland CA 94612
Tuesday, March 5, 4:00 to 6:00 pm

The meeting may also be attended virtually. It is requested that all parties interested in attending either in person or virtually pre-register at the following link: Meeting Registration - Zoom. Please describe any accommodations or translation needs by Feb. 28.

PROJECT DESCRIPTION

PROJECT LOCATION

The federal navigation channels and associated placement sites are located in the San Francisco Bay, which spans 11 counties, including Alameda, Contra Costa, Marin, Napa, Sacramento, San Joaquin, Santa Clara, San Francisco, San Mateo, Solano, and Sonoma. However, the geographic scope of the potential impacts of the proposed project are limited to 11 federally authorized navigation channels (though the Suisun Slough is not anticipated to be dredged during this period and will not be included in the EA/EIR) and associated placement sites in the San Francisco Bay (defined herein as including San Francisco, San Pablo, Suisun bays) (Figure 1).

PROJECT PURPOSE, NEED, AND GOAL

The USACE, as mandated by Congress, has the authority to maintain navigability of federal navigation channels to authorized depth. Accumulation of sediment that settles in these channels can impede navigability and represent navigation safety hazards. Maintenance dredging removes this sediment and returns the channels to authorized depths to provide safe, reliable, and efficient waterborne transportation systems (channels, harbors, and waterways) for the movement of commerce, national security needs, and recreation. USACE's purpose of the project is to continue maintenance dredging of the federal navigation channels in San Francisco Bay consistent with navigation project authorizations and as laid out in the USACE 20-year Regional Dredge Material Management Plan (RDMMP). Where practicable, the project would be aligned with the goals of the Long-Term Management Strategy for Placement of Dredged Material in the San Francisco Bay Region (LTMS) program, as described in the 1998 LTMS Final EIS/EIR and the 2001 LTMS Management Plan, while adequately protecting the environment, including listed species.

The Water Board has authority under Clean Water Act (CWA) Section 401 and the Porter-Cologne Act to issue permits governing dredge and fill activities. The Water Board will consider USACE's application for a 5-year Section 401 Water Quality Certification (WQC)/Waste Discharge Requirements (WDR) for continued maintenance dredging of San Francisco Bay federal channels and associated dredged materials placement. To issue a WQC/WDR to USACE, the Water Board, in compliance with CEQA, must analyze and disclose potential water quality and other environmental impacts of the project; consider alternatives that would avoid or substantially reduce potentially significant impacts of the project as approved; adopt or make a condition of approval all feasible mitigation for potentially significant impacts; and demonstrate that all applicable state water quality requirements are met.

The Water Board's overall project goal is to ensure USACE's consistency with the Water Quality Standards adopted in the Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan), as will be addressed through the WQC process.

DESCRIPTION OF THE PROJECT

The USACE, in coordination with the Water Board and other stakeholders, has been performing dredging and placement activities in San Francisco Bay for decades. This project is consistent with the activities presented and analyzed in the 2015-2024 EA/EIR; the 2025-2034 EA/EIR will update the activities and analysis therein.

The Proposed Project includes the operation and maintenance of the 11 federal navigation channels (though the Suisun Slough is not anticipated to be dredged during this period and will not be included in the EA/EIR) and use of the associated federally-designated or alternate placement sites in and near San Francisco Bay for the next 10 years, anticipated to begin in 2025. The USACE proposes that each federal navigation channel would continue to be dredged as needed, depending on shoaling and available funding. The frequency of dredging would range from annual activities to those that may occur only once during the 10-year planning horizon. Dredging activities would be consistent with the 2015-2024 EA/EIR and other approved management plans and where appropriate incorporates new information on dredging impacts, including those to newly listed species, and environmental benefits from beneficial use of dredged material (beneficial reuse).

The USACE's current maintenance dredging typically involves four steps: 1) testing for sediment quality and placement suitability determination; 2) removing recently shoaled sediment from the dredging site to restore authorized navigation channel dimensions; 3) transporting the dredged material by barges, hopper dredges, or pipeline to the placement site; and 4) placing the dredged material at the designated placement site(s).

Before conducting dredging activities under the Proposed Project, the USACE would continue to sample and analyze sediment to determine its suitability for various placement and beneficial reuse alternatives based on its physical, chemical, and biological characteristics. Current maintenance dredging typically includes hydraulic dredging, mechanical dredging, and/or knockdowns. Current hydraulic dredging usually involves hopper dredges, or cutterhead suction attached to hydraulic pipelines that convey dredged material to a barge or directly onto a placement site. Current mechanical dredging usually involves bucket or clamshell dredges, which scoop material into a barge for transport to a placement site.

Current knockdowns use a clamshell or other equipment to smooth high spots into immediately adjacent deeper areas, without transport to an offsite placement location. The USACE proposes to conduct dredging activities within the environmental work windows to the maximum extent practicable and in coordination with regulatory agencies.

The USACE proposes to continue to place dredged material at established placement sites. As proposed, placement would be dependent on sediment characteristics. Current dredged material placement sites in the San Francisco Bay Area include the existing federally-designated aquatic in-Bay placement sites SF-9, SF-10, SF-11, and SF-16; the existing federally-designated ocean placement sites SF-8, San Francisco Deep Ocean Disposal Site (SFDODS), and SF-17; and several permitted and operational beneficial reuse sites, including, but not limited to, SF-17 Ocean Beach, Montezuma Wetlands Restoration Project, and Cullinan Ranch Restoration Project (see Figure 1). Additionally, USACE places material at sponsor-provided upland sites for certain channels such as Napa River and Petaluma River. In the near future, it is expected that new beneficial reuse sites may be available, such as the Bel Marin Keys wetland restoration site, and other nearshore strategic placement sites or other Engineering with Nature beneficial reuse methods. These will undergo additional environmental impact review under CEQA and/or NEPA as appropriate and necessary permitting actions before they are used by USACE or other dredgers.

PROBABLE ENVIRONMENTAL IMPACTS

The purpose of the EA/EIR is to analyze, in a public setting, the potential impacts associated with the Proposed Project, and identify and evaluate the comparative merits of a range of reasonable alternatives to the Proposed Project that feasibly attain most of the basic project objectives, are potentially feasible and would avoid or substantially lessen any of the significant impacts.

Primary areas of analysis for this project will include, but will not be limited to, sediment quality, sedimentation, and circulation; air quality; biological resources including federally and state-listed fish species; greenhouse gases; water quality; noise; hazardous materials; marine navigation; environmental justice; and tribal cultural resources.

In addition, the EA/EIR will also evaluate cumulative impacts of the Proposed Project, including effects of other past, present, and reasonably foreseeable projects in the vicinity. Where significant impacts are identified, feasible mitigation measures to minimize or avoid those impacts will be described.

OTHER AGENCIES WHO'S APPROVAL MAY BE REQUIRED

The San Francisco Bay Conservation and Development Commission (BCDC) will consider the USACE's request for consistency certification pursuant to the Coastal Zone Management Act.

The management of dredging and dredged material placement in the San Francisco Bay Region is coordinated through the Dredged Material Management Office, consisting of the USACE, the U.S. Environmental Protection Agency, the Water Board, BCDC, and the California State Lands Commission.

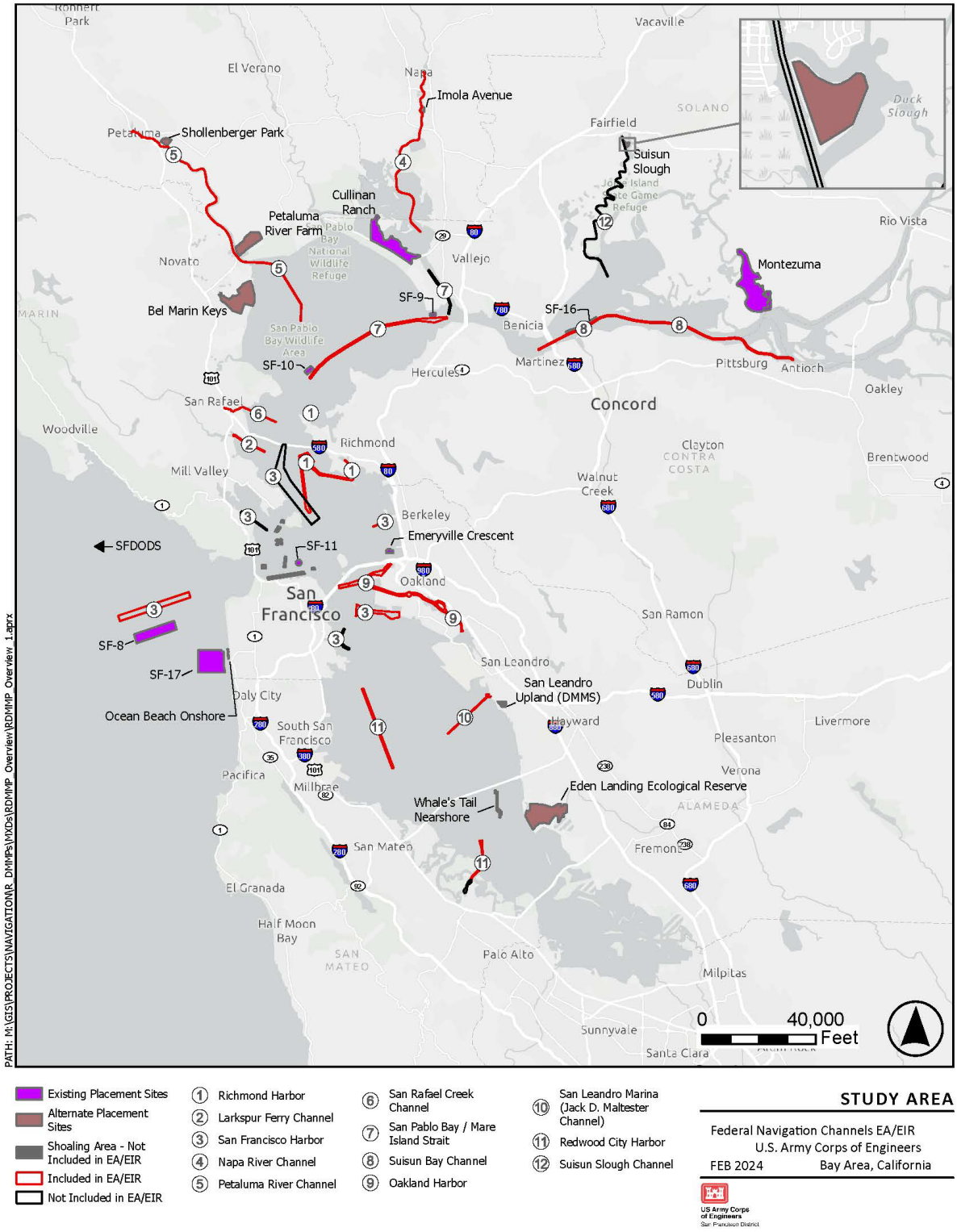


Figure 1. Study Area for the San Francisco Bay Federal Channels Operation and Maintenance Dredging and Sediment Placement Activities

ATTACHMENT B

Scoping Meeting Transcript

MEETING: SAN FRANCISCO BAY FEDERAL CHANNELS OPERATION AND MAINTENANCE DREDGING AND SEDIMENT PLACEMENT ACTIVITIES SCOPING MEETING

MEETING DATE: TUESDAY, MARCH 5, 2024

MEETING TIME: 4:00 P.M. – 6:00 P.M.

LENGTH OF RECORDING: 1 HOUR 9 MINUTES 50 SECONDS

Meeting Transcript

RECORDING TIMESTAMP: [00:00:00]

[Meeting Begins]

SPEAKER: TESSA BEACH / **RECORDING TIMESTAMP:** [00:00:00]

Thank you, very much and good evening, everyone. I'm Dr. Tessa Beach with the US Army Corps of Engineers San Francisco District and I want to welcome you to our public scoping meeting regarding the Army Corps of Engineers, San Francisco Bay, Federal Channels, Operation and Maintenance Dredging.

And Sediment Placement Activities. Next slide, please.

We truly appreciate you all taking the time to join us this evening to learn more about these proposed activities and we look forward to your comments on the scope of our environmental analysis.

This is a joint presentation by the US Army Corps of Engineers, San Francisco District and the San Francisco Bay Regional Water Quality Control Board. The US Army Corps of Engineers, San Francisco District is the lead federal agency for operations and maintenance dredging of federal navigation channels in San Francisco Bay.

And the Water Board has permitting authority over dredge and fill activities under Section 401 of the Clean Water Act.

We're conducting this meeting tonight in a hybrid fashion. We have people in the room here in the Water Board offices in Oakland and we have participants online via Zoom.

With me in person and online are our team of folks from the Army Corps of Engineers, the Water Board, and Scout-Stantec Joint Venture, our consultants.

From the Army Corps of Engineers, I'm Tessa. We have Arye, Ellie, and Jade.

From the Water Board we have Kevin, Jazzy, and Xavier, and from our consultant team, we had Ryan, Jamil, Khandriale, Cynthia, and Becky.

Next Slide Please.

As a federal action, the proposed project must comply with the National Environmental Policy Act or NEPA.

And USACE as the action agency is the lead agency for NEPA. The Water Board will be asked to consider the Corps of Engineers application for a five year water quality certification for the

maintenance dredging activities, and in doing so, must comply with CEQA or the California Environmental Quality Act. Therefore, the Water Board is the lead agency for CEQA.

Our agencies are preparing a joint NEPA/CEQA document. For NEPA, this document is expected to be an Environmental Assessment.

And for CEQA, this document will be an Environmental Impact Report. I should note that if the Corps of Engineers determines during the NEPA process that there are significant impacts after considering all avoidance, minimization, and mitigation measures, the Corps would instead release an Environmental Impact Statement in accordance with NEPA.

I also want to note that there is a prior Environmental Assessment/Environmental Impact Report for the Army Corps of Engineers maintenance dredging that was released in 2015, and the forthcoming NEPA/CEQA document will be an update to that document. The purpose of tonight's meeting is really to provide awareness and understanding of the project background, purpose, and need;

Inform you all about the proposed project; gather your input to assist in framing the analysis and focus of the NEPA/CEQA document; and to accept comments on the scope of the NEPA/CEQA document.

So in particular, I really want to highlight here that the focus of tonight’s meeting is the scope of the environmental impact assessment and the resources analyzed there.

Finally, we will advise you all on schedule and next steps and opportunities for future public engagement on this path.

Now I'll turn it over to Khandriale to walk us through some participation logistics for tonight's meeting. Thank you.

SPEAKER: KHANDRIALE CLARK / **RECORDING TIMESTAMP:** [00:04:27]

Thank you, Tessa. As Tessa mentioned, I'm Khandriale Clark.

I am a part of the Stantec team, and I'll be your facilitator for today.

Just some general housekeeping rules for anybody participating in person. Please make sure any device you're using is muted so that we can limit interruptions.

If you're participating remotely, same rules apply, please make sure your mic is muted when a presenter is speaking to minimize distractions.

And, if you're using your phone in addition to your laptop, please make sure that one or the other is muted to avoid any echoes.

Also, please be aware that today's meeting is being recorded to aid in the correct application of the transcript.

Next slide.

If you would like to provide comments today, there are a few ways that you can do so. For folks participating in person, there is a physical comment card in the room that you can use.

Both for folks in person and folks participating remotely today there is a Survey Monkey link that has been dropped into the chat where you can provide comments.

Comments will be accepted all throughout the meeting and also outside of the meeting via Water Board staff, which we'll get to at a later slide.

Ground rules for today. The Water Board will be accepting comments or clarifying questions about the meeting, but they will not be answering any questions outside of the scope of that.

All of the comments and questions received will be considered when developing the draft EA/EIR which is expected for summer 2024.

Next slide. Finally, your agenda for today. You will hear from both USACE and Water Board staff to learn more about the project overview, background purpose and need.

You'll learn about what activities are anticipated for the project, what the Water Board's role is,

the environmental analysis involved, how all the agencies will coordinate with one another, the anticipated schedule for NEPA and CEQA actions, how you can provide scoping comments today and throughout the rest of March,

and more information about certain points of contact should you have any additional clarifying questions past today's meeting.

And with that, I will pass it over to Arye.

SPEAKER: ARYE JANOFF / **RECORDING TIMESTAMP:** [00:06:53]

Thanks so much. So good afternoon slash evening everyone. As Tessa mentioned, my name is Dr. Arye Janoff.

I am a senior project planner with the Corps, and I am working on this project.

So, some projects background, the Corps in coordination with the Water Board and numerous stakeholders we've been dredging and placing sediment, from navigation channels in San Francisco Bay for several decades now.

Dredging process simply involves the excavation of accumulated sediment, at the bed of a navigation channel and then subsequently the transportation and placement of that sediment at a permitted placement location.

The reason why we do this is because sediment can impede navigability, and maintenance dredging removes that sediment in order to return the channels to their authorized depths.

And that provides for safe, reliable and efficient waterborne transportation. As well as the movement of commerce, for national security needs and as well as recreation.

This project is, is considering and working, to build off of the 2015 EA/EIR for maintenance dredging that covered fiscal years 2015 to 2024.

With some potential changes, and we'll get into that a little bit later. Next slide please.

So the project overview, the regional scope of the project is across 11 counties that span the San Francisco Bay area.

That includes the Alameda, Contra Costa, Marin, Napa, Sacramento, San Joaquin, Santa Clara, San Francisco, San Mateo, I've already started this list, Solano and Sonoma Counties.

But it's important to know that the geographic scope of this project is limited to the area of the navigation channels and the placement site locations.

So, the EA/EIR, that is, you know, addressing the NEPA/CEQA document.

It'll be similar to the 2015 effort and the minor changes would include any differences in beneficial use sites in particular, as I will mention later, we're hoping to do more beneficial use, so that will include a broader array of beneficial use sites that are available.

And on this map you can see a number of federal navigation channels in red, and some channels that are in our navigation portfolio but are not necessarily going to be, we don't anticipate dredging, for instance Suisun Slough. And that's common practice, based on the last 10 years execution of our navigation program.

Next slide, please.

So, where appropriate our proposed project would incorporate any new information on dredging impacts.

This includes if there are any newly listed species. In addition, as we are analyzing the effects of doing more beneficial use, we also want to capture the environmental benefits of doing more beneficial use, because it's it has a benefit, broad benefit to the region.

Maintenance dredging typically, follows four different steps, or four sequential steps.

First, we have to test sediment and, there are three tiers to this testing.

And we test for quality and then, determine the suitability of the material to go to certain placement sites.

Then we actually remove the sediment that's shoaled in the federal navigation channels, and we restore the channels,

potentially restore them to their authorized navigation dimensions and channel depths. Then once that material is excavated from the channel bottom, we have to transport it either by barges, hopper dredges or by pipeline, depending on what dredge is used.

And then that material, eventually is placed at its designated placement site. Next slide, please.

So our purpose and need for the project. Congress, we, have these federal navigation channels, are authorized at the Congressional level, project specific authorizations, to specific channel depths, and

We are able to maintain those Federal navigation channels to those authorized depths. As I had mentioned, yeah, you know, maintenance dredging includes removing that sediment in order to ensure that we have safe, reliable, and efficient maritime transportation system and to ensure commercial throughput for national security needs and for recreational users.

Our purpose is to provide safe navigation. Primary method is by, by maintenance, dredging of those navigation channels.

And again, this would be consistent with our project authorizations. As authorized by Congress and also as laid out in our upcoming 20-year regional dredge material management plan.

We would consider, where practical, the goals of the long-term management strategy for the placement of dredge material.

And also ensure that we're adequately protecting the environment, including listed species. Next slide, please.

So, some project goals. In addition to providing safe navigation, we also need to identify what's called the Federal Standard Based Plan.

And that is an Army Corps policy that translates to the least cost, environmentally acceptable and technically feasible, dredging and placement activities.

As, part of this, we would like to increase beneficial use as well. And that is in consideration of the Army Corps recent command philosophy that outlines, we would like to reach 70% beneficial use of dredge material by volume by 2030 as well as in line with you know considering the LTMS beneficial use goals to the maximum extent practicable.

And then lastly, we would like to, our goal is to conduct dredging in a manner that minimizes impacts to resources, including to listed species.

Next slide, please.

So the project activities would include, maintenance dredging by the following methods, hydraulic, dredging, mechanical dredging, and knock downs.

And the next slide outlines what hydraulic dredging is. You could go to the next slide please.

The hydraulic dredging is, utilizing pressure differentials in order to essentially suck sediment off of the bed of the channel.

This can be done by a hopper dredge, trailing arms suction hopper dredge.

It can also be done by a cutter head suction dredge, and then that material can be transported either by, by hopper or barge or by pipeline.

Next slide, please.

For mechanical dredging, that is the, that is physically removing sediment. Rather than by hydraulic means, it would be using a clam shell or bucket to reach down to the bottom of a navigation channel and physically dig that sediment from the channel bottom and then place it into a barge or scow, transport it to a placement site.

Similarly, we can use mechanical means to smooth the surface or the depth.

Across the channel that's referred to as knock downs. Where we essentially remove high spots and maintain a consistent channel depth.

Next slide please.

So, we proposed to conduct these dredging activities within the environmental work windows, to the maximum extent practicable and in coordination with regulatory agencies.

As I had mentioned, both dredging and placement activities depend on economics. So that's the identification of the least cost, dredging method and placement site, as well as the sediment quality and characteristic.

So, you know, going back to the sediment testing step in the dredging process.

And that hits on the environmental acceptability piece of the federal standard as well as technical feasibility. So that would be built on sound engineering.

And the placement of the sediment would be a federally designated aquatic in-Bay placement site, permitted and operational beneficial use sites, or the deep ocean disposal site SF-DODS, if necessary

And, and that's, for shallow draft and deep draft channels; there's some shallow draft channels that there are sponsor- provided, upland sites that we would be placing material at from our navigation channels.

This, EA/EIR, will evaluate an array of alternatives, and its focus, as I mentioned with the goals, is on beneficial use.

And in order to do that, that would include a variety of different dredging methods.

So that's a mix of both hydraulic and mechanical dredging. Also reducing ocean disposal and trying to retain sediment within the Bay system.

Next slide, please.

And in the future, because there will be, this is, you know, this document covers 10 years.

So we know that there would be new beneficial use sites that become available for placement of dredge material such as Bel Marin Keys and other wetland restoration sites.

Or other near-source strategic placement sites or Engineering with Nature methods. Similar to what was done in 20- at the end of 2023 the placement in the near shore shallow subtidal environment.

Any of those future sites will undergo additional environmental impact review under CEQA and NEPA, and obtain permitting approvals before we were able to place at those sites.

And some other innovative approaches I would also note are some cost sharing opportunities for beneficial use, but that's more on the policy side of things; that's based on recent legislation that governs how we, the Corps, are able to cost share the incremental cost of beneficial use.

But with that I will hand it off to Jazzy to discuss the Water Board’s role.

Thank you.

SPEAKER: JAZZY GRAHAM-DAVIS / **RECORDING TIMESTAMP:** [00:##:##]

Thanks, Arye. My name is Jazzy Graham-Davis. I use They/Them pronouns. I'm a staff geologist with the Water Board, and I'm the lead staff for all things dredging and beneficial reuse at the Water Board.

So the Water Board regulates the US Army Corps of Engineers maintenance navigational dredging program through Section 401 of the Clean Water Act and also the Porter-Cologne Water Quality Control Act.

Since 2015, we've accomplished this by issuing five-year combined water quality certifications under Section 401 and waste discharge requirements under the Porter-Cologne Act to the Corps.

We will be considering their application for a new five-year permit starting in 2025. The Water Board is required to analyze the impacts for this project

Through the California Environmental Quality Act or CEQA. We will, we are analyzing the impacts of dredging activities planned for 2025 to 2034 with an Environmental Impact Report or EIR to cover the next two five-year permit cycles for the Corps.

Next slide.

We have identified potential impacts to these listed resource areas. Some of the types of impacts include geology and soils.

Dredging may cause erosion at channel edges, and sampling and testing data is reviewed by the interagency dredged materials management office to ensure sediment and soils are not significantly or permanently degraded.

Hydrology and water quality. Dredging and sediment disposal causes temporary and localized impacts to temperature, salinity, pH, and dissolved oxygen.

Air quality and greenhouse gas emissions. We will analyze emissions to compare to Bay Area Air Quality Management District thresholds and air quality plan objectives.

Biological resources. We will analyze the effects on special status species and other biological resources associated with temporary and increased turbidity,

localized temporary physical impacts, including entrainment, underwater noise, and contaminants and sediment that enter the food web.

Cultural and paleontological resources. There's potential to find cultural resources during dredging. Hazards and hazardous materials.

There's potential for oil and gasoline spills from mechanical equipment for dredging and also spills of dredged sediment during transport.

Tribal Cultural Resources. We are in consultation with tribes to identify potential impacts to this area and are open to receiving comments from tribes at any time during the CEQA process.

And other resources, resource areas that we will consider, but do not anticipate adverse effects, include forestry, agriculture, public services, minerals, noise, utilities, energy, recreational resources,

aesthetics and visual resources. Population and housing, regional growth, land use and transportation.

We'll also be covering environmental justice. Under AB 2108 the Water Board is required to engage in equitable, culturally relevant community outreach to promote meaningful civil engagement.

Next slide.

We are in coordination with other agencies to identify means to reduce or avoid impacts. For example, under biological resources, we will be looking at environmental impacts of multiple dredging methods such as clamshell and hydraulic dredging,

as they have different abilities entrain fish and aquatic organisms. We will also be examining benefits to biological resources, including listed fish species, from increasing the amount of dredge sediment that is beneficially reused for wetland and tidal marsh restoration and enhancement, as a means to offset impacts from increased hydraulic dredging.

We will examine possible increases to the Corps' use of in-Bay placement sites, which would be balanced by the environmental benefits that come with associated increases in tidal wetland reuse.

As another example, we will examine effects of increased turbidity on essential fish habitat, and identify best practices like silt curtains to reduce impacts where appropriate.

Next slide.

We're coordinating with the listed federal agencies for impacts under their jurisdiction. The EPA plays a key role in the DMMO to coordinate management of

dredging and dredged material placement in the San Francisco Bay region, and also regulate sediment disposal in the Pacific Ocean.

The United States Fish and Wildlife Service and NOAA/National Marine Fishery Service protect federally listed species and essential fish habitat and have issued biological opinions that apply to dredging in San Francisco Bay.

This coordination is separate from ESA consultations. All 3 agencies are active in the LTMS.

Next slide.

We're also coordinating with the listed state species for impacts under their jurisdiction. BCDC, State Lands Commission, and CDFW are also agencies involved in the DMMO and LTMS.

BCDC will also issue a consistency determination to the Corps under the Coastal Zone Management Act.

And with that, I'm going to pass it back off to Khandriale.

SPEAKER: KHANDRIALE CLARK / **RECORDING TIMESTAMP:** [00:22:38]

Thank you so much, Jazzy. Before we jump into this next slide, we do have one question in the chat from Brenda Goedon.

Will this document cover any advanced maintenance dredging?

SPEAKER: JAMIL IBRAHIM / **RECORDING TIMESTAMP:** [00:22:56]

Yeah, Khandriale, why don't we wait until the end of the presentation and then we could go ahead and provide a response like clarifying question or comment from Brenda.

SPEAKER: KHANDRIALE CLARK / **RECORDING TIMESTAMP:** [00:23:05]

Okay. The slides you're looking at currently depicts the flow of project milestones and opportunities for public review and comment.

After preparation of the final EA/EIR, the Army Corps of Engineers and the Water Board will prepare a decision document.

And that document will either be a finding of no significant impacts or an environmental impact statement if significant impact is identified that is unavoidable or unmitigable.

We are currently in the first of those two engagement opportunities. The next and final opportunity will be the release of the public draft EA/EIR, which is again anticipated for summer 2024. Next slide.

The Notice of Preparation for the CEQA process was published on Tuesday, February 13. We will drop the link to that in the chat for you shortly, but it is also currently available on the Water Board website.

Additional notification or outreach for this effort also included postings on the USACE and Water Board websites.

Posting on the USACE's X account, which is formerly Twitter, and distributions to the long-term management strategy for the placement of dredge material in the San Francisco Bay Region and Regional Dredge Material Management Plan and CEQA actions listservs. That was a bit of a mouthful, that was three separate listservs,

My apologies. Written comments on the scope of the document can be sent to Jazzy, who you've just heard from, via email at Jazzy.Graham-Davis@Waterboards.ca.gov. During this meeting, comments and questions can be provided via the Survey Monkey link which you should see in the chat or for those in the room via a physical comment card.

Comments must be received outside of this meeting by no later than 5:00 PM on Thursday, March 14.

After that, USACE and Water Board will collate all of the questions and comments involved and consider all of them relevant to the project,

In preparation of the draft EA/EIR, and you'll also see on the screen a QR code for those who would like to have access to the comment card on your phone.

Next slide, please.

For more information on the project, the CEQA or NEPA processes, or anything else to do with the project,

You can be added to the mailing listserv by Jazzy. Their email address is on the screen.

For direct contact with someone from the Army Corps of Engineers, you can speak with Ellie Covington.

Ellie’s email is on the screen, but there's also more general information available on the USACE website.

For direct contact with Water Board staff about questions on the project. Again, you can contact Jazzy, their email address is on the screen, or review information on the Water Board website.

And with that, I will pause there, and we will begin the Q&A session. So far, we have 2 comments in the chat.

Going back to that first one from Brenda. Will this document cover any advanced maintenance dredging?

SPEAKER: ARYE JANOFF / **RECORDING TIMESTAMP:** [00:26:25]

The answer is yes.

SPEAKER: KHANDRIALE CLARK / **RECORDING TIMESTAMP:** [00:26:30]

Okay. Follow up question from Brenda. Is the Jack Maltester Channel also included in this document?

There is no marina in which to dredge to currently.

SPEAKER: ARYE JANOFF / **RECORDING TIMESTAMP:** [00:26:44]

It is included. For potential impacts.

In the event that it is dredged.

SPEAKER: KHANDRIALE CLARK / **RECORDING TIMESTAMP:** [00:26:54]

Thank you.

Is there any other questions and comments? Please feel free to unmute yourself.

Okay, hearing none, Jamil, do we have any initial comments posted to the survey monkey?

SPEAKER: JAMIL IBRAHIM / **RECORDING TIMESTAMP:** [00:27:19]

Not yet, Khandriale.

SPEAKER: KHANDRIALE CLARK / **RECORDING TIMESTAMP:** [00:27:23]

Okay. Is there any additional information or clarifications that the project team would like to share?

SPEAKER: JAMIL IBRAHIM / **RECORDING TIMESTAMP:** [00:27:35]

Khandriale, I think it would be worth mentioning if you don't mind just reiterating that the presentation is going to be repeated at 5:00 PM.

For those that might be joining us late or by—based on the time now I'd say 5 PM.

So again, just to reiterate. You know, we did schedule this meeting in order to be able to accommodate

Both agency and public participation, and with that said or anyone that might be interested in participating later,

We will repeat the presentation at 5:00 PM. And conclude the meeting at 6:00 PM.

So those that are here for this early portion of the presentation are more than welcome to stick around. In case already public or agency comments that are actually provided that you want to hear later on,

They're in the discussion, but we will be repeating the same presentation again at 5:00 PM.

SPEAKER: KHANDRIALE CLARK / **RECORDING TIMESTAMP:** [00:28:35]

We do have an additional question in the chat. What is the frequency for dredging the navigation channels?

Specifically, will the Pinole Shoals Channel in Richmond Outer Harbor be dredged annually, or every other year?

SPEAKER: ARYE JANOFF / **RECORDING TIMESTAMP:** [00:28:51]

So the frequency depends obviously on the project authorizations. There's some channels that are annual,

Some are semi annual, some are periodic, not as frequent. For Pinole, I think looking at range of frequencies,

So as frequent as every year, or potentially every other year.

But looking at trying to look at the highest impact, like what would be the maximum impact?

SPEAKER: JAMIL IBRAHIM / **RECORDING TIMESTAMP:** [00:29:30]

So no comments we're seeing so far the Survey Monkey.

SPEAKER: KHANDRIALE CLARK / **RECORDING TIMESTAMP:** [00:29:37]

And for the Richmond Outer Harbor?

SPEAKER: ARYE JANOFF / **RECORDING TIMESTAMP:** [00:29:40]

Yeah, it'd be the same as the answer for Pinole.

SPEAKER: KHANDRIALE CLARK / **RECORDING TIMESTAMP:** [00:29:50]

Thank you.

We will of course be online for the entirety of the advertised meeting, from now until 6:00 PM.

So if you would like to ask a question or raise your hand like Mr. Hausner has, please feel free to do so, Mr. Hausner?

SPEAKER: JIM HAUSNER / **RECORDING TIMESTAMP:** [00:30:20]

Great. Thank you. A clarifying question about which projects are not getting dredged. I believe, Arye, you made a comment about Suisun Slough, and it looked like there might have been some black versus red, and I was thinking about further up into Redwood Creek,

as well as Richmond Inner. So which projects currently are you not looking at dredging, and it looked like perhaps a Richardson Bay was listed as being project number 3 which is SF Harbor, which looked like it was in black, so it be nice to know which ones you, are not included in this process.

SPEAKER: ARYE JANOFF / **RECORDING TIMESTAMP:** [00:31:03]

Correct, yeah, Richardson Bay, so, SF Harbor has a number of channels as part of the project.

SF Harbor, the only channel that we would anticipate dredging, as part of that project would be the main ship channel.

That's the approach channel to the Golden Gate Bridge. Yeah, Suisun Slough is not anticipated to be dredged.

Let's see, well.

I think you're referring to Redwood City Harbor?

Speaker: JIM HAUSNER / **RECORDING TIMESTAMP:** [00:31:33]

Yeah, I couldn't tell online as to whether part of that was black or not.

SPEAKER: ARYE JANOFF / **RECORDING TIMESTAMP:** [00:31:38]

Yeah, that one I'm not, sure if that was just a, I'm not sure. Ellie, do you have any, do you have any answer to that about Redwood City Harbor?

I don't believe that there was a portion of Redwood City Harbor that we were proposing to not dredge, but

SPEAKER: ELLIE COVINGTON / **RECORDING TIMESTAMP:** [00:31:57]

Yeah, hey Arye, it’s Ellie. Redwood City is tentatively scheduled to be dredged this FY [fiscal year]. Depends on how much we get for the current dredging right now.

SPEAKER: JIM HAUSNER / **RECORDING TIMESTAMP:** [00:32:18]

Okay, so the answer is that the full project dimensions will be dredged, as you move forward in accordance with your standards.

SPEAKER: TESSA BEACH / **RECORDING TIMESTAMP:** [00:32:28]

That's correct.

SPEAKER: JIM HAUSNER / **RECORDING TIMESTAMP:** [00:32:32]

And the same for all of Richmond Inner? Including all the channel?

SPEAKER: ARYE JANOFF / **RECORDING TIMESTAMP:** [00:32:37]

Yeah, Yeah, Richmond Inner a well.

SPEAKER: JAZZY GRAHAM-DAVIS / **RECORDING TIMESTAMP:** [00:32:42]

It's dredged to a certain point within the channel where a certain channel marker is a certain point where it stops typically being dredged.

But most of the channel is dredged. It's just the inner reach as a portion that isn't regularly dredged.

SPEAKER: JIM HAUSNER / **RECORDING TIMESTAMP:** [00:33:02]

Well, it's my understanding it's not regularly dredged because of potential contaminants, not because of the, and that there is a need by some of those terminal operators to have that area dredged.

SPEAKER: TESSA BEACH / **RECORDING TIMESTAMP:** [00:33:17]

I think that we will be analyzing the potential to dredge that area, and if—

SPEAKER: ARYE JANOFF / **RECORDING TIMESTAMP:** [00:32:22]

Yeah.

SPEAKER: TESSA BEACH / **RECORDING TIMESTAMP:** [00:33:17]

— necessary based on contaminants we may amend the document further should that need arise. But we will be considering that within the NEPA document-

SPEAKER: JIM HAUSNER / **RECORDING TIMESTAMP:** [00:33:38]

And is.

SPEAKER: XAVIER FERNANDEZ / **RECORDING TIMESTAMP:** [00:33:38]

Jim, Jim, if I could direct you to figure, this is Xavier with the Regional Board. If I could direct you to figure one in the Notice of Preparation.

That's where the map is that Arye presented.

SPEAKER: JIM HAUSNER / **RECORDING TIMESTAMP:** [00:33:51]

Okay

SPEAKER: XAVIER FERNANDEZ / **RECORDING TIMESTAMP:** [00:33:52]

And so you can see what's in and what's out right there.

SPEAKER: JIM HAUSNER / **RECORDING TIMESTAMP:** [00:33:56]

All right, and I'm just trying to get some clarification on some of these as to why. In Richardson Bay. there's complaints that boats are running aground.

Islas Creek I've heard from the port of San Francisco there's complaints about, the need some dredging.

Obviously, Suisun Slough, now that the disposition is over. I met with Congressman Garamendi two weeks ago, and he is still pushing the Mare Island Strait project.

So, I'm just wondering as to what process the Corps went through. When they submitted the application to the Water Board for these projects that are authorized and may not have been dredged in quite some time. But still are authorized projects and why they got dropped out.

How do we get them back in?

SPEAKER: XAVIER FERNANDEZ / **RECORDING TIMESTAMP:** [00:34:42]

So Jim, they haven't submitted. Jim, this is Xavier again. They have not submitted an application yet.

SPEAKER: JIM HAUSNER / **RECORDING TIMESTAMP:** [00:34:48]

Got it.

SPEAKER: XAVIER FERNANDEZ / **RECORDING TIMESTAMP:** [00:34:48]

This is what's being proposed to be analyzed in the CEQA document. If you would like us to analyze additional, then that's where you submit a comment and ask and request that we, and the Army Corps, analyze either additional sort of impacts, or you could ask us to analyze additional channels.

SPEAKER: JIM HAUSNER / **RECORDING TIMESTAMP:** [00:35:09]

Great, and I appreciate that. Now if I could switch, and I am the chair of the dredging work group for the San Francisco Harbor Safety Committee,

And there's a consensus by the membership of the work group that hydraulic dredging is faster, more thorough, provides a more uniform grade,

Less anchors, less coordination and safer. I didn't necessarily see, and so we would like to make sure that the safety aspect of that

Is recognized. One of the problems with the Oakland Inner in particular is that there's a lot of coordination to get the dredge and the anchors, primarily the anchors, out of the way.

And there have been delays and vessels have not been able to leave because couldn't get that dredge out of the way.

And so the consensus is from a safety point of view. That we may want to take a look at more hydraulic dredging, not hopper dredging, but hydraulic cutter head dredges.

Thank you.

SPEAKER: ARYE JANOFF / **RECORDING TIMESTAMP:** [00:36:10]

Thank you for the comment, Jim. I think that's one of the things that we're trying to look at is looking at various methods of dredging in different channels.

SPEAKER: KHANDRIALE CLARK / **RECORDING TIMESTAMP:** [00:36:22]

Ellie, we have one response question to the comments you've put in the chat. Is this document covering the outer coast of the Sacramento District's channels?

SPEAKER: ELLIE COVINGTON / **RECORDING TIMESTAMP:** [00:36:37]

This document will cover all authorized Federal channels.

SPEAKER: UNKNOWN / **RECORDING TIMESTAMP:** [00:36:50]

Sorry, yeah, could you please clarify that further?

SPEAKER: XAVIER FERNANDEZ / **RECORDING TIMESTAMP:** [00:36:50]

I'm gonna clarify further. Yes, I am gonna clarify further because the San Francisco region.

SPEAKER: UNKNOWN / **RECORDING TIMESTAMP:** [00:36:56]

Thanks.

SPEAKER: XAVIER FERNANDEZ / **RECORDING TIMESTAMP:** [00:36:56]

This document will only cover dredging within the San Francisco region because the San Francisco Bay Regional Water Quality Board is the lead agency.

It will not cover dredging projects outside of the San Francisco Bay region.

SPEAKER: TESSA BEACH / **RECORDING TIMESTAMP:** [00:37:14]

That's correct.

SPEAKER: JAMIL IBRAHIM / **RECORDING TIMESTAMP:** [00:37:25]

Again, Khandriale, no comments submitted via the Survey Monkey.

SPEAKER: KHANDRIALE CLARK / **RECORDING TIMESTAMP:** [00:37:32]

We have an additional question in the chat. Will the Corps continue entrainment monitoring? I know it is paused due to COVID, but I'm unsure whether or not the pause is indefinite.

SPEAKER: TESSA BEACH / **RECORDING TIMESTAMP:** [00:37:45]

The Corps is going to consider all avoidance and minimization measures and we'll propose appropriate measures in our proposed actions.

SPEAKER: KHANDRIALE CLARK / **RECORDING TIMESTAMP:** [00:38:15]

Are there any other comments or questions?

SPEAKER: JAMIL IBRAHIM / **RECORDING TIMESTAMP:** [00:38:22]

Nothing via the Survey Monkey.

SPEAKER: XAVIER FERNANDEZ / **RECORDING TIMESTAMP:** [00:38:25]

I'll just encourage Nicole if she would like to make a comment regarding entrainment, monitoring that she do so as on the NOP.

SPEAKER: KHANDRIALE CLARK / **RECORDING TIMESTAMP:** [00:38:36]

Agreed. All of the comments submitted via the Survey Monkey link or emailed to Jazzy will be collated together and all applicable will be considered in preparation of the draft document.

If they aren't any other questions or comments from folks online currently, I know there are a few people who joined late.

We will be doing a repeat of the presentation in about 10 to 15 min. Would the project team like a take a break while we get ready to reset and then re-present to those who've joined us later in the evening.

SPEAKER: JAMIL IBRAHIM / **RECORDING TIMESTAMP:** [00:39:16]

16:42:41 Yeah, Khandriale I recommend that we mute and then just keep the meeting open.

SPEAKER: KHANDRIALE CLARK / **RECORDING TIMESTAMP:** [00:39:20]

Of course.

SPEAKER: JAMIL IBRAHIM / **RECORDING TIMESTAMP:** [00:39:20]

If folks that you have any questions or, or comments to submit, go ahead and submit those via the Survey Monthly link,

And we'll monitor that and hop back on and address whatever we can, or during this meeting, but again, just the encourage folks to provide comments via the link provided for the meeting.

SPEAKER: KHANDRIALE CLARK / **RECORDING TIMESTAMP:** [00:39:39]

Thank you very much. All right, we'll go ahead and mute and reset and we will jump back in about 15 min to restart the presentation for those who were not able to view it previously.

SPEAKER: UNKNOWN / **RECORDING TIMESTAMP:** [00:39:52]

Thanks, Tessa. Thanks, Arye. Thanks, Jazzy.

SPEAKER: UNKNOWN MULTIPLE SPEAKERS / **RECORDING TIMESTAMP:** [00:39:56]

Thanks, everyone. Thank you.

SPEAKER: TESS BEACH / **RECORDING TIMESTAMP:** [00:39:56]

Thanks, take care.

SPEAKER: KHANDRIALE CLARK / **RECORDING TIMESTAMP:** [00:40:00]

Okay, we have a few members of the public still with us and a couple of new additions.

Jamil, before we get started with the presentation again, have we had any comments entered into the Survey Monkey?

SPEAKER: JAMIL IBRAHIM / **RECORDING TIMESTAMP:** [00:40:18]

We have, Khandriale, I'll go ahead and state the comment here just for the record. Just so that everyone hears the comment.

This comment is from Jim McNally, Manson Construction Company, and the question topic is related to specifying the use of turbidity currents to protect eel grass beds adjacent to dredge areas.

And the comment is, “Turbidity curtains are impractical for use in deep water, or water of any significant current.

See ERDC Technical note ERDC TN-DOER-E21. Lengthy, anchored turbidity curtains in or near deep draft navigation channels are not effective and not practical due to the risk presented to safe navigation of vessels by the potential for fouling of ship propellers with curtain.

Our suggestion is to continue to use light transmittance readings in the eel grass survey monitoring to demonstrate protection of eel grass beds

and not specify the installation turbidity curtains as was attempted in the 23’ O&M dredging at Oakland and Richmond.”

SPEAKER: TESS BEACH / **RECORDING TIMESTAMP:** [00:41:24]

That's [unclear].

SPEAKER: JAMIL IBRAHIM / **RECORDING TIMESTAMP:** [00:41:26]

Thank you, Jim.

Speaker: KHANDRIALE CLARK / **RECORDING TIMESTAMP:** [00:41:30]

Thank you so much. Well, with that, thank you all for joining us. As a reminder, this is the second presentation.

It's the same presentation over again for those who are not able to join us at 4:00. We will begin with Tessa Beach.

It’s all yours.

SPEAKER: TESSA BEACH / **RECORDING TIMESTAMP:** [00:41:45]

Thank you, very much and good evening, everyone. I'm Dr. Tessa Beach with the US Army Corps of Engineers San Francisco District and I want to welcome you to our public scoping meeting regarding the Army Corps of Engineers, San Francisco Bay, Federal Channels, Operation and Maintenance Dredging.

And Sediment Placement Activities. Next slide, please.

We truly appreciate you all taking the time to join us this evening to learn more about these proposed activities and we look forward to your comments on the scope of our environmental analysis.

This is a joint presentation by the US Army Corps of Engineers, San Francisco District and the San Francisco Bay Regional Water Quality Control Board. The US Army Corps of Engineers, San Francisco District is the lead federal agency for operations and maintenance dredging of federal navigation channels in San Francisco Bay.

And the Water Board has permitting authority over dredge and fill activities under Section 401 of the Clean Water Act.

We're conducting this meeting tonight in a hybrid fashion. We have people in the room here in the Water Board offices in Oakland and we have participants online via Zoom.

With me in person and online are our team of folks from the Army Corps of Engineers, the Water Board, and Scout-Stantec Joint Venture, our consultants.

From the Army Corps of Engineers, I'm Tessa. We have Arye, Ellie, and Jade.

From the Water Board we have Kevin, Jazzy, and Xavier, and from our consultant team, we had Ryan, Jamil, Khandriale, Cynthia, and Becky.

Next Slide Please.

As a federal action, the proposed project must comply with the National Environmental Policy Act or NEPA.

And USACE as the action agency is the lead agency for NEPA. The Water Board will be asked to consider the Corps of Engineers application for a five year water quality certification for the maintenance dredging activities, and in doing so, must comply with CEQA or the California Environmental Quality Act. Therefore, the Water Board is the lead agency for CEQA.

Our agencies are preparing a joint NEPA/CEQA document. For NEPA, this document is expected to be an Environmental Assessment.

And for CEQA, this document will be an Environmental Impact Report. I should note that if the Corps of Engineers determines during the NEPA process that there are significant impacts after considering all avoidance, minimization, and mitigation measures, the Corps would instead release an Environmental Impact Statement in accordance with NEPA.

I also want to note that there is a prior Environmental Assessment/Environmental Impact Report for the Army Corps of Engineers maintenance dredging that was released in 2015, and the forthcoming NEPA/CEQA document will be an update to that document. The purpose of tonight's meeting is really to provide awareness and understanding of the project background, purpose, and need;

Inform you all about the proposed project; gather your input to assist in framing the analysis and focus of the NEPA/CEQA document; and to accept comments on the scope of the NEPA/CEQA document.

So in particular, I really want to highlight here that the focus of tonight’s meeting is the scope of the environmental impact assessment and the resources analyzed there.

Finally, we will advise you all on schedule and next steps and opportunities for future public engagement throughout this process.

Now I'll turn it over to Khandriale to walk us through some participation logistics for tonight's meeting. Thank you.

Speaker: KHANDRIALE CLARK / **RECORDING TIMESTAMP:** [00:46:16]

Thank you, Tessa. As mentioned, my name is Khandriale. I am a Public Affairs Specialist with Stantec, and I'll be your facilitator for this evening.

A few housekeeping rules. For those participating in person if you are also connected to a laptop please make sure that your device is muted to avoid any interruptions.

For those participating remotely, also the same rules apply. Please make sure that your microphone is muted to avoid any interruptions.

If you happen to be using your cell phone, either by itself or in conjunction with a laptop, please make sure that both are muted so that there is not only no interruptions but also no echo, there will be opportunities for folks to unmute themselves and provide additional comments or questions,

And engage in dialogue with the project team towards the end of the presentation. And as a note for folks, today's meeting is being recorded to aid in the accuracy of the transcript for the meeting.

Next slide.

There are a few different ways that you can provide a comment. Or the official scoping record. The first is digitally.

There as you see on the screen and also in the links provided in the chat is a Survey Monkey that will allow you to provide an official comment for the scoping record.

If you're attending in person, there are physical comment cards in the room for you to fill out, but you're also welcome to use the Survey Monkey link.

And, you are able to provide a verbal comment during the meeting towards the Q&A portion just by unmuting your mic.

As some ground rules, USACE and Water Board will not answer any questions or comments in this meeting other than clarifying questions as in,

getting bit more information on the information provided today, not outside of the scope of this meeting, but all comments and questions received

pertinent to the draft EA/EIR will be considered and expected, which is expected to be included in the document prepared and ready during summer 2024.

Next slide. Over the course of the presentation, you will get some background information, overview, and purpose in need on the project.

You're going to learn about the activities scoped for the project, how the Water Board factors into the equation,

The environmental analysis, how the agencies will coordinate with one another, the schedule involved for the NEPA/CEQA process, how you can provide scope and comments, and more information and contacts.

And with that, I'll pass it off to Arye.

SPEAKER: ARYE JANOFF / **RECORDING TIMESTAMP:** [00:48:52]

Thanks so much. So again, my name is Arye Janoff. I'm with the Corps of Engineers.

I'm a senior project planner. And I'm gonna talk about the project background here.

We the Corps, in coordination with the Water Board and various other stakeholders throughout the Bay

Have been dredging and placing dredge material in and around San Francisco Bay for several decades now.

Dredging process includes the excavation of sediment that's accumulated on a channel bed, in addition to transporting that sediment and ultimately placing it at a permitted site.

The accumulation of these sediments, they need to be removed from the channel, because they can impede navigability.

And, maintenance strategy does this. It removes the sediment, returns the channel gently to the authorized channel depths, and the purpose is to provide safe, reliable and efficient waterborne transportation in addition to commercial throughput, national security, and recreation.

This project is built off of the 2015 EA/EIR for maintenance dredging that covers the 10 year period from 2015 to 2024 and also updates it based on new information.

So, next slide please.

So, our project overview. We, the project, the regional scope of the project is looking across 11 counties in the Bay Area.

But specifically, the scope of impacts that will be analyzed will be, will be specific to the navigation channels, there are 11 federal navigation channels that we're looking at across the Bay and the approach to San Francisco Bay as well as the federally designated or alternate placement sites in and around San Francisco Bay.

It will cover the next 10 years beginning in 2025, and will, dredging activities will be generally consistent with what was outlined in the 2015-2024 or the last EA/EIR, but we will also consider any new beneficial use sites that become available or

any different placement sites that are available. The next slide please.

So, as I mentioned, I kinda got ahead of my slide where appropriate, the proposed project will incorporate any new information.

Also, in addition to placement sites, also on dredging impacts. So that could be, any impacts to newly listed species such as the longfin smelt, potentially, as well as we'd like to, analyze the effects of, the environmental benefits of beneficial use of dredge material, because we know that it provides a benefit to the region.

So, maintenance dredging, the cycle of maintenance dredging is comprised of these four steps that are listed here at the bottom right, first we have to test the sediment, is a 3 tier testing program.

We test the sediment for quality in order to determine if it's suitable to be placed at certain locations and then determine where it can be placed.

Then we dredge the sediment from the channel that's been shoaled in in order to, restore it to the depth, the authorized navigation channel depth.

Then we take the sediment, transport it either by, hopper, dredge, by barges or scows or by pipeline to different placement sites and then we ultimately place the sediment at that placement site.

Next slide.

So on our purpose and need, each federal navigation channel is authorized by Congress to a specific depth,

And we maintain that we have the ability to maintain those channels to the authorized navigation depth.

As I mentioned, you know, dredging is focused on, taking out sediment that's been accumulated in the channel bottom, and the purpose is to ensure safe navigation and as well as efficient waterborne transportation systems, movement of commerce, national security, and recreation needs as well.

So, the, purpose of this project, you know, as, part of maintaining safe navigation and dredging, this will be consistent with the navigation project authorizations,

the congressional authorizations as well as those that will be laid out in our upcoming 20-year Regional Dredge Material Management Plan.

In addition, we will consider, where practicable, the goals of the long-term management strategy. In SF Bay, and also adequately protects the environment and putting any listed species as I mentioned before.

Next slide, please.

So our goals of the project, in addition to, providing safe navigation, an important piece is also identifying the federal standard base plan, and that is federal policy that is the least cost, environmentally acceptable, and technically feasible dredging and placement options.

And as part of this, the goal is to also increase beneficial use in coordination with, the Army Corps' recent command philosophy that came out that outlined a goal of 70% beneficial use of dredge material by volume by the year 2030 as well as in line, you know, considering, the long-term management strategies goals for beneficial use across the region.

And another project goal is to conduct this dredging in a manner that minimizes impacts to resources including listed species.

Next slide. So, our project activities. How we dredge is an array of methods.

One is hydraulic dredging, which we'll get to on the next slide. There's also mechanical dredging, as well as knock downs.

So next slide, please. For hydraulic it is, it is done either by hopper dredge or by cutter head suction dredge and it uses differential pressures in order to essentially suck sediment off of a channel bed and move it to a placement site.

And that is moved either by, in the hopper dredge, within the compartment or by pipelines, using a cutterhead suction dredge.

Next slide, please. And mechanical dredging is just physically removing sediment, either by a bucket or a clam shell from the channel bottom, scooping it and placing it into a barge, in order to be transported to a placement site.

In addition, knock downs are a method that would be used in order to smooth out high spots and maintain a consistent depth across the channel bed.

Next slide, please.

In addition, the project activities, we propose to dredge, conduct our dredging activities within the environmental work windows to the maximum extent practicable, and in coordination with the various regulatory agencies in the area.

As I had mentioned, dredging and placement of dredge material depends on economics,

so that's the least cost component; sediment quality characteristics, that's harking back to the sediment testing and the environmental acceptability; as well as technical feasibility., So it’s built on sound engineering.

And placement of dredge material will occur at the federal federally designated aquatic in-Bay sites. In addition we have permanent and operational beneficial use sites, as well as deep ocean disposal at SF-DODs, the San Francisco Deep Ocean Disposal Site, as necessary.

In addition, there are certain shallow draft channels that have sponsor-provided upland sites as part of the project authorization.

So we would propose placing material there as well. In addition, this EA/EIR, will evaluate an array of alternatives, and the focus is on beneficial use.

As well as looking at various, dredging methods, potentially different dredging methods from the last EA/EIR.

So that means a mix of both hydraulic and mechanical dredging in certain channels and also focused on reducing ocean placement and trying to keep sediment within the base system where it is certainly needed. And next slide, please.

And finally, we acknowledge that, this, yeah, EA/EIR, covering 10 years, new information will become available and therefore can be incorporated into our dredging program in the future.

So in the future, in any new beneficial sites that do become available, such as, Bel Marin Keys or other wetland restoration sites or other nearshore strategic placement sites or other methods of conducting a beneficial use based on our engineering nature toolkit,

those will be, will undergo additional environmental impact review under NEPA and CEQA and obtain permitting approvals before we propose placing material at that site.

And there are also, other innovative approaches to, cost sharing beneficial use.

Based on recent water resources development act that's the Corps every two-year authorization, so there are also innovative approaches that will be incorporated in the future as well for funding beneficial use.

And with that, I'll pass it over to Jazzy from the Water Board.

SPEAKER: JAZZY GRAHAM-DAVIS / **RECORDING TIMESTAMP:** [00:57:53]

Thanks, Arye. My name is Jazzy Graham-Davis. My pronouns are They/Them.

I'm a staff level geologist with the Water Board, and I lead the dredging and beneficial reuse at the staff level for the Water Board.

So the Water Board regulates the US Army Corps of Engineers maintenance navigational dredging program through Section 401 of the Clean Water Act and also the Porter Cologne Water Quality Control Act.

Since 2015 we have accomplished this by issuing five-year combined water quality certifications under Section 401 and waste discharge requirements under the Porter Cologne Act to the Corps.

We will be considering their application for a new five-year permit starting in 2025. The Water Board is required to analyze the impacts of this project through the California Environmental Quality Act or CEQA.

We are analyzing the impacts of dredging activities planned for 2025 to 2034 with an environmental impact report or EIR to cover the next two five-year permit cycles for the Corps.

Next slide.

We have identified potential impacts to these listed resource areas. Some of the types of impacts include geology and soils.

Dredging may cause erosion at channel edges, and sampling and testing data is reviewed by the interagency Dredged Materials Management Office to ensure sediment and soils are not significantly or permanently degraded.

Hydrology and water quality. Dredging and sediment disposal causes temporary and localized impacts to temperature, salinity, pH, and dissolved oxygen.

Air quality and greenhouse gas emissions. We will analyze emissions to compare to Bay Area Air Quality Management District thresholds and air quality plan objectives.

Biological resources. We will analyze the effects on special status species and other biological resources associated with temporary and increased turbidity;

localized temporary physical impacts, including entrainment underwater noise; and contaminants and sediment that enter the food web.

Cultural and paleontological resources. There's potential to find cultural resources during dredging. Hazards and hazardous materials.

There's potential for oil and gasoline spills from mechanical equipment for dredging and also spills in transport.

Tribal and Cultural Resources. We’re in consultation with tribes to identify potential impacts to this area and are open to receiving comments from tribes at any time during the CEQA process.

And other resource areas that we will consider, but do not anticipate adverse effects include forestry, agriculture, public services, minerals,

noise, utilities, energy, recreational resources, aesthetics, and visual resources, population and housing, regional growth, land use, and transportation.

And under environmental justice under AB 2108, the Water Board is required to engage in equitable, culturally relevant community outreach to promote meaningful civil engagement.

Next slide, please.

We're in coordination with other agencies to identify means to reduce or avoid impacts. For example, under biological resources, we'll be looking at environmental impacts of multiple dredging methods such as clamshell and hydraulic dredging, as they have different abilities to entrain fish and aquatic organisms.

We'll also be examining benefits to biological resources, including listed fish species from increasing the amount of the dredge sediment that is beneficially reused for wetland and tidal marsh restoration and enhancement as a means to offset impacts from increased hydraulic dredging.

We will examine possible increases to the Corps use of in-Bay placement sites, which would be balanced by the environmental benefits that come with associated increases in tidal wetland reuse.

As another example, we will examine effects of increased turbidity on essential fish habitat and identify best practices like silt curtains to reduce impacts where appropriate.

Next slide, please.

We're coordinating with the listed federal agencies for impacts under their jurisdiction. The EPA plays a key role in the DMMO to coordinate management of dredging and dredged material placement in the San Francisco Bay region and also regulate sediment disposal in the Pacific Ocean site.

US Fish and Wildlife Service and NOAA/National Marine Fisheries Service protect federally listed species and essential fish habitat and have issued biological opinions that apply to dredging in San Francisco Bay.

This coordination is separate from ESA consultations. All three agencies are active with the LTMS.

Next slide, please.

We're also coordinating with listed state agencies for impacts under their jurisdiction. BCDC State Lands Commission and CDFW are also agencies involved in the DMMO and LTMS.

BCDC will also issue a consistency determination to the Corps under the Coastal Zone Management Act.

And with that, I'll pass it back to Khandriale.

SPEAKER: KHANDRIALE CLARK / **RECORDING TIMESTAMP:** [01:03:37]

Thank you. Jazzy. The graphic you currently see on your screen is a flow of the project milestones and opportunities for public review and comment.

After preparation with the final EA/EIR the Corps and the Water Board will prepare a decision document,

which will either be a finding of no significant impact, or an Environmental Impact Statement if a significant impact is identified that is unavoidable or unmitigable.

We are currently in the first of those two opportunities for public input. The next and final opportunity will be the release of the public draft EA/EIR, which is anticipated for summer 2024.

Next slide, please.

The NOP or Notice of Preparation for the CEQA process was first published on Tuesday, February 13.

The link to the NOP is shown on your screen and it is also available in the chat. As far as outreach goes, for the NOP and for the scoping process, additional outreach included postings on the USACE's and Water Board websites.

Postings on the USACE X account which was formally Twitter, and distributions through the Long-term Management Strategy for the Placement of Dredge Material in the San Francisco Bay Region listserv, the Regional Dredge Material Management plan listserv, and the CEQA Actions listserv.

Written comments on the scope of the EA/EIR can be sent via email to Jazzy Davis as you've just heard from.

Their email address is shown on the screen and also included in the chat. They are also able to be submitted through the Survey Monkey link, which is available on the chat.

You can submit comments here today during the meeting, or you can submit comments by 5:00 PM on Thursday, March 14. USACE and Water Board will consider all relevant comments in preparation of the draft document.

If you would like to submit comments now you are free to use the comment in the chat, excuse me the link in the chat or use the QR code shown to the right of your screen.

Next slide, please.

As far as contact information goes for the project team, you can be added to the official mailing list by emailing Jazzy,

You can contact Ellie Covington with the Army Corps of Engineers. Her email address is shown on the screen as well as a link to the Army Corps' website where you can find written materials.

For the Water Board project team, you can contact Jazzy or view the materials present on the Water Board website.

And with that, we will end the presentation and jump into Q&A mode. We have five or six interested parties still on the line with us.

Is there anybody who would like to provide a comment or ask a clarifying question?

SPEAKER: JAMIL IBRAHIM / **RECORDING TIMESTAMP:** [01:06:33]

And, Khandriale, just to note, we did not receive any additional comments using the Survey, Monkey link, provided in the chat.

SPEAKER: KHANDRIALE CLARK / **RECORDING TIMESTAMP:** [01:06:44]

I'll ask for folks joining us for the presentation, is there any content that you were hoping to be covered in this presentation that has not yet been covered?

Well, there are no questions currently in the chat, and Jamil stated, no additional comments in the Survey Monkey.

Project team, how would you like to proceed?

SPEAKER: JAMIL IBRAHIM / **RECORDING TIMESTAMP:** [01:07:22]

Suggest that we stick around and just keep the comments opportunities open until at least 5:45.

And then plan to close the meeting there, we'll continue monitoring. There's Survey Monkey and chat for the Zoom Meeting to determine whether not any scoping comments that have been submitted.

But just recommend that we, just go on mute, continue to monitor and if folks would like to chime in and provide verbal comments, we could accommodate that, but we also have the opportunity to provide your written comments via the Survey Monkey link.

And we could repeat those comments to the audience here in case that there's any clarifying questions that are raised are in those comments.

So with that said, Khandriale, just suggest that we in the room here go on mute, and just continue to monitor the chat and the Survey Monkey comment responses to determine whether any additional comments are provided by our participants.

SPEAKER: KHANDRIALE CLARK / **RECORDING TIMESTAMP:** [01:08:22]

Agreed. I think we're because we advertise the meeting to go from 4:00 PM to 6:00 PM.

Have to keep going until 6:00 but I think that plan of attack will suffice. We'll close out officially right on the dot at 6:00.

SPEAKER: JAMIL IBRAHIM / **RECORDING TIMESTAMP:** [01:08:36]

Great.

SPEAKER: KHANDRIALE CLARK / **RECORDING TIMESTAMP:** [01:08:36]

If you have any questions or comments during this period of, please feel free to drop them in the chat, drop them in the Survey Monkey link, or even just unmute yourself.

Okay, we are coming right up on time. Thank you all for joining us this evening. To USACE and the Water Board and the rest of the consultant team,

And I believe we have just one more interested party on the line, appreciate your time this evening.

Again, if there are any questions or comments, please submit those via the Survey Monkey link in the chat or send them to Jazzy Graham-Davis over at the Water Board.

And we hope to see you for the second opportunity as part of the CEQA/NEPA process.

Any last words from the meeting room?

SPEAKER: TESSA BEACH / **RECORDING TIMESTAMP:** [01:09:31]

Yeah, thanks everybody for your time. And, you know, what we receive today, we really appreciate it.

And we look forward to continuing this process.

SPEAKER: CYNTHIA JONES / **RECORDING TIMESTAMP:** [01:09:41]

Alright, thanks everybody. Thanks, Khandriale.

SPEAKER: UNKNOWN MULTIPLE SPEAKERS / **RECORDING TIMESTAMP:** [01:09:44]

Okay. Have a good night. Good night. Take care.

RECORDING TIMESTAMP: [01:09:50]

[Meeting Ends]

ATTACHMENT C

Comment Matrix

Commenter Name	Scoping Comment	Response
Laura J. Hidas Director of Water Resources **Alameda County Water District** 43885 South Grimmer Boulevard Fremont, CA 94538 (510) 668-4200	The Alameda County Water District (ACWD) wishes to thank you for the opportunity to comment on the U.S. Army Corps of Engineers (USACE) and San Francisco Bay Regional Water Quality Control Board (Regional Water Board) Notice of Preparation (NOP) of a Draft Environmental Assessment (EA)/Environmental Impact Report (EIR) for San Francisco Bay Federal Channels Operation and maintenance Dredging and Sediment Placement Activities (Project). The Eden Landing Ecological Reserve (Eden Landing) is characterized in the NOP as an "Alternate Placement Site" for the placement of material dredged during operation and maintenance (O&M) activities as part of the Project. Eden Landing is located within the ACWD-managed Niles Cone Groundwater Basin (Niles Cone Subbasin 2-09.001 or Niles Cone). The Niles Cone is located within the cities of Fremont, Newark, Union City, and the southern portion of the City of Hayward. ACWD is identified within the Sustainable Groundwater Management Act (SGMA) as an agency created by statute to manage groundwater and deemed to be the exclusive local agency within its statutory boundaries to comply with SGMA. In addition, ACWD is the Groundwater Sustainability Agency for the Niles Cone and has an approved Alternative to a Groundwater Sustainability Plan. ACWD has reviewed the NOP and offers the following comments for your consideration: 1. Groundwater Protection: The Niles Cone represents a major source of ACWD's water supply; therefore, it is imperative that ACWD protects the water quality and ensures the continued use of the Niles Cone for water supply for ACWD's customers: a. Hazards and hazardous Materials: Page 3 of NOP states, "Before conducting dredging activities under the Proposed Project, the USACE would continue to sample and analyze sediment to determine its suitability for various placement and beneficial reuse alternative based on its physical, chemical, and biological characteristics." The forthcoming EA/EIR should specify the screening levels that will be used to evaluate concentrations of potential contaminants in sediment, as well as a justification for the suitability of those screening criteria. b. Groundwater Well Protection/Destruction: Since 2002 ACWD has worked with the South Bay Salt Pond Restoration Project proponents in identification and the proper destruction of abandoned wells to protect the Niles Cone. A number of identified wells have not been located and records indicate they are within Eden Landing, which is characterized in the NOP as an Alternate Placement Site (hereafter referred to as the "Eden Landing Alternate Placement Site"):	Thank you for your comment. The EA/EIR (Section 1.3.7) will identify the testing requirements for the placement of beneficial use of dredged material. The guidelines are also found in the Regional Water Board's Beneficial Reuse of Dredged Material: Sediment Screening and Testing Guidelines, which is incorporated by reference into this document (Regional Water Board 2019). It should also be noted that this and all potential future placement sites would undergo separate environmental analysis and permitting to allow placement of dredged material.
Alameda County Water District (continued)	ACWD has identified at least ten (10) remaining water wells and one (1) monitoring well located within or near the Eden Landing Alternate Placement Site. i. The monitoring well within the Project limits is owned and monitored by ACWD. Groundwater sampling and monitoring of the monitoring well is imperative to ACWD's management of the Niles Cone. Therefore, ACWD has identified at least ten (10) remaining water wells and one (1) monitoring well located within or near the Eden Landing Alternate Placement Site. ii. Historical records indicate the presence of ten (10) abandoned water wells within the Project area. Although excavation activities are not expected in the area of the well locations, should the wells be discovered during the improvements, ACWD requests to be notified as soon as possible following such a discovery. Any abandoned wells must be properly destroyed in accordance with ACWD requirements. 2. ACWD Contacts: The following ACWD contacts are provided so that USACE and the Regional Water Quality Board can coordinate with ACWD as needed during the permitting process: Michelle Walden, Groundwater Resources manager at (510) 668-4454, or by email at michele.walden@acwd.com, for coordination regarding ACWD's groundwater resources. Kit Soo, Well Ordinance Program Coordinator, at (510) 668-4455, or by email at kit.soo@acwd.com for coordination regarding groundwater wells and drilling permits. Thank you for the opportunity to comment on the Project at this time.	Thank you for your comment. The EA/EIR will include specific analysis of dredged material placement at existing placement sites listed in Section 1.5.2. Where possible, potential impacts associated with the use of future placement will be broadly discussed; however, use of these sites, including the potential future site at Southern Eden Landing Ecological Preserve, by the USACE would be conditioned upon completion of separate, site-specific supplemental environmental review under the NEPA and/or CEQA, and acquisition of required environmental approvals from resource and regulatory agencies.

Commenter Name	Scoping Comment	Response
Becky Ota Environmental Program Manager Marine Region **CA Department of Fish and Wildlife** 1123 Industrial Rd. Suite 300 San Carlos, CA 94070	The California Department of Fish and Wildlife (Department) received a NOP from the San Francisco Regional Water Quality Control Board (Waterboard) for the Project pursuant the California Environmental Quality Act (CEQA) and CEQA Guidelines.1 Thank you for the opportunity to provide comments and recommendations regarding those activities involved in the Project that may affect California fish and wildlife. Likewise, we appreciate the opportunity to provide comments regarding those aspects of the Project that the Department, by law, may be required to carry out or approve through the exercise of its own regulatory authority under the Fish and Game Code. **DEPARTMENT ROLE** The Department is California's Trustee Agency for fish and wildlife resources and holds those resources in trust by statute for all the people of the state. (Fish & G. Code, Section 711.7, subd. (a) & 1802; Pub. Resources Code, Section 21070; CEQA Guidelines Section 15386, subd. (a).) The Department, in its trustee capacity, has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of those species. (Id., Section 1802.) Similarly for purposes of CEQA, the Department is charged by law to provide, as available, biological expertise during public agency environmental review efforts, focusing specifically on projects and related activities that have the potential to adversely affect fish and wildlife resources. The Department is also responsible for marine biodiversity protection under the Marine Life Protection Act in coastal marine waters of California, and ensuring fisheries are sustainably managed under the Marline Life Management Act. The Department is also submitting comments as a Responsible Agency under CEQA. (Pub. Resources Code, Section 21069; CEQA Guidelines, Section 15381.) The Department may need to exercise regulatory authority as provided by the Fish and Game Code. To the extent implementation of the Project as proposed may result in take as defined by State law of any species protected under the California Endangered Species Act (CESA) (Fish & Game Code, Section 2050 et seq.), related authorization as provided by the Fish and Game Code will be recommended. Pursuant to our jurisdiction, the Department has the following comments and recommendations regarding the Project. **PROJECT DESCRIPTION SUMMARY** Proponent: United States Army Corps of Engineers (USACE) Objective: The objective of the Project is to maintain navigability of federal navigation channels to authorized depths in San Francisco Bay. Location: The project is located within San Francisco Bay and the Pacific Ocean in Alameda, Contra Costa, Marin, Napa, Sacramento, San Joaquin, Santa Clara, San Francisco, San Mateo, Solano, and Sonoma counties. Timeframe: This Environmental Impact Report will cover anticipated Project activities for a 10-year timeframe from 2025 to 2034. **MARINE BIOLOGICAL SIGNIFICANCE** The San Francisco Bay-Delta is the second largest estuary in the United States and supports numerous aquatic habitats and biological communities. It encompasses 479 square miles, including shallow mudflats. This ecologically significant ecosystem supports both state and federally threatened and endangered species and sustains important commercial and recreational fisheries. **STATE AND FEDERALLY LISTED AND COMMERCIALLY/RECREATIONALLY IMPORTANT SPECIES** Protected species under the State and Federal Endangered Species Acts that could potentially be present near Project activities include: • Longfin smelt (*Spirinchus thaleichthys*), state-threatened, • Delta smelt (*Hypomesus transpacificus*), • Chinook salmon (*Oncorhynchus tshawytscha*), state and federally threatened (Central Valley Spring-run), state and federally endangered (Sacramento River Winter-run), • Steelhead (*Oncorhynchus mykiss*), federally threatened (Central California Coast and Central Valley evolutionary significant units), • Green sturgeon (*Acipenser medirostris*), federal threatened (Southern Distinct Population Segment), • White sturgeon (*A. transmontanus*), state species of special concern, • California least tern (*Sternula antillarum browni*), state and federal endangered.	Thank you for your comment. The EA/EIR will address potential impacts to fish, wildlife, and habitat in the vicinity of proposed dredging activities, including species identified in this comment. Minimization and mitigation measures are incorporated where appropriate.

Commenter Name	Scoping Comment	Response
	Several species with important commercial/recreational fisheries value and habitat value for spawning and rearing could potentially be present near Project activities. These include: • Dungeness crab (*Cancer magister*), • Pacific herring (*Clupea pallasii*), • Rockfish (*Sebastes* spp.), • California halibut (*Paralichthys californicus*) • Surfperches (*Embiotocidae*), • Eelgrass (*Zostera marina*). **COMMENTS AND RECOMMENDATIONS** The Department offers the comments and recommendations below to assist the Waterboard in adequately identifying and/or mitigating the Project's significant, or potentially significant, direct, and indirect impacts on fish and wildlife (biological) resources. Editorial comments or other suggestions may also be included to improve the document. I. Marine Project Level Impacts and Other Considerations <u>Longfin Smelt</u> Comment: Longfin smelt was listed as threatened under CESA in 2009 (CDFW 2009). Scientists have significant concern with the decline of Longfin Smelt as it is part of the collective decline of pelagic fishes known as the Pelagic Organism Decline (POD) that also includes native Delta Smelt, introduced Striped Bass (*Morone saxatillis*), and introduced Threadfin Shad (*Dorosoma pentenense*). The Pelagic Organism Decline Management Team (POD-MT) was formed by the Interagency Ecological Program (IEP) in 2005 to evaluate potential causes of the decline. The team developed several conceptual models to guide work plan development and integrate results. More information can be found on the Departments website at https://wildlife.ca.gov/Conservation/Fishes/Longfin-Smelt. Entrainment monitoring conducted onboard the federal hopper dredge Essayons since 2014, shows that entrainment is continuing to be documented in both Pinole Shoals and Richmond Outer Harbor channels. Although it appears that some measures the Department recommended during consultation with the Waterboard for the 2014 EIR and subsequent CEQA comment letter have been followed, other recommended measures, specifically adherence to the recommended work window, have not. Recommendation: The Department recommends the Draft Environmental Impact Report (DEIR) include an analysis of the measures that were included in the 2014 EIR and measures provided by the Department in 2014 as a memo at the request of the Waterboard (Attachment 1). The analysis should include which of the measures were successfully implemented, which measures were not implemented, and the reason for the lack of implementation during the previous 10-year period. The DEIR should also consider recommendations provided in the 2015 San Francisco Bay Long Term Management Strategy (LTMS) report, A Study Plan to Seek Solutions to Hopper Dredge Entrainment of Longfin and Delta Smelt (Attachment 2). Recommendation: The Department recommends that the DEIR include additional measures to further avoid the take of Longfin smelt. The measures could be a range of actions and include, but not be limited to, alternatives to suction dredging, a reduction in the amount of hopper dredging in San Francisco Bay, analysis of alternative channels in which hopper dredging may be feasible to avoid take of CESA listed species, alterations to the schedule of dredging activities in San Francisco Bay to remain within the recommended work window, and possible fish deterrents as described in the LTMS report attached. <u>White Sturgeon</u> Comment: White sturgeon is a state species of special concern (SSC). Although the SSC designation does not have a formal legal status, species are designated to bring additional attention to conservation, research, and recovery of species that have previously been subject to population declines or are generally rare. SSCs should be considered during the environmental review process. CEQA (California Public Resources Code §§ 21000-21177) requires State agencies, local governments, and special districts to evaluate and disclose impacts from projects in the State. Section 15380 of the CEQA Guidelines indicates that species of special concern should be included in an analysis of project impacts if they can be shown to meet the criteria of sensitivity outlined therein. Sections 15063 and 15065 of the CEQA Guidelines, which address how an impact is identified as significant, are particularly relevant to SSCs. Project-level impacts to listed (rare, threatened, or endangered species) species are generally	

Commenter Name	Scoping Comment	Response
	considered significant thus requiring lead agencies to prepare an Environmental Impact Report to fully analyze and evaluate the impacts. In assigning "impact significance" to populations of non-listed species, analysts usually consider factors such as population-level effects, proportion of the taxon's range affected by a project, regional effects, and impacts to habitat features. Additionally, the Department received a petition to list White sturgeon as threatened under CESA on November 29, 2023. The Department is expected to complete our review of the petition by April 2024. Information regarding this petition for listing can be found on the California Fish and Game Commission webpage at, https://fgc.ca.gov/CESA?utm_medium=email&utm_source=govdelivery#ws. Recommendation: The Department recommends the DEIR include analysis of the potential impacts to White sturgeon from Project activities. <u>Pacific Herring</u> Comment: The Department has concerns with the amount of dredging that is occurring each year outside of the LTMS environmental work windows, and specifically during the winter Pacific herring spawning season. Dredging in Oakland Inner Harbor occurs yearly outside of the work window through the entirety of the spawning season each year. In addition, channels such as Richmond Inner Harbor, seem to occur on a more frequent basis which has caused conflicts between dredging activities and spawning fish. This has caused dredging to be halted, following other permitting agency conditions of approval and consistent with protocols included in Department issued Pacific herring work window waivers, until after spawning events have concluded. These locations are within the core spawning areas of Pacific herring in San Francisco Bay and dredging during the spawning season may be having impacts to fish each winter dredging occurs (CDFW 2019). Additional impacts from dredging during a sensitive timeframe for a species such as herring, which have seen a decline in overall numbers in San Francisco Bay over the last decade, should be addressed within the DEIR. Recommendation: The Department recommends the DEIR discuss and analyze the known impacts to species from the continued dredging activities outside of the approved LTMS work windows. The analysis should include a description of mitigation measures that would avoid and minimize impacts to species, and specifically directly benefit species such as herring. Mitigation measures should include adherence to the approved LTMS work windows, approaches to modifying current dredging schedules for channels continually dredged outside of the work windows, continue herring observer monitoring requirements, and compensatory mitigation. <u>Monitoring and Mitigation</u> Comment: Entrainment monitoring, and some additional detection surveys, have continued during hopper dredging episodes since 2014 with only a brief interruption due to the COVID-19 pandemic. Monitoring should continue until enough data is available to make informed decisions and create an actionable plan for USACE to implement that would reduce impacts to CESA listed and commercially and recreationally important species. Compensatory mitigation for CESA listed species impacts should continue as a method to offset impacts from suction dredging occurring in San Francisco Bay and its tributaries. Given the continued level of take being documented and non-adherence to some minimization measures such as work windows, compensatory mitigation to fully offset the impacts of the Project has to be described fully in the DEIR. The mitigation calculation used in 2014 is no longer a viable way to calculate mitigation amounts for Projects that have entrainment and impingement impacts. The Department determined that the calculation, based on water volume entrained and subsequent mitigation from the State Water Project, did not translate accurately to projects with lower volumes of water entrained. The DEIR should consider a new approach to calculating the mitigation amount to fully offset the Project's impacts. Recommendation: The Department recommends the DEIR include discussion and analysis of monitoring options, including onboard entrainment monitoring on all suction dredges including cutterhead dredges. Continued monitoring will add to the existing data and assist USACE in making necessary changes to dredging practices that could further reduce or eliminate impacts to sensitive species. Improvements recommended by CDFW in the attached memo and in the attached LTMS report should be considered such as changes to the sampling basket or the addition of a flow meter on the sample basket diversion pipe.	

Commenter Name	Scoping Comment	Response
CA Department of Fish and Wildlife (continued)	Recommendation: The Department recommends that the DEIR describe different compensatory mitigation options to offset dredging impacts to listed species under CESA and the Federal Endangered Species Act. The Department also recommends that the Waterboard and USACE engage with the resources agencies when determining options and amounts for compensatory mitigation to ensure that the DEIR is describing mitigation options based on the recommendations and requirements of each resource agency. ENVIRONMENTAL DATA CEQA requires that information developed in environmental impact reports and negative declarations be incorporated into a database which may be used to make subsequent or supplemental environmental determinations. (Pub. Resources Code, § 21003, subd. (e).) Accordingly, please report any special status species and natural communities detected during Project surveys to the California Natural Diversity Database (CNDDB). The CNNDB field survey form can be found at the following link: https://wildlife.ca.gov/Data/CNDDB/SubmittingData#44524420-pdf-field-survey-form. The completed form can be mailed electronically to CNDDB at the following email address: CNDDB@wildlife.ca.gov. The types of information reported to CNDDB can be found at the following link: https://wildlife.ca.gov/Data/CNDDB/Plants-and-Animals. FILING FEES The Project, as proposed, would have an impact on fish and/or wildlife, and assessment of filing fees is necessary. Fees are payable upon filing of the Notice of Determination by the Lead Agency and serve to help defray the cost of environmental review by the Department. Payment of the fee is required in order for the underlying project approval to be operative, vested, and final. (Cal. Code Regs, tit. 14, Section 753.5; Fish & G. Code, Section 711.4; Pub. Resources Code, Section 21089.) CONCLUSION The Department appreciates the opportunity to comment on the NOP to assist the Waterboard in identifying and mitigating Project impacts on biological resources. Questions regarding this letter or further coordination should be directed Arn Aarreberg, Environmental Scientist, at (707) 791-4195 or R7CEQA@wildlife.ca.gov.	Thank you for your comment. New project surveys of special status species are not currently planned for this EA/EIR.
Bob Boye President, Board of Directors **Galilee Harbor Community Association**	We hope this letter finds you well. Our community association is reaching out to you regarding the navigational channel that runs along Sausalito's waterfront. Our marina is adjacent to this channel, which serves as our entrance. Beyond our role as a liveaboard marina, Galilee Harbor is also home to several small businesses operated by our members. The majority of Galilee's residents fall well below Marin County's Median Family Income limits, and they've worked hard to establish careers chartering boats, boatbuilding, diving and more. Each depends on Sausalito's navigational channel for their livelihood, so its condition is of critical importance. Several local marina operators, boaters, and shipyards have expressed deep concern over being excluded from your proposed Operation and Maintenance Dredging and Sediment project. Collectively, these waterfront businesses create a hive of productivity, employing hundreds of people to build, service, refuel and maintain thousands of vessels throughout the Bay Area and beyond. As larger vessels slowly lose the ability to reach Sausalito's fuel docks, marinas, and shipways for servicing, these employees and their families, including residents of Galilee Harbor, immediately feel the negative economic impact. We humbly request that you advocate on behalf of our working waterfront to include the Sausalito channel in your EA/EIR before it becomes impassable. We thank you for your time, and are hopeful that we can ultimately participate in this important project.	Thank you for your comment. Because it is not a federally authorized navigation channel, the Sausalito channel will not be included as part of the proposed action. See Section 2.4.7 for additional information.

Commenter Name	Scoping Comment	Response
Brenda Goeden Sediment Program Manager **San Francisco Bay Conservation and Development Commission** 375 Beale Street, Suite 510 San Francisco, CA 94105 (415) 3523600	Thank you for the opportunity to comment on the San Francisco Bay Regional Water Quality Control Board (Water Board) and U.S. Army Corps of Engineers (USACE) Notice of Preparation (NOP) of a Draft Environmental Assessment and Environmental Impact Report (DEA/EIR) for USACE's 2025 through 2035 Operations and Maintenance Dredging Program for San Francisco Bay Federal Navigation Channels (USACE O&M Dredging Program), dated February 13, 2024. The Proposed Project includes the operation and maintenance of the 11 federal navigation channels: the deep draft channels - San Francisco Main Ship, Richmond Inner and Outer Harbor, Suisun, Pinole, Oakland, Redwood City, and San Bruno Shoal; as well as the shallow draft channels - San Rafael Creek, Petaluma River, and Napa River, exclusive of the Suisun Slough, and use of the associated federally-designated disposal or alternate placement sites in and near San Francisco Bay for the next 10 years, anticipated to begin in 2025. The USACE proposes that each federal navigation channel would continue to be dredged as needed, depending on shoaling and available funding. The frequency of dredging would range from annual activities to those that may occur only once during the 10-year planning horizon. Dredging activities would be consistent with the 2015-2024 EA/EIR and other approved management plans and where appropriate incorporates new information on dredging impacts, including those to newly listed species, and environmental benefits from beneficial use of dredged material (beneficial reuse). The USACE's current maintenance dredging typically involves four steps: 1) testing for sediment quality and placement suitability determination; 2) removing recently shoaled sediment from the dredging site to restore authorized navigation channel dimensions; 3) transporting the dredged material by barges, hopper dredges, or pipeline to the placement site; and 4) disposing or placing the dredged material at the designated disposal or placement site(s). The USACE would use either hydraulic (hopper or cutterhead dredge) and/or mechanical (clamshell or excavator bucket) dredge equipment for different channels, and may employ knockdowns where necessary and appropriate. Current hydraulic dredging usually involves hopper dredges, or cutterhead suction attached to hydraulic pipelines that convey dredged sediment to a barge or directly onto a placement site. Current mechanical dredging usually involves placing dredged sediment into a barge for transport to a placement site. The USACE proposes to conduct dredging activities within the environmental work windows to the maximum extent practicable and in coordination with regulatory agencies. The USACE proposes to continue to dispose or place dredged sediment at established disposal and/or placement sites. As proposed, disposal and/or placement would be dependent on sediment characteristics. Current dredged sediment placement sites in the San Francisco Bay Area include the existing federally-designated aquatic in-Bay disposal sites SF-9, SF-10, SF-11, and SF-16; the existing federally-designated ocean disposal sites SF-8, San Francisco Deep Ocean Disposal Site (SFDODS), and SF-17; and several permitted and operational beneficial reuse sites, including, but not limited to, SF-17 Ocean Beach, Montezuma Wetlands Restoration Project, and Cullinan Ranch Restoration Project. Additionally, USACE places sediment at sponsor-provided upland sites for the Napa River and Petaluma River. San Francisco Bay Conservation and Development Commission (Commission) staff has reviewed the NOP and provides the following comments and recommendations for consideration and inclusion in the DEA/EIR. The Commission staff notes that the entire proposed O&M Dredging Program activities are located within the San Francisco Bay Coastal Zone, and/or have the potential to affect the San Francisco Bay Coastal Zone. Therefore, the O&M Dredging Program should be evaluated in consideration of the potential effects to the coastal zone, consistent with the federally approved San Francisco Bay Coastal Zone Management Program (SFBCZMP). In addition, the Commission staff recognizes that the Water Board is the state lead per the California Environmental Quality Act (CEQA), but as this is a joint document, both CEQA and the SFBCZMP should be addressed. Further, the Commission anticipates receiving and analyzing a request for consistency concurrence, and the information contained in the EA/EIS may be used to support that effort later in 2024. Comments and Recommendations 1. Coordination and Cooperation The Commission respects the Water Board and USACE position as leads in preparing the CEQA/NEPA analysis for the proposed program. However, as a long-time partner in the Long Term Management Strategy for the Placement of Dredged Material in the Bay Region (LTMS) Management Program implementation, the Commission respectfully requests that the Commission and the US Environmental Protection Agency (EPA), as the other federal sponsor, be included in the alternatives analysis array development. This is important because as each agency retains its authority, the program must be implemented in accord with its laws and policies. Further, the impact of the USACE's eventual selected alternative may have unintended consequences for other dredging projects in the region. Lastly, the selected alternative may result in challenges or opportunities for the LTMS Management Program implementation that will require coordination and cooperation of regulatory and resource agencies, as well as stakeholders. The Commission is seeking alternatives that can be supported by all agencies. Recommendation: The USACE and Water Board coordinate directly with the Commission and EPA in its alternative array development and selection.	Thank you for your comments. The alternatives for this project and NEPA/CEQA process were described and discussed in the April 12, 2024, LTMS Management Committee Meeting. The USACE and Water Board have and will continue to coordinate with BCDC on the proposed action.

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San Francisco Bay Conservation and Development Commission (continued)	2. Use of “Placement” and “Disposal” In the project description, the term “placement” is used to describe both beneficial reuse and disposal of dredged sediment. It is important to be clear in language use both for understanding and analysis needs, in accord with the State’s directive to use plain language for public documents. Disposal of dredged sediment is when the sediment is treated as a waste product rather than a resource. The recognized aquatic disposal sites include the Alcatraz (SF-11), San Pablo Bay (SF-10), Carquinez Strait (SF-9), and Suisun Bay (SF-16), as well as the San Francisco Deep Ocean Disposal Site (SFDODS). Each of the in-Bay disposal sites have been shown through modeling to move the majority of the sediment into deep water channels and continue the transport towards the ocean, with some limited sediment depositing on deep water shoals. Sediment disposed at SFDODS is known to take sediment out of the Bay system and deposit it off the shelf. The San Francisco Bar Channel (SF-8) has been described as a disposal site, with some limited beneficial reuse for sand to support the outer coast littoral cell. “Placement of dredged sediment” has generally been used to describe beneficial reuse (or beneficial use) of dredged sediment regionally. The primary beneficial reuse in the region due to both Bay sediment characteristics and need, has been for wetland restoration and enhancement, and thus specific use of the term placement at a beneficial reuse site. Recommendation: Please refer to the in-Bay and SFDODS disposal sites as disposal sites for clarity as they have been authorized and understood as such in the region for decades. Please use “placement” in association with beneficial reuse, or other non-disposal site discussion for clarity in communication. 3. No Action Alternative In a no action alternative, presumably, the USACE would continue to dispose of sediment at the deep ocean disposal site and multiple in bay disposal sites in support of finding the least cost alternative under the federal standard. This alternative would likely exacerbate the loss of sediment for beneficial reuse of sediment for wetland restoration and adaptation, as well as loss of resiliency in the region that natural and nature-based solutions can provided. Recommendation: The Commission staff recommends that the Water Board and the USACE thoroughly examine this alternative and the loss of sediment from disposal for both ecological and resilience projects, and how this practice would cause more loss of sediment over time and the impacts of this loss, not only to the system, but also to the projects that need the sediment for completion. A thorough examination of this alternative can provide the necessary analysis determine what is appropriate for the region, but also to support the development of a comprehensive benefits package to provide to USACE Headquarters to support additional beneficial reuse activities and funding over the ten-year evaluation period.	Thank you for your comment. We appreciate BCDC’s recommendation to improve clarity on use of terms “disposal” and “placement” in this EA/EIR, and references to analyses that show that the majority of sediment at in-Bay sites moves into deep water channels and continues transport towards the ocean, with some limited sediment depositing on deep water shoals. The terminology used in this EA/EIR and application of terms “disposal” versus “placement” is consistent with the August 2023 Memorandum on Expanding Beneficial Use of Dredged Material in the USACE. Disposal is defined as the placement of material in an area where the material is anticipated to remain in place and have no measurable benefit. In open water placement sites, nondispersive sites are considered disposal; in confined placement sites, disposal applies if the material is not intended to be offloaded for another beneficial use. Transitional placement is defined as keeping sediment in the riverine or coastal system as a part of a management process or in a period of transition. In-Bay sites, SF-9 (Carquinez Strait Placement Site), SF-10 (San Pablo Bay Placement Site), SF-11 (Alcatraz Placement Site), SF-16 (Suisun Placement Site), as well as the ocean site, SF-8 (San Francisco Bar Channel Placement Site (SF-8), are currently characterized as transitional placement sites in the RDDMP and this EA/EIR because, as the commenter suggests, the majority of sediment placed at these sites is maintained as part of the system. EA/EIR will include impact analysis from No Action Alternative loss of ecosystem restoration opportunity.
San Francisco Bay Conservation and Development Commission (continued)	4. Additional Beneficial Reuse Sites As mentioned, Bel Marin Keys Wetland Restoration site (BMKWR) is anticipated to accept dredged sediment in the near future and well within the 10-year period being reviewed for the USACE O&M Dredging Program. Because it is an expansion of the Hamilton Wetlands Restoration Project (HWRP) much is understood regarding the potential placement options, likely volume of sediment needed, other details. Understanding the site is still in development a generalized evaluation should be included as a beneficial reuse site and placement opportunity for the federal and non-federal dredging projects. Should the Water Board and USACE include BMKWRP even with general assumptions, it would allow supplemental documents to be effectively executed to support this site efficiently in the future. Similarly, please also investigate the potential to include Eden Landing Wetland Restoration site (ELWRP) in the analysis. It is our understanding that this site is being reconsidered for beneficial reuse (pers. Comm. D. Halsing), and is in the permitting process now. Direct placement for sediment from Redwood City federal channel would be an ideal project matching for beneficial reuse and ecological restoration. As you’re aware, the USACE and the Water Board have been able to consider projects in conceptual development or phasing in the past, and a similar approach could be implemented here. Recommendation: Please include both BMKWRP and ELWRP at a general evaluation level now to support future use of these sites over the next ten years.	Thank you for your comment. The EA/EIR will identify and analyze Bel Marin Keys and Eden Landing (Eden Landing Ecological Reserve) as possible future beneficial use placement sites. As noted in the EA/EIR, these sites will undergo separate environmental analysis. The EA/EIR will analyze the potential impacts to listed species and listed species of concern from the difference dredge methods, material transport, and equipment.

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	5. Evaluation of Impacts of Dredging Outside the Environmental Work Window While the NOP states that the USACE would work within the LTMS environmental works windows, for several years now the USACE has regularly dredged outside of the work windows for several dredging projects (Oakland, Richmond, Redwood City, San Rafael Creek, most recently) for many months. The EA/EIR should anticipate this practice to continue again in the future unless the USACE can address some of the contracting challenges, and evaluate the potential impacts to both state and federally listed species, and species of special concern. This evaluation should include dredging using different mechanisms (hydraulic and mechanical equipment). Recommendation: Please fully evaluate the impacts of both dredging and disposal outside of the work windows for both state and federally listed and candidate species. Please note, that the State is currently considering listing white sturgeon, and the federal government is in the process of listing longfin smelt.	
San Francisco Bay Conservation and Development Commission (continued)	6. Alternatives Analysis In developing the alternatives for evaluation, the Water Board and USACE should consider the past 10 years of dredging, including contracting methodology, new policies, bids that have been received, funding availability and potential funding opportunities to share the incremental cost, taking full advantage of new guidance from WRDA 2020, contractor availability and ability to start and complete work within the contract parameters, effects on other dredging projects when the contracting or project is extended, or delayed, and other factors that contribute to the regions ability to maximize beneficial reuse and minimizing wasting valuable resources. One of the alternatives should consider whether development of more Section 204 projects, or federal local partnerships on restoration projects that provide resilience and adaptation for the region while minimizing loss of sediment. Recommendation: Carefully and thoroughly review the potential alternatives, working with the agency partners to identify those that maximize beneficial reuse while minimizing disposal. 7. Advanced Maintenance Dredging The USACE has recently requested additional advanced maintenance dredging at Bullshead Reach in Suisun, that includes both deepening and widening the area previously dredged for this purpose. This proposal should be thoroughly evaluated to understand how it may improve the navigability of the adjacent channel, but also impacts to the sediment transport system. The Water Board and the USACE should also consider whether working with one of the sand mining companies to periodically remove sand from this shoal could both support safe navigation and the supply of sand to the construction industry, thus reducing mining in other areas of Suisun and overall impacts to the system. The USACE has a program known as Section 408 that allow miners to work in this regard for the program. Recommendation: Include the advanced maintenance dredging at Bullshead Reach in the analysis, as well as investigate ways the USACE can work with others (sand miners) to reduce shoaling without having to widen or deepen Bullshead Reach. 8. Project Description As described in the project description “The USACE proposes to continue to dispose or place dredged sediment at established disposal and/or placement sites. As proposed, disposal and/or placement would be dependent on sediment characteristics.” It is important to note that there are many factors involved in determining where sediment can be placed. Less than 5% of the sediment has contaminate levels that prevent some form of beneficial reuse, either as surface sediment or foundation.	Thank you for your comment. The USACE and Water Board have and will continue to coordinate with BCDC on alternatives and maximizing beneficial use. The alternatives analyzed in the EA/EIR will be consistent with the alternatives identified in the RDMMP, a companion document to this Draft EA/EIR. See Section 2.2 of the EA/EIR for detail on the process and stakeholders involved with developing the alternatives.
San Francisco Bay Conservation and Development Commission (continued)	9. Jack Maltester Channel The proposed program presumably includes dredging and disposal or beneficial reuse of sediment from the Jack Maltester Channel. The Commission staff also notes that the upland disposal site has been closed by the local project sponsor. While this channel has been federally authorized in the past, the San Leandro Marina that is associated with this channel, is no longer functioning, and therefore, a need for dredging does not seem to exist in that area. Conversely, the project description notes that Suisun City Channel is not included in this analysis but does not state why. The Suisun City Channel has a large, functioning marina and an associated upland disposal site provided by the sponsor. Recommendation. Please clarify why the Suisun City Channel is not included in the analysis while the Jack Maltester Channel is, and whether an evaluation of federal economic interest was conducted for both, its findings, and the bases for and relevance of including or not including these channels in this analysis.	Thank you for your comment. Jack Maltester Channel will not be included in this EA/EIR. Suisun Slough will also be removed from the project description.

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San Francisco Bay Conservation and Development Commission (continued)	10. Cumulative Impacts Analysis Please note that during the period of this analysis, the Oakland Turning Basins Widening Projects, the Port of San Francisco Piers 39-41 ½ Remediation Project, sand mining in Central Bay and Suisun, and potentially the first phase of the San Francisco Waterfront Resilience Project would be underway. Other projects may also be active during this ten-year period. The cumulative impacts to the Bay resources, water quality and wildlife, as well as equipment availability, and other impacts may be confounding this work. Please evaluate at a minimum how these four large projects would interact or inter-relate with the USACE O&M Dredging Program and the sediment system, including wetland restoration. Commission staff appreciate the opportunity to comment at the scoping phase of this review. Please note, the analysis should include information sufficient to evaluate consistency with the SFB CZMP if the USACE intends to rely on this document for its federal consistency determination. The McAteer Petris Act and the Suisun Preservation Act, and the San Francisco Bay Plan and Suisun Marsh Protection Plan include multiple applicable and enforceable policies that this program would be subject to. Please review those documents to assist your team in ensuring the necessary information is included in this review. If you have questions or would like additional information, please feel free to contact me at 415.352.3623 or via email at brenda.goeden@bcdc.ca.gov. The Commission stands ready to collaborate with the Water Board and the USACE in identify an array of alternatives that meets the needs of all agencies. Thank you for your efforts in this regard.	The cumulative analysis considers all past, present, and reasonably foreseeable projects.
Christopher Lacey Principal **Blue Water Yacht Harbor, LLC** 55 Liberty Ship Way Sausalito, CA 94966 (415) 289-0135	Mr. Graham-Davis: I hope that this email finds you well. I am writing regarding to the impending Maintenance Dredging of the Federal Navigation Channels in San Francisco Bay Project. It has come to my intention that the Richardson Bay Channel (also known as the Marin Ship Channel, Sausalito Canal, Sausalito Canal or Sausalito Channel) is not currently in the Scope of Work for said project, which we feel is a very big mistake and oversight. We respectfully request that the Richardson Bay Channel be included in the Notice of Preparation of a Draft Environmental Assessment/Environmental Impact Report for the San Francisco Bay Federal Channels Operation and Maintenance Dredging and Sediment Placement Activities and ultimately in this project. The maintenance of the Richardson Bay/Sausalito navigational channel is critical because it serves as the primary “highway” for vessels coming into numerous Sausalito marinas, boatyards, The US Army Corps of Engineers Dock, several sanitation pump out stations and Marin County’s only functioning fuel dock. For your information, all of the boatyards, several marinas, several pump out stations and the fuel dock cannot currently be accessed by deep draft vessels outside of high tides. Regarding the pump out stations and the fuel dock, the current conditions can quickly become a public health and safety issue if access is restricted because of a shallow channel. The fuel dock provides fuel to many maritime emergency service providers, including but not limited to Southern Marin Fire Protection District, Marin County Sherriff’s Office, United States Coast Guard, Tiburon Fire Protection District, etc. and the importance of access to sanitary pump out stations is self-explanatory. An increasing number of boaters have been reporting that the navigational channel that runs along Sausalito’s waterfront has become so shallow that vessels with a 6-foot plus draft cannot transit the channel during a low tide. This channel serves over 2,500 recreational vessels in Sausalito, many thousands of vessels from around the Bay Area, and countless vessels from outside the region visiting the Bay Area. The last vestiges of the maritime industry in Sausalito depend heavily upon the maintenance and upkeep of the Sausalito navigational channel. If this channel is not dredged in the near future, the consequences will be disastrous and will likely sound the death knell for Sausalito’s working waterfront. The maritime industry in Sausalito employs over 500 people including boat yard workers, mechanics, yacht brokers, marina employees, fishermen and others in the marine services. Individuals of all socioeconomic backgrounds use the channel for recreational purposes. The channel protects the public welfare, provides recreational opportunities, supports economics in the maritime sector, and is the primary thoroughfare for those seeking maritime services. I’m reaching out to you today to include this in the project scoping for the San Francisco Bay Federal Channels Operation and Maintenance Dredging and Sediment Placement Activities. Thank you in advance for your time in reading this correspondence and I sincerely hope that this grave oversight will be addressed appropriately. Best Regards, Christopher Lacey Principal	Thank you for your comment. As explained in Section 2.4.7, Richardson Bay portion of San Francisco Harbor is dredged infrequently and is not projected to be dredged in the time span covered by this EA/EIR. If federal interest in dredging a channel not included in this EA/EIR is determined at a later date, separate environmental analysis and permitting would be performed for the channel to be added.

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Curtis Havel Harbormaster **Clipper Yacht Harbor** 310 Harbor Drive Sausalito, CA 94965 (415) 332-3500	Hello Jazzy, Please include the Richardson Bay Channel (also known as the Marinship Channel, Sausalito Canal, Sausalito Canal or Sausalito Channel) in the Notice of Preparation of a Draft Environmental Assessment/Environmental Impact Report for the San Francisco Bay Federal Channels Operation and Maintenance Dredging and Sediment Placement Activities. The maintenance of the Richardson Bay/Sausalito navigational channel is critical because it serves as the primary “highway” for vessels coming into Sausalito and provides access to Marin County’s only functioning fuel dock at Clipper Yacht Harbor. The fuel dock at Clipper Yacht Harbor currently cannot be accessed by deep draft vessels outside of high tides. This quickly becomes a public health and safety issue because the Clipper Yacht Harbor fuel dock provides fuel to many maritime emergency service providers, including but not limited to Southern Marin Fire Protection District, Marin County Sherriff’s Office, United States Coast Guard, Tiburon Fire Protection District, and more. An increasing number of boaters have been reporting that the navigational channel that runs along Sausalito’s waterfront is becoming so shallow that vessels with a 6-foot draft cannot transit the channel during a low tide. This channel serves over 2,500 recreational vessels in Sausalito, many thousands of vessels from around the Bay Area, and countless vessels from outside the region visiting the Bay Area. The last vestiges of the maritime industry in Sausalito depend heavily upon the maintenance and upkeep of the Sausalito navigational channel. If this channel is not dredged in the near future, the consequences will be disastrous and will likely sound the death knell for Sausalito’s working waterfront. The maritime industry in Sausalito employs over 500 people including boat yard workers, mechanics, yacht brokers, marina employees, fishermen and others in the marine services. Individuals of all socioeconomic backgrounds use the channel for recreational purposes. The channel protects the public welfare, provides recreational opportunities, supports economics in the maritime sector, and is the primary thoroughfare for those seeking maritime services. I’m reaching out to you today to include this in the project scoping for the San Francisco Bay Federal Channels Operation and Maintenance Dredging and Sediment Placement Activities. Attached are two drawings prepared by the United States Army Corps of Engineers depicting the precise location of the subject channel that should be included with the project.	Thank you for your comment. As explained in Section 2.4.7, Richardson Bay portion of San Francisco Harbor is dredged infrequently and is not projected to be dredged in the time span covered by this EA/EIR. If federal interest in dredging a channel not included in this EA/EIR is determined at a later date, separate environmental analysis and permitting would be performed for the channel to be added.
Trey Powell Northern District Deputy **California Department of Conservation** Geologic Energy Management Division 715 P Street, MS 1803 Sacramento, CA 95814 (916) 445-5986	Construction Site Well Review (CSWR) ID: 1012981 Assessor Parcel Number(s): 048090005000, 0067030180, 0067030140, 0067030150, 0067030170, 0067040150, 0067040120, 0067040160, 0067040170, 0067040030, 0067040210, 0067040220, 0067040130, 0067040090, 0090070360, 0090070370, 0090070320, 0090070440, 0090070450, 0090070140, 0090070180, 0090110260, 0090110290, 0090110430, 0090110270, 0090110050, 0090110360, 0090110280, 0090110400, 0090110410, 0090110390, 0090110320, 0090110350, 0090110420, 0090110210, 0090110330, 0090110180, 0090120240, 0090120270, 0090120290, 0090120010, 0090120020, 0090120280 Property Owner(s): State of California Project Location Address: San Francisco Bay California 94612 Project Title: SF Bay Federal Channels Operation and Maintenance Dredging and Sediment Placement Activities Public Resources Code (PRC) § 3208.1 establishes well reabandonment responsibility when a previously plugged and abandoned well will be impacted by planned property development or construction activities. Local permitting agencies, property owners, and/or developers should be aware of, and fully understand, that significant and potentially dangerous issues may be associated with development near oil, gas, and geothermal wells. The California Geologic Energy Management Division (CalGEM) has received and reviewed the above referenced project dated 3/6/2024. To assist local permitting agencies, property owners, and developers in making wise land use decisions regarding potential development near oil, gas, or geothermal wells, the Division provides the following well evaluation. The project is located in Contra Costa County, within the boundaries of the following fields: Any Field, Ryer Island Gas, Van Sickle Island Gas CAUTION IS ADVISED WHEN DREDGING NEAR ABANDONED OIL AND GAS WELLS TO AVOID ACCIDENTAL DAMAGE OR COLLISION. CARE SHOULD BE TAKEN TO ENSURE ABANDONED OIL AND GAS WELLS ARE NOT FURTHER BURIED BY DUMPING DREDGE MATERIAL ON TOP OF ABANDONED WELL LOCATIONS.	Thank you for your comment. This information has been added to the EA/EIR - Section 3.5. USACE shall exercise caution when dredging near abandoned oil and gas wells to avoid accidental damage or collision, and shall care to ensure abandoned oil and gas wells are not further buried by dumping dredge material on top of abandoned well locations.

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	Our records indicate there are 36 known oil or gas wells located within the project boundary as identified in the application. • Number of wells Not Abandoned to Current Division Requirements as Prescribed by Law and Projected to Be Built Over or Have Future Access Impeded by this project: 0 • Number of wells Not Abandoned to Current Division Requirements as Prescribed by Law and Not Projected to Be Built Over or Have Future Access Impeded by this project: 20 • Number of wells Abandoned to Current Division Requirements as Prescribed by Law and Projected to Be Built Over or Have Future Access Impeded by this project: 0 • Number of wells Abandoned to Current Division Requirements as Prescribed by Law and Not Projected to Be Built Over or Have Future Access Impeded by this project: 16 The Division categorically advises against building over, or in any way impeding access to, oil, gas, or geothermal wells. Impeding access to a well could result in the need to remove any structure or obstacle that prevents or impedes access including, but not limited to, buildings, housing, fencing, landscaping, trees, pools, patios, sidewalks, roadways, and decking. Maintaining sufficient access is considered the ability for a well servicing unit and associated necessary equipment to reach a well from a public street or access way, solely over the parcel on which the well is located. A well servicing unit, and any necessary equipment, should be able to pass unimpeded along and over the route, and should be able to access the well without disturbing the integrity of surrounding infrastructure. There are no guarantees a well abandoned in compliance with current Division requirements as prescribed by law will not start leaking in the future. It always remains a possibility that any well may start to leak oil, gas, and/or water after abandonment, no matter how thoroughly the well was plugged and abandoned. The Division acknowledges wells plugged and abandoned to the most current Division requirements as prescribed by law have a lower probability of leaking in the future, however there is no guarantees that such abandonments will not leak. The Division advises that all wells identified on the development parcel prior to, or during, development activities be tested for liquid and gas leakage. Surveyed locations should be provided to the Division in Latitude and Longitude, NAD 83 decimal format. The Division expects any wells found leaking to be reported to it immediately. Failure to plug and reabandon the well may result in enforcement action, including an order to perform reabandonment well work, pursuant to PRC § 3208.1, and 3224. PRC § 3208.1 give the Division the authority to order or permit the re-abandonment of any well where it has reason to question the integrity of the previous abandonment, or if the well is not accessible or visible. Responsibility for re-abandonment costs may be affected by the choices made by the local permitting agency, property owner, and/or developer in considering the general advice set forth in this letter. The PRC continues to define the person or entity responsible for reabandonment as: 1. The property owner - If the well was plugged and abandoned in conformance with Division requirements at the time of abandonment, and in its current condition does not pose an immediate danger to life, health, and property, but requires additional work solely because the owner of the property on which the well is located proposes construction on the property that would prevent or impede access to the well for purposes of remedying a currently perceived future problem, then the owner of the property on which the well is located shall obtain all rights necessary to reabandon the well and be responsible for the reabandonment. 2. The person or entity causing construction over or near the well - If the well was plugged and abandoned in conformance with Division requirements at the time of plugging and abandonment, and the property owner, developer, or local agency permitting the construction failed either to obtain an opinion from the supervisor or district deputy as to whether the previously abandoned well is required to be reabandoned, or to follow the advice of the supervisor or district deputy not to undertake the construction, then the person or entity causing the construction over or near the well shall obtain all rights necessary to reabandon the well and be responsible for the reabandonment. 3. The party or parties responsible for disturbing the integrity of the abandonment - If the well was plugged and abandoned in conformance with Division requirements at the time of plugging and abandonment, and after that time someone other than the operator or an affiliate of the operator disturbed the integrity of the abandonment in the course of developing the property, then the party or parties responsible for disturbing the integrity of the abandonment shall be responsible for the reabandonment. No well work may be performed on any oil, gas, or geothermal well without written approval from the Division. Well work requiring approval includes, but is not limited to, mitigating leaking gas or other fluids from abandoned wells, modifications to well casings, and/or any other re-abandonment work. The Division also regulates the top of a plugged and abandoned well's minimum and maximum depth below final grade. CCR §1723.5 states	

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	well casings shall be cut off at least 5 feet but no more than 10 feet below grade. If any well needs to be lowered or raised (i.e. casing cut down or casing riser added) to meet this regulation, a permit from the Division is required before work can start. The Division makes the following additional recommendations to the local permitting agency, property owner, and developer: 1. To ensure that present and future property owners are aware of (a) the existence of all wells located on the property, and (b) potentially significant issues associated with any improvements near oil or gas wells, the Division recommends that information regarding the above identified well(s), and any other pertinent information obtained after the issuance of this letter, be communicated to the appropriate county recorder for inclusion in the title information of the subject real property. 2. The Division recommends that any soil containing hydrocarbons be disposed of in accordance with local, state, and federal laws. Please notify the appropriate authorities if soil containing significant amounts of hydrocarbons is discovered during development. As indicated in PRC § 3106, the Division has statutory authority over the drilling, operation, maintenance, and abandonment of oil, gas, and geothermal wells, and attendant facilities, to prevent, as far as possible, damage to life, health, property, and natural resources; damage to underground oil, gas, and geothermal deposits; and damage to underground and surface waters suitable for irrigation or domestic purposes. In addition to the Division's authority to order work on wells pursuant to PRC §§ 3208.1 and 3224, it has authority to issue civil and criminal penalties under PRC §§ 3236, 3236.5, and 3359 for violations within the Division's jurisdictional authority. The Division does not regulate grading, excavations, or other land use issues. If during development activities, any wells are encountered that were not part of this review, the property owner is expected to immediately notify the Division's construction site well review engineer in the Northern district office, and file for Division review an amended site plan with well casing diagrams. The District office will send a follow-up well evaluation letter to the property owner and local permitting agency. Should you have any questions, please contact me at (805) 937-7246 or via email at Trey.Powell@conservation.ca.gov.	
Jim Haussener	I request that the following federally authorized navigation projects be included in the EA/EIR: Islais Creek; Mare Island Strait; Full Channel at Redwood City Creek; Full Channel at Richmond (inner harbor – Santa Fe Channel); and, Suisun Slough. Also, there should be a mechanism to include any new projects that may get authorized and funded because of self-nominations under Section 7001 of the Water Resources Reform and Development Act of 2014. This could include locations such as Ayala Cove, Clipper Cove, or San Francisco Marina. Some of these could be considered O&M dredging under the Long Term Management Strategy for Dredged Material Placement. Respectfully, Jim Haussener	Section 2.4.7 explains why Islais Creek, Santa Fe Channel, and Suisun Slough are not included in the EA/EIR. Redwood Creek (referred to in scoping comment as “Redwood City Creek”) is encompassed within Redwood City Harbor and will be included in this EA/EIR; the Redwood Creek portion was unintentionally omitted in the version of the study area figure provided in the NOP. Mare Island Strait is included as part of the proposed action. If federal interest in dredging a channel not included in this EA/EIR is determined at a later date, separate environmental analysis and permitting would be performed for the channel to be added.

Commenter Name	Scoping Comment	Response
Ken Watsey, Manager **Richardson Bay Marina** 100 Gate Six Road Sausalito, CA 94965 (415) 332-5510	Hello Jazzy - On behalf of Richardson Bay Marina, I would like to urge the inclusion of the Richardson Bay channel in the EIR for the San Francisco Channels, Operation and Maintenance Dredging Activities proposed projects. There are many reasons to support this, not the least of which is to maintain all tide stage access to the only waterfront fuel dock in this part of the San Francisco Bay. They are disappearing at a high rate due to the environmental complexities and expense of retention. This is a significant factor for both recreational and commercial vessels. Additionally, virtually all agency studies and reports for decades have concurred with the importance and value of developing and retaining recreational pleasure boat use in San Francisco Bay and its surrounding areas. The economic and social benefits are innumerable, but access to public waterways at all stages of tide are critical to reap those benefits. The Sausalito waterfront is a major attraction and destination for vessels from all over the geographical area due to the unique combination of waterfront developments, marine facilities, floating home communities, restaurants and other related businesses used by mariners. Access to these has been codified in all public trust doctrines and should be maintained. To avoid redundancy, I will also say I concur with all other points illuminated in the March 6 letter to you from Curtis Havel of Clipper Yacht Harbor.	Thank you for your comment. As explained in Section 2.4.7, Richardson Bay portion of San Francisco Harbor is dredged infrequently and is not projected to be dredged in the time span covered by this EA/EIR. If federal interest in dredging a channel not included in this EA/EIR is determined at a later date, separate environmental analysis and permitting would be performed for the channel to be added.
Nicole C. Sasaki Staff Attorney **San Francisco Baykeeper** 1736 Franklin Street, Suite 800 Oakland, CA 94612 (510) 735-9700	On behalf of San Francisco Baykeeper (Baykeeper) and our more than five thousand members and supporters who use and enjoy the environmental, recreational, and aesthetic qualities of the San Francisco Bay and its surrounding tributaries and ecosystems, we respectfully submit the following comments for consideration by the San Francisco Regional Water Quality Control Board (Regional Board) (lead agency under the California Environmental Quality Act (CEQA)), and the U.S. Army Corps of Engineers (Corps) (lead agency under the National Environmental Protection Act (NEPA)) with regard to the Notice of Preparation (NOP) for the upcoming Environmental Assessment/Environmental Impact Report (EA/EIR) for the Corps' San Francisco Bay Federal Channels Operations and Maintenance (O&M) Dredging and Sediment Placement Activities from 2025 to 2034 (Project). Baykeeper's mission is to defend San Francisco Bay from the biggest threats and hold polluters and government agencies accountable to create healthy communities and help wildlife thrive. Our team of scientists and lawyers investigate pollution via aerial and water patrols, strengthen regulations through science and policy advocacy, and enforce environmental laws on behalf of the public. Baykeeper has an ongoing history of protecting the bed and substrate of the Bay as a limited resource for the public in perpetuity. We have dedicated significant resources to ensuring navigational dredging is conducted in a manner protective of the Bay's water quality. **Sedimentation:** Since the 2015-2024 EA/EIR, the Corps Headquarters has adopted two new policies: 1) increase the beneficial use of dredged material to 70% by 2030, and 2) increase flexibility, including cost sharing, in determining the "Federal Standard" for the Corps' dredging programs. Combined, these two policies have the potential to maximize beneficial reuse of dredged sediment well beyond the Long-Term Management Strategy's (LTMS) goal of 40% beneficial reuse of dredged sediment. The Bay is continuing to experience a severe sediment deficiency, which, combined with rising sea levels, puts the remaining wetlands around the Bay's perimeter at risk of submersion. Instead of shipping dredged material to the ocean for disposal, the Corps needs to prioritize keeping sediment within the Bay's ecosystem. The Project presents an opportunity for the Corps to increase beneficial use and potentially utilize strategic in-Bay placement to help combat the Bay's sediment deficiency. The 2025-2034 EA/EIR must be updated to thoroughly evaluate the impacts of changing the Corps' O&M dredging program as compared to the last term, including but not limited to differences in dredged material disposal activities.	Thank you for your comment. The EA/EIR will include alternatives that would increase beneficial use of dredged material in San Francisco Bay.
San Francisco Baykeeper (continued)	**Biological Resources:** Delta Smelt is a native fish that is only found in the San Francisco Bay-Delta Estuary and is in imminent danger of extinction. The species is listed as threatened under the federal Endangered Species Act (ESA) and endangered under the California ESA. Longfin Smelt is another native Bay fish and, in recent decades, its populations have declined by more than 90%. Longfin Smelt is listed as threatened under the California ESA and the U.S. Fish and Wildlife Service (FWS) has determined that listing of the Bay-Delta population is warranted under the federal ESA. Between 2015 and 2024, the Bay's Delta Smelt and Longfin Smelt populations have continued to decline. Delta Smelt remain at an all-time low, with the Fall midwater trawl abundance index at 0 every year since 2018. In 2021, Baykeeper initiated litigation against FWS for its failure to move forward with formally listing the Longfin Smelt as endangered under the federal ESA.1 On October 7, 2022, FWS published in the Federal Register its proposed rule to list the Longfin Smelt distinct population segment (DPS) as endangered under the federal ESA. Baykeeper expects FWS to issue a final rule for the Longfin Smelt San Francisco Bay-Delta DPS during 2024. Baykeeper notes that in its draft proposed listing, FWS concluded that existing regulatory mechanisms (including the existing Biological	Thank you for your comment. The EA/EIR will address potential impacts to fish species, including delta smelt, longfin smelt, and other sensitive species in the vicinity of proposed dredging activities. Minimization and mitigation measures will be incorporated where appropriate.

Commenter Name	Scoping Comment	Response
	Opinions and state incidental take permits) were inadequate to prevent the extinction of this species. Since the listing status for the Longfin Smelt has changed, FWS must be reconsulted as part of the preparation of the 2025-2034 EA/EIR for the Project. Historically, the Corps has conducted the majority of the O&M dredging in the Bay using two technologies: hopper dredges and mechanical dredges. The Corps has used a third technology, cutterhead dredges, in the Napa River Channel, Petaluma River Channel, and the San Leandro Marina. It is Baykeeper's understanding that the Corps is considering increasing the use of cutterhead dredges in channels that have historically been mechanically dredged. The 2015-2024 EA/EIR contains a single paragraph discussing the impacts from cutterhead dredging on Delta Smelt in the Napa River Channel, Petaluma River Channel, and San Leandro Marina. This analysis relied on limited data from 2006/2007, which found that the risk of entrainment from cutterhead dredging was negligible. The only mitigation measure adopted was to avoid conducting cutterhead dredging when water temperatures are above 22 degrees Celsius, to the extent feasible. If the Corps intends to expand the use of cutterhead dredges in the Bay, then it must update the 2025-2034 EA/EIR to assess whether the mitigation measure identified in the 2015-2024 EA/EIR is sufficient to protect smelt in other parts of the Bay, and if not, identify other mitigation measures needed to ensure impacts from cutterhead dredging are not significant. Dredging with hopper dredges has significant adverse impacts on Delta Smelt and Longfin Smelt, because the fish get sucked into the dredge (i.e., entrained) and are killed. The 2015-2024 EA/EIR included analysis of a 2013 entrainment study conducted by the U.S. Army Engineer Research and Development Center which concluded that up to 29% of the annual population abundance of Delta Smelt, and up to 8% of the annual population abundance of Longfin Smelt, will be entrained by the hopper dredges the Corps proposed to use in its O&M dredging operations in the Bay. Provision 13 of the Regional Board's Clean Water Act section 401 Water Quality Certification for the 2015-2024 Project required the Corps to conduct entrainment monitoring to collect data regarding the entrainment rates for Delta Smelt, Longfin Smelt, and other special status fish species during hopper dredging episodes in the Bay. Below is the Corps' entrainment data for Longfin Smelt that is available to Baykeeper from the period between 2016 and 2019. The Corps discontinued its entrainment monitoring program in 2020 due to the COVID-19 pandemic, and it is unclear to Baykeeper when the Corps resumed monitoring, if at all. **Location** / **Month/Year** / **Number of LFS Entrained** Richmond Outer Harbor (ROH) / June 2016 / 12 ROH / October 2016 / 0 Pinole Shoal / October 2016 / 0 Pinole Shoal / June 2017 / 56 Pinole Shoal / November 2017 / 3 ROH / June 2018 / 0 ROH / October 2018 / 30 Pinole Shoal / August 2019 / 1 The 2025-2034 EA/EIR must include an assessment of the entrainment monitoring data collected between 2015 and 2024. Based on Baykeeper's analysis of the entrainment monitoring data the Corps collected between 2016 and 2019, the Corps recorded more than 100 entrained Longfin Smelt, but the actual number of entrained fish is likely significantly higher. Dredging outside of the work window in June 2016 resulted in the entrainment of more than half of the recorded Longfin Smelt over that four-year period, and roughly a third of the recorded entrainment occurred in October 2018, within the August 1 to November 30 work window. It is no surprise that dredging outside and inside of the work window has resulted in significant adverse impacts to smelt. The August 1 to November 30 work window for smelt established by the 1998 LTMS Programmatic Biological Opinion is the primary mitigation measure relied upon to address impacts to these species. Given subsequent species listings, critical habitat designations, ongoing aquatic species decline, and the advancement of science that have occurred during the past 26 years, that Biological Opinion is now extremely outdated. For example, current science indicates that pre-spawning adult Longfin Smelt aggregate in the Central Bay during spring and summer, including August and September, before moving into the northern estuary (Suisun Bay and western Delta) from October through March. Thus, Longfin Smelt are likely to be present in the Project areas during the August 1 to November 30 work window. In contrast, larval Longfin Smelt are uncommon in the Central Bay between December and March. Therefore, in order to avoid entrainment impacts to pre-spawning adult and young-of-year Longfin Smelt, the work window for the Corps' dredging activities in the Central Bay should be revised to occur between December and mid-February. The Resource agencies must be re-consulted to inform the 2025-2034 EA/EIR's updated mitigation measures for the Corps' O&M dredging.	

Commenter Name	Scoping Comment	Response
	In addition to native smelt, the Corps' O&M dredging can also adversely impact the Bay's sturgeon populations. The southern DPS of Green Sturgeon is listed under the federal ESA as a threatened species, and the entire San Francisco Bay below the mean higher high water is designated as critical habitat for this species, including the Project area. Green sturgeon is also considered a species of special concern by the California Department of Fish and Wildlife (CDFW). The 2015-2024 EA/EIR did not identify a work window for green sturgeon, since the species was presumed to be present throughout the Bay year-round. According to the 2015-2024 EA/EIR, the LTMS agencies were in the process of updating the LTMS Programmatic ESA consultation with the National Marine Fisheries Service to include Green Sturgeon. The 2025-2034 EA/EIR must incorporate the analysis from this updated federal ESA consultation to ensure the adverse impacts to Green Sturgeon are adequately mitigated to not significant. In summer 2022, large sections of the Bay experienced a catastrophic red tide and resulting fish kill. Among the fish most affected were the White Sturgeon, a species with an already dwindling population. In response to this devastating fish kill, at the end of 2023, Baykeeper and partners petitioned FWS to list the White Sturgeon as threatened under the federal ESA.2 At the same time, Baykeeper and partners also petitioned CDFW to list the White Sturgeon as threatened under the California ESA. Both listing processes are currently ongoing, so the 2025-2034 EA/EIR will need to include a robust analysis for this species.	
San Francisco Baykeeper (continued)	Dredging of the federal navigational channels, as well as smaller-scale dredging projects, poses a variety of direct and indirect impacts to White Sturgeon. In 2009, the San Francisco Estuary Institute prepared a study for the Corps regarding Bay dredging impacts on Green Sturgeon. Direct impacts included entrainment from hydraulic dredging, exposure to contaminated sediments, water quality impacts via sediment resuspension and sedimentation, disturbance from underwater noise, and changes to habitat (e.g., bed leveling). Indirect impacts included modifications to prey base, increased occurrence of ship propeller strikes, and predation by invasive species. Impacts to Green Sturgeon are likely amplified for White Sturgeon, because White Sturgeon spend most of their lives in the Bay, whereas Green Sturgeon migrate through the estuary quickly. Thus, the 2025-2034 EA/EIR must assess the adverse impacts to Green Sturgeon and White Sturgeon, as well as appropriate mitigation measures to reduce impacts to not significant. **Marine Navigation:** The 2015-2024 EA/EIR assumed the Pinole Shoal Channel and Richmond Outer Harbor would be dredged annually, and it did not analyze the impacts from deferring dredging to every other year in these channels. Rather, the 2015-2024 EA/EIR included a "qualitative notation," asserting the risk of a navigational hazard (i.e., vessel groundings, allisions, or collisions) was "speculative" and thus did not require a full assessment. However, in response to the Regional Board's inclusion of Provision 10 in the Clean Water Act section 401 Water Quality Certification for the Project, requiring the Corps to reduce hydraulic dredging in the Bay, the Corps decided to dredge Pinole Shoal Channel and Richmond Outer Harbor every other year to save costs – deferring dredging beginning in 2017. These two channels provide ship access to the Bay's refinery corridor, so it is critical these channels are maintained to minimize the risk of navigational accidents and resulting oil spills. The 2025-2034 EA/EIR must thoroughly assess the adverse environmental and navigational impacts of deferred dredging in these navigation channels. In fall 2020, the Port Captain for the Marathon Refinery in Martinez, whose ships access the refinery via the Pinole Shoal Channel, contacted the U.S. Coast Guard to request the Corps conduct emergency dredging in the channel. The U.S. Coast Guard agreed shoaling had created a navigational hazard, and in November 2020, the Corps conducted emergency dredging in Pinole Shoal Channel to remove a significant shoal of sediments that had reduced the navigable width of the channel. Similarly, in summer 2022, the Port Captain for the Marathon Refinery in Martinez again contacted the U.S. Coast Guard to request the Corps conduct additional emergency dredging in Pinole Shoal Channel. However, the U.S. Coast Guard declined this request. It is Baykeeper's understanding that the Corps intends to analyze both annual and bi-annual dredging frequencies for Pinole Shoal Channel and Richmond Outer Harbor in the 2025-2034 EA/EIR. Baykeeper expects this analysis to include a robust analysis of the navigational risks associated with deferring dredging in these channels. Rather than rely on the warnings of third parties to activate emergency dredging, the Corps must conduct its own internal bathymetric monitoring to actively assess the condition of the deferred channel. We cannot continue to risk a catastrophic oil spill on the Bay due to untimely maintenance dredging in these channels.	Thank you for your comment. As commentor suggests, under the No Project Alternative, existing dredging activities and the current dredging program as implemented by USACE would continue irrespective of current federally authorized dredging frequencies for channels. For Richmond Outer Harbor and Pinole Shoal, dredging would occur every other year rather than annually. Effects of the reduced, or lack of, annual maintenance of dredging for Richmond Outer Harbor and Pinole Shoal channels on navigation will be described in this EA/EIR. 33 CFR § 64.31 outlines the factors considered by the U.S. Coast Guard when determining if an obstruction is a hazard to navigation. This determination is crucial because it dictates whether the obstruction needs to be marked or removed to ensure safe navigation in U.S. waters. If the USCG determine that shoaling in a federal channel is a hazard to safe navigation, typically based on USACE condition surveys that are posted publicly, they will request emergency dredging from USACE under the existing MOU between both agencies regarding the mitigation of obstructions to navigation. If USACE San Francisco District pursuant to 33 CFR § 337.7 determines it's an emergency, then it will send a declaration to the USACE South Pacific Division commander and initiate an emergency dredging action to retore safe deep draft vessel navigation or reduce imminent risks to life, health, property or severe economic losses, and potential severe adverse impacts to the surround environment.

Commenter Name	Scoping Comment	Response
	Conclusion: In sum, the Corps' 2025-2034 O&M dredging program presents an exciting opportunity to maximize beneficial reuse and keep sediment in the Bay ecosystem. However, the Corps' O&M dredging also presents adverse impacts to several Bay fish on the brink of extinction which must be thoroughly mitigated. Baykeeper thanks the Regional Board and the Corps for the opportunity to comment on the NOP. We look forward to reviewing the 2025-2034 EA/EIR and are available to work with staff to prepare this analysis. Please contact me via email at nicole@baykeeper.org or via telephone at (510) 735-9700 x 110 with any questions or concerns.	
John DiRe Annabelle Joy Craig Merrileess, Board Members **Sausalito Working Waterfront Coalition**	Dear Jazzy Graham-Davis The Sausalito Working Waterfront Coalition is a non-profit organization whose mission is to advocate for the protection and expansion of Sausalito's waterfront industry and culture. Our vision for the future includes an expanded maritime/artist/industrial economic engine that leverages Marinship's history of innovation and fabrication. Marinship is poised to become an innovation and incubation hub focused on resilient technologies that can address the realities of a changing environment. Our coalition is comprised of waterfront property owners, businesses, employees, educators and local, regional and national residents. We are also affiliated with the National Working Waterfront Network. It has come to our attention that the upcoming SF Bay dredging operation will not include the Sausalito navigation channel in Richardson's Bay. Please be aware that this oversight is potentially a significant economic hardship to Sausalito and southern Marin's economy, much of which depends on the maritime industry. Also realize that the Army Corp debris removal operations in Sausalito use this same channel. Please reconsider your decision to exclude Richardson Bay and the Sausalito channel from the dredging plan. Thank you for your attention to this matter.	Thank you for your comment. As explained in Section 2.4.7, Richardson Bay portion of San Francisco Harbor is dredged infrequently and is not projected to be dredged in the time span covered by this EA/EIR. If federal interest in dredging a channel not included in this EA/EIR is determined at a later date, separate environmental analysis and permitting would be performed for the channel to be added.
Nicole C. Sasaki Staff Attorney **San Francisco Baykeeper** 1736 Franklin Street, Suite 800 Oakland, CA 94612 (510) 735-9700	Hello Jazzy - Thanks for yesterday's scoping presentation. I heard someone say the Project will include the Sacramento to Stockton navigational channel, but I'm not seeing that in the NOP. Can you please confirm that the Suisun Bay Channel will be as far east as the Project will go? Thanks! Nicole	Thank you for your comment. This is correct; the EA/EIR will not include the Sacramento River Deep Water Ship Channel or John F. Baldwin and Stockton Deepwater Ship channels. See Figure 1-2 for reference.
Wes Turner Research Data Specialist I **California Geologic Energy Management Division** (916) 529-9814	Good Morning, I am a GIS specialist at GalGEM. I'm assisting Nick Aiello with a CEQA project, title: San Francisco Bay Federal Channels Operation and Maintenance Dredging and Sediment Placement Activities (Proposed Project) I need to make a list of all the parcel polygons shown in the two large areas shown in purple in the attached document. Were those polygons created in GIS? If so, could you send the shapefiles used to me, or put me in contact with your GIS unit? This would greatly help with me ensuring all the needed parcels are selected. Thank you, Wes Hi Jazzy, were you able to locate shapefiles for the Cullinan Ranch and Montezuma areas? Thanks, Wes	The Water Board provided the requested files on March 1, 2024.

Commenter Name	Scoping Comment	Response
Brenda Goeden #1	Brenda Goeden: 1. Will this document cover any advance maintenance dredging? 2. Is the Jack Maltester Channel? There is no marina in which to dredge to currently.	Thank you for your comment. The EA/EIR will not include advance maintenance dredging (see alternative descriptions in Chapter 2). Jack Maltester Channel is not included in this EA/EIR.
Nicole Sasaki, Baykeeper #1	What is the frequency for dredging the navigation channels? Specifically, will the Pinole Shoal channel in Richmond Outer Harbor be dredged annually or every other year?	Thank you for your comment. The EA/EIR will include an analysis of both dredging scenarios for Pinole Shoal. It is assumed that both channels would be dredged every other year under the CEQA No Project Alternative, and every year under the NEPA No Project Alternative.
Jim Haussener	Jim Haussener #1: A clarifying question about which projects are not getting dredged. I believe, Arye, you made a comment about Suisun Slough, and it looked like there might have been some black versus red, and I was thinking about further up into Redwood Creek, as well as Richmond Inner. So which projects, currently, were you not looking at dredging? It looked like perhaps Richardson Bay was listed as being project number 3 which is SF Harbor, which looked like it was in black. It would be nice to know which ones are not included in this process.	Thank you for your comment. The EA/EIR will list the channels that are expected to be dredged during this planning horizon.
Jim Haussener	Jim Haussener #2: I am trying to get some clarification on some of these as to why. In Richardson Bay, there's complaints that boats are running aground. Islas Creek, I've heard from the Port of San Francisco, there's complaints that it needs some dredging. Obviously, Suisun Slough, now that the disposition is over. I met with Congressman Garamendi two weeks ago, and he is still pushing the Mare Island Strait project. So, I'm just wondering what process the Corps went through when they submitted the application to the Water Board for these projects that are authorized, and may not have been dredged for in quite some time, but still are authorized projects, and why they got dropped out. How do we get them back in?	Thank you for your comment. Section 2.5.7 explains why some channels were excluded. If federal interest in dredging a channel not included in this EA/EIR is determined at a later date, separate environmental analysis and permitting would be performed for the channel to be added.
Jim Haussener	Jim Haussener #3: I am the chair of the dredging work group for the San Francisco Harbor Safety Committee. There's a consensus by the membership of the work group that hydraulic dredging is faster, more thorough, provides a more uniform grade, less anchors, less coordination, and safe. I didn't necessarily see it, so we would like to make sure that the safety aspect of that is recognized. One of the problems with Oakland Inner in particular is that there's a lot of coordination to get the dredge and the anchors, primarily the anchors, out of the way. And there have been delays and vessels have not been able to leave because they couldn't get that dredge out of the way. And so the consensus is, from a safety point of view, that we may want to take a look at more hydraulic dredging - not hopper dredging, but hydraulic cutter head dredges. Thank you.	Thank you for your comment. The Draft EA/EIR will address potential environmental impacts associated with alternatives developed through the RDMMP process, including the impacts of different dredge methods. The RDMMP outlines the plan for dredging and dredged sediment management over the next 20 years, starting in 2025, presents a detailed assessment of dredging and placement alternatives for federally authorized navigation channels within the study area, and establishes a regional Federal Standard Base Plan (i.e., the least cost, environmentally acceptable, and technically feasible dredging and placement option across the San Francisco Bay region). Safety and viability of various dredging methods, including hydraulic cutterhead dredges, were evaluated and considered in the alternatives developed for the RDMMP. In addition, hydraulic cutterhead is included as an alternate dredge method in several channels, including in Oakland Harbor, when appropriate.

Commenter Name	Scoping Comment	Response
Brenda Goeden #2	Is this document covering the outer coast and the Sacramento District's channels? I thought it was for SFBay only.	Thank you for your comment. This EA/EIR only covers USACE San Francisco District channels. Refer to Figure 1-2.
Nicole Sasaki, Baykeeper #2	Will the Corps continue entrainment monitoring? I know it is paused due to COVID, but I am unsure whether or not the pause is indefinite.	Thank you for your comment. USACE has reinitiated entrainment monitoring.
Jim McNally, jmcnally@mansonconstruction.com Manson Construction Co.	Subject - Specifying the use of turbidity curtains to protect eel grass beds adjacent to dredge areas. Comment: Turbidity curtains are impractical for use in deep water or water of any significant current. See ERDC Technical note ERDC TN-DOER-E21. Lengthy anchored Turbidity curtains in or near deep draft navigation channels are not effective and not practical due to the risk presented to safe navigation of vessels by the potential for fouling of ships propellors with curtain. Our suggestion is to continue to use light transmittance readings and eel grass survey monitoring to demonstrate protection of eel grass beds and not specify the installation of turbidity curtains as was attempted in the 23' O&M dredging at Oakland and Richmond.	Thank you for your comment. The installation of turbidity curtains will not be specified in the EA/EIR.