FINDING OF NO SIGNIFICANT IMPACT

CRESCENT CITY HARBOR MAINTENANCE DREDGING
CRESCENT CITY, DEL NORTE COUNTY, CALIFORNIA

The U.S. Army Corps of Engineers, San Francisco District (USACE) has conducted an environmental analysis in accordance with the National Environmental Policy Act of 1969, as amended. The Final Environmental Assessment (EA) dated 12 July 2024, for the Crescent City Harbor Maintenance Dredging FY2024-2035 addresses navigational access and safety opportunities and feasibility in the Crescent City, Del Norte County, California area.

The EA evaluated various alternatives that would maintain navigational access and safety in the study area. The recommended plan is described below:

- The Proposed Action is the maintenance dredging of the Crescent City Harbor Federal Channels, using hydraulic and/or mechanical dredge equipment, and in-water placement of dredged material at the Humboldt Open Ocean Disposal Site (HOODS), Whaler Island Nearshore Site, Crescent City Dredge Pond, or a combination of the three placement sites. The specific dredging method and placement site (or sites) will depend on individual project factors like sediment characteristics, sediment suitability, site capacity, available funding, scheduling constraints, etc. The dredging action will involve the removal of approximately 60,000 cubic yards of material (on average) from the Entrance Channel, Inner Harbor Basin, and Marina Access Channel to reach the maintenance depths of -20 feet, -15 feet, and -15 feet MLLW, respectively, with two feet of allowable overdepth. The in-water placement work window is July 1 through October 15, as established by the California Department of Fish and Wildlife (CDFW), and which the USACE recognizes as a matter of comity. The USACE regularly requests an extension of the work window to November 15, provided that heavy rains have not begun. The Proposed Action dredging duration typically requires two months, though this is highly dependent on individual year project needs. As a USACE dredging project, the Proposed Action is in compliance with the Federal Standard, 33 C.F.R. Part 335, Section 335.7. The Federal Standard requires that the dredged material disposal alternative or alternatives identified by the USACE represent the least costly alternatives consistent with sound engineering practices and meeting the environmental standards established by the 404(b)(1) evaluation process or ocean dumping criteria. Therefore, the specific disposal location and dredging method will likely be determined during the contracting process based on cost. Given the variability between project years, this programmatic EA intends to cover ten calendar years of project actions consistent with those described below or the removal of 600,000 cubic yards of dredged material[1]. Once one of these markers has been reached, further NEPA analysis may be required. While this programmatic analysis ensures NEPA coverage, compliance would still be required for all other applicable environmental laws and regulations, such as the Clean Water Act, the Endangered Species Act, etc.

In addition to a No Action Alternative, five other alternatives were considered and are described in Chapter 3 of the EA and listed below in Table 1.

[1] Calculated using the project average of 60,000 cubic yards per episode, times ten calendar years.

Table 1. Proposed Alternatives in addition to the No Action

Proposed Alternatives	Carried forward	Eliminated
Dredging and Disposal at the Humboldt Open Ocean Disposal Site (HOODS)	X	
Dredging and Disposal at the Whaler Island Nearshore Site	X	
Dredging and Disposal at the Crescent City Dredge Pond	X	
Rogue River Ocean Dredged Material Disposal Site		X
Chetco River Ocean Dredged Material Disposal and Nearshore Placement Site		X

SUMMARY OF POTENTIAL EFFECTS:

For certain potential impacts, such as construction-related noise, the scope of analysis also includes adjacent properties surrounding the project site. Additionally, the scope of analysis incorporates evaluation of potential cumulative impacts associated with past, present, and reasonably foreseeable future projects occurring within the vicinity of the action area and within the temporal scope of the action. In this analysis, the temporal scope of the action includes the dredging performance period and the associated period of indirect effects that could follow, estimated at approximately 2 to 6 months, as described in the EA resource sections. A summary assessment of the potential effects of the recommended plan are listed in Table 2:

Table 2: Summary of Potential Effects of the Recommended Plan

	Insignificant effects	Insignificant effects as a result of mitigation*	Resource unaffected by action
Aesthetics	☒	☐	☐
Recreation	☒	☐	☐
Navigation	☒	☐	☐
Cultural and Historic Resources	☒	☐	☐
Water Quality	☒	☐	☐
Geology, Sedimentation, and Seismology	☒	☐	☐
Hazardous and Toxic Materials	☒	☐	☐
Biological Resources	☒	☐	☐
Cumulative Effects	☐	☐	☒

All practicable and appropriate means to avoid or minimize adverse environmental effects were analyzed and incorporated into the recommended plan. Best management practices (BMPs) as detailed in the EA will be implemented, if appropriate, to minimize impacts.[2] BMP's in accordance with the Clean Water Act are discussed in Section 4.6.2 and will be employed as follows depending on dredge type;

[2] 40 CFR 1505.2(a)(3) all practicable means to avoid and minimize environmental harm are adopted.

For Mechanical (*Clamshell*) dredging:

- Multiple horizontal dredge cuts will be taken where a thick horizontal volume needs to be dredged in order to avoid overfilling the bucket and causing spillage.
- No overflow or decant water will be allowed to be discharged from any barge, with the exception of spillage incidental to clamshell dredge operations.

For Hydraulic (*Cutterhead*) dredging:

- Pipeline pumps will only be turned on when the cutterhead is on the seafloor or within 3 feet of the seafloor when priming pumps.
- The cutterhead will be monitored so that it maintains positive contact with the seafloor during suction dredging.
- Effluent monitoring requirements include daily measurements by grab sample for turbidity, as Nephelometric Turbidity Units (NTUs) and settleable solids (as mL/L). Receiving water monitoring will be collected daily for turbidity.

No compensatory mitigation is required as part of the recommended plan.

OTHER ENVIRONMENTAL AND CULTURAL COMPLIANCE REQUIREMENTS:

ENDANGERED SPECIES ACT

Pursuant to section 7 of the Endangered Species Act of 1973, as amended, the U.S. Army Corps of Engineers determined that the recommended plan may affect but is not likely to adversely affect the following federally listed species or their designated critical habitat: marbled murrelet, tidewater goby, and western lily. Concurrence with these findings was received on 13 June 2024 from the U.S. Fish and Wildlife Service (FWS).

Pursuant to section 7 of the Endangered Species Act of 1973, as amended, the USACE determined that the recommended plan may affect but is not likely to adversely affect the following federally listed species or their designated critical habitat Southern Oregon/Northern California Coast (SONCC) coho salmon, the southern district population segment (DPS) of North American green sturgeon, and the southern DPS of Eulachon, or the designated critical habitat of SONCC coho salmon. USACE is consulting with the National Marine Fisheries Service (NMFS) under the Magnuson-Stevens Fisheries Conservation and Management Act that the proposed project may affect EFH for the Pacific Groundfish Fishery Management Plan (FMP), Pacific Salmon FMP, and Pacific Coastal Pelagic Species FMP. Concurrence is expected by 12 July 2024.

NATIONAL HISTORIC PRESERVATION ACT

NO HISTORIC PROPERTIES AFFECTED:

Pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended, the USACE determined on December 31, 1996 under 36 C.F.R. § 800.4(d)(1) that the recommended plan has no effect on historic properties. Past review covered maintenance dredging within Crescent City Harbor's Entrance Channel, Inner Harbor Channel, and Access Channel Marina and no new analysis was warranted.

CLEAN WATER ACT SECTION 404(B)(1) COMPLIANCE

Pursuant to the Clean Water Act of 1972, as amended, the discharge of dredged or fill material associated with the recommended plan has been found to be compliant with section 404(b)(1) Guidelines (40 C.F.R. Part 230). The Clean Water Act Section 404(b)(1) Guidelines evaluation is found in Appendix A of the EA.

CLEAN WATER ACT SECTION 401 COMPLIANCE:

A Waste Discharge Requirement / Water Quality Certification (WDR/WQC) pursuant to section 401 of the Clean Water Act was obtained from the California Regional Water Quality Control Board, North Coast Region for the maintenance dredging of the district berthing areas and federal channel on August 25, 2000. All conditions of the monitoring and reporting program attached to the WDR/WQC shall be implemented in order to minimize adverse impacts to water quality.

COASTAL ZONE MANAGEMENT ACT

A determination of consistency with the California Coastal Zone Management program pursuant to the Coastal Zone Management Act of 1972 will be obtained from the California Coastal Commission by 14 July 2024. It is anticipated that the California Coastal Commission will state that the recommended plan appears to be consistent with state Coastal Zone Management plans, pending confirmation based on information to be developed during the pre-construction engineering and design phase. All conditions of the determination shall be implemented in order to minimize adverse impacts to the coastal zone.

OTHER SIGNIFICANT ENVIRONMENTAL COMPLIANCE:

All applicable environmental laws have been considered and coordination with appropriate agencies is expected to be completed by 12 July 2024.

FINDING

Technical, environmental, and economic criteria used in the formulation of alternative plans were those specified in the Water Resources Council's 1983 Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies. All applicable laws, executive orders, regulations, and local government plans were considered in evaluation of alternatives.[3] Based on this report, the reviews by other Federal, State and local agencies, Tribes, input of the public, and the review by my staff, it is my determination that the recommended plan would not cause significant adverse effects on the quality of the human environment; therefore, preparation of an Environmental Impact Statement is not required.[4]

[3] 40 CFR 1505.2(a)(2) requires identification of relevant factors including any essential to national policy which were balanced in the agency decision.

[4] 40 CFR 1508.1(l) states the FONSI is a document by a Federal agency briefly presenting the reasons why an action, not otherwise categorically excluded (§ 15018.4), will not have a significant effect on the human environment and for which an environmental impact statement therefore will not be prepared.

SHEBESTA.TIMOTHY.WILLIAM.1260730980 Digitally signed by SHEBESTA.TIMOTHY.WILLIAM.1260730980 Date: 2024.07.03 10:09:08 -07'00'

03 JULY 2024
Date

Timothy W. Shebesta
Lieutenant Colonel, U.S. Army
District Commander and Engineer

Final Environmental Assessment

For

Crescent City Harbor Maintenance Dredging
Crescent City, Del Norte County, California
Fiscal Years 2024-2035

U.S. Army Corps of Engineers
San Francisco District

June 2024

TABLE OF CONTENTS

ACRONYYMS AND ABBREVIATIONS

APE	Area of Potential Effects
BA	Biological Assessment
BMPs	best management practices
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
Caltrans	California Department of Transportation
CCC	California Coastal Commission
CDFW	California Department of Fish and Wildlife
CEQ	Council on Environmental Quality
Chetco	Chetco River Section 102 Ocean Dredged Material Disposal Site
CWA	Clean Water Act
DNSWMA	Del Norte Solid Waste Management Authority
DTSC	California Department of Toxic Substances Control
EA	Environmental Assessment
EFH	Essential Fish Habitat
ER	Engineering Regulation 200-2-2
FMP	Fishery Management Plan
HOODS	Humboldt Open Ocean Disposal Site
MET	modified elutriate testing
MHHW	mean higher high water
mL/L	milliliter per liter
MLD	most likely descendants
MLLW	mean lower low water
MPRSA	Marine Protection, Research, and Sanctuaries Act
MSFCMCA	Magnuson-Stevens Fishery Conservation and Management Act
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
National Register	National Register of Historic Places
NCRWQCB	North Coast Regional Water Quality Control Board
NCUAQMD	North Coast Unified Air Quality Management District
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMSA	National Marine Sanctuaries Act
NTU	Nephelometric Turbidity Units
O&M	Operations and Maintenance program
Rogue	Rogue River Ocean Dredged Material Disposal Site
RWCQB	Regional Water Quality Control Board
SMMP	site management and monitoring plan
SPCC	Spill Prevention, Control, and Countermeasures

USACE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service

1 PROPOSED PROJECT

1.1 Introduction

This environmental assessment (EA) is written in compliance with the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. § 4321 *et seq.*), as amended, the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of the NEPA (40 C.F.R. §§1500-1508), and U.S. Army Corps of Engineers (USACE) Engineering Regulation (ER) 200-2-2, Procedures for Implementing NEPA. It presents an evaluation of the potential impacts associated with the proposed maintenance dredging of the Crescent City Harbor Federal Channel within fiscal years 2024-2035.

1.2 Description and Location

Crescent City Harbor is a small commercial harbor located on the Northern California coast, approximately 280 miles north of San Francisco and 17 miles south of the Oregon border. The south facing harbor occupies a natural indentation in the coastline and is protected by a 4,700- foot rubble mound Outer Breakwater to the west; a 2,400-foot sand barrier to the east; a 1,600-foot inner breakwater to the south; and the topography of the coastline to the north.

Federally authorized construction of the harbor's Outer and Inner Breakwaters, sand barrier, Outer Basin, and the 10-foot deep Inner Small Boat Basin was completed in 1957. A 400-foot extension to the Inner Breakwater was completed in 1973, and a 20-foot-deep Inner Harbor Basin and Entrance Channel was completed in 1983 (Leidersdorf 1975, USACE 1999a). As authorized in 1965 and following a 1999 Final General Reevaluation Report (USACE 1999b), an access channel was constructed between the Inner Harbor Basin and Inner Boat Basin in 2000 (USACE 2006).

As shown in ***Figure 1***, the Inner Harbor contains two boat basins that are maintained by the Crescent City Harbor District (CCHD). The Commercial Small Boat Basin (Outer Boat Basin) has temporary moorage space for approximately 20 vessels. The Outer Basin also contains two fish processing plants with docks, a main dock (Citizens Dock), a marine repair facility equipped with a syncrolift, a dock for the U.S. Coast Guard (USCG), and other auxiliary commercial and recreational facilities. Citizens Dock is a publicly owned, Y-shaped wooden dock originally constructed in 1950 and operated by the CCHD and is primarily used for refueling, loading ice, and unloading commercial fish catch. The depths maintained in the Outer Basin range from -10 feet mean lower low water (MLLW) in the southern half adjacent to Whaler Island and -15 feet MLLW in the northern half adjacent to the Citizens Dock. Whaler Island is situated at the westward point of the south jetty, see ***Figure 1***. The Whaler Island Groin protects the harbor district's boat ramp from large tides and ocean swells.

The Recreational Small Boat Basin (Inner Boat Basin) was damaged by a tsunami in 2006 and completely destroyed by the March 11, 2011 tsunami. The rebuilding process took 3 years, and the Inner Boat Basin was re-opened in March 2014. The new Inner Boat Basin was designed to resist a 50-year tsunami event, has 291 slips ranging in length from 30 feet to 70 feet, and is maintained to a depth of -15 feet MLLW.

To remain a viable option for commercial fishing activities, the Harbor must maintain accessibility of its navigation channels for a variety of vessels, especially larger commercial vessels. Dredging of the Entrance Channel and Inner Harbor Basin has been conducted under the U.S. Army Corps of Engineers (USACE) Operations and Maintenance (O&M) program since 1936. The Marina Access Channel was

deepened in 2000, at which time it also became part of the federal channel system. The authorized and maintained depths and widths of each federal channel are depicted in ***Table 1.***

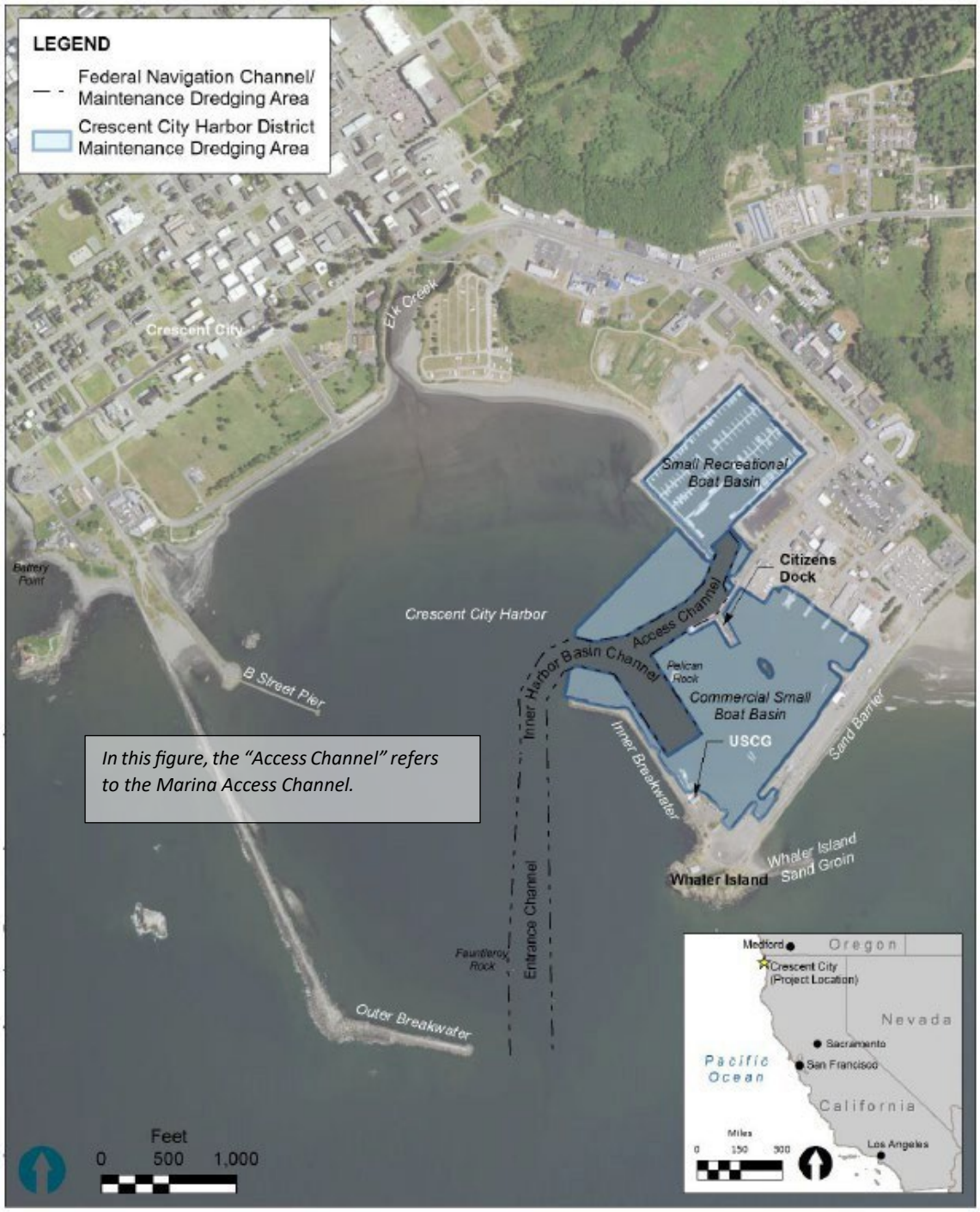

Figure 1. *Crescent City Harbor Federal Channels*

Table 1. *Maintained Dimensions of the Crescent City Harbor Federal Channels*

Federal Channel	Depth (feet MLLW)	Width (feet)
Entrance Channel	-20	200-320
Inner Harbor Basin	-15	200-300
Marina Access Channel	-15	140-210

While all three federal channels are congressionally authorized to a depth of -20 MLLW, only the Entrance Channel is maintained to that depth. Portions of the inner harbor that are outside and adjacent to the federal channels are maintained by the CCHD to a depth of -15 feet MLLW along the Inner Breakwater and to a depth of -12 feet MLLW northeast of the Marina Access Channel.

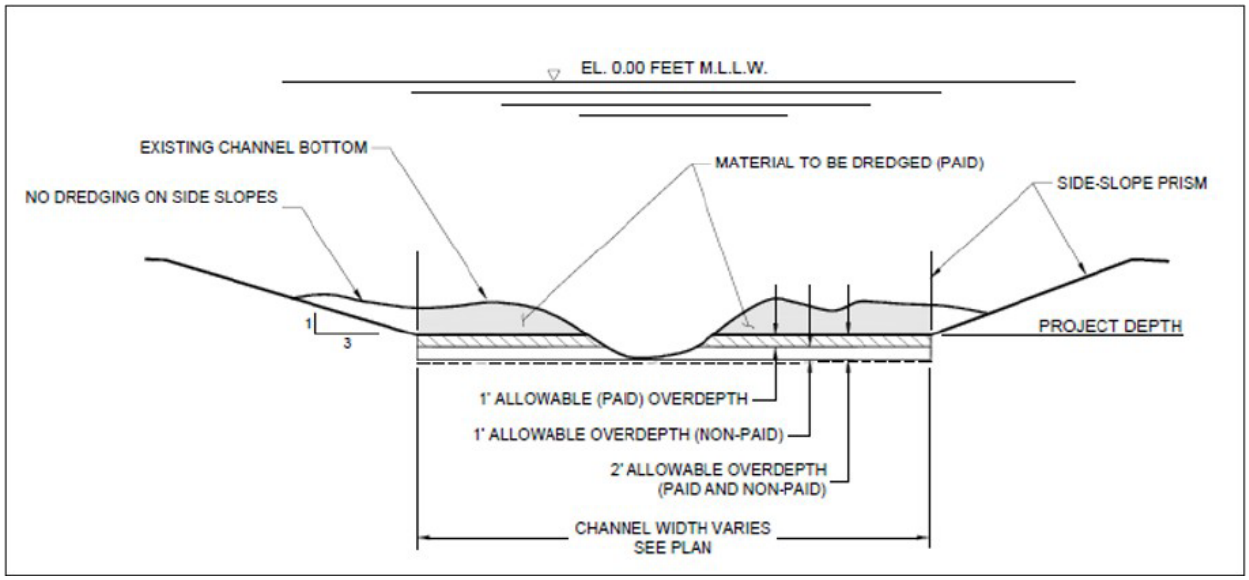

Figure 2. *Typical Dredging Section*

1.3 Historical Maintenance Dredging

The Crescent City Harbor was first dredged under the USACE O&M Program in 1936. Since that time, maintenance dredging of the channels has occurred at intervals ranging from one to seventeen years between each episode. In 1999, only the Entrance Channel was dredged, and in 2000 the Marina Access Channel was deepened and became a federal channel. Due to funding constraints, the Marina Access Channel and Entrance Channel were only dredged to -14 feet MLLW (with one foot of overdepth) in 2011, instead of the standard depth of -15 and -20 feet MLLW, respectively. Based on dredged volumes from 1936 to 2019, an approximate total of 1,027,601 cubic yards has been dredged from the Crescent City Harbor Federal Channels. See ***Table 2*** (below) for more information.

A hopper dredge was used to dredge the channels from 1936 to 1939. From 1956 to present, all dredging has been performed with a cutterhead dredge and hydraulic pipeline, aside from the use of a hopper dredge for the portion of the channels in 1982.

Table 2. *Crescent City Harbor Federal Channels Historical Dredge Volumes*

Fiscal Year	Channels	Volume (cubic yards)
1936	Entrance Channel, Inner Harbor Basin	48,449
1937	Entrance Channel, Inner Harbor Basin	27,756
1938	Entrance Channel, Inner Harbor Basin	16,353
1939	Entrance Channel, Inner Harbor Basin	58,396
1956/1957	Entrance Channel, Inner Harbor Basin	120,466
1964/1965	Entrance Channel, Inner Harbor Basin	187,372[a]
1976	Entrance Channel, Inner Harbor Basin	61,013
1982	Entrance Channel, Inner Harbor Basin	107,019
1983	Entrance Channel, Inner Harbor Basin	40,221
1988	Entrance Channel, Inner Harbor Basin	62,192
1993	Entrance Channel, Inner Harbor Basin	37,487
1999/2000	Entrance Channel, Marina Access Channel	88,867
2009	Marina Access Channel	34,947
2011[b]	Entrance Channel, Inner Harbor Basin	41,630
2019	Entrance Channel, Inner Harbor Basin, Marina Access Channel	131,000
2024	Entrance Channel, Inner Harbor Basin, Marina Access Channel	114,632[c]
		PROJECT AVERAGE: 60,491

a. The 1964 tsunami may have contributed to above average dredge volume.

b. Due to funding constraints, the Entrance Channel and Marina Access Channel were only dredged to -14 feet MLLW (with one foot of overdepth) in 2011.

c. The 2024 value is an estimate only, as the federal channels have not yet been dredged.

1.4 Study Authority

The existing federal project for the improvement of the Crescent City Harbor was authorized by the Rivers and Harbors Act of 1918. It was based on the report printed in House Document 434 of the 64th Congress, First Session, and provided for construction of a rubble mound Outer Breakwater. The CCHD is the non-federal sponsor for the project. The documents authorizing improvements that comprise the existing federal project are summarized in ***Table 3***.

Table 3. *Crescent City Harbor Project Authorizations*

Authorization Date	Project Description	Documentation
July 18, 1918	A breakwater bearing S. 26-1/4 E. from Battery Point to Fauntleroy Rock and breakwater from the shore to Whaler Island.	*House Doc. 434, 64th Congress, 1st Session*
September 22, 1922	Modified condition of local cooperation, which required that local interests construct a railroad from Grants Pass, Oregon to Crescent City, California. State Highway to Grants Pass would be an acceptable alternative.	*Committee Doc. 4, 67th Congress, 2nd Session*
January 21, 1927	Extension of the breakwater to a length of 3,000 feet and a reduced cash contribution required of local interests.	*House Doc. 595, 69th Congress, 2nd Session*
August 30, 1935	Maintenance by dredging of an outer harbor basin that is 1,800 feet long, 1,400 feet wide and 20 feet deep, except in rock.	*Committee Doc. 40, 74th Congress*
August 26, 1937	Construction of a sand barrier from Whaler Island to the mainland and for maintenance dredging in the vicinity of the seaward end of the sand barrier.	*Senate Committee Print, 75th Congress, 1st Session*
March 2, 1945	Extension of existing breakwater 2,700 feet to Round Rock (modified by USACE in 1952).	*House Doc. 688, 76th Congress, 3rd Session*
March 2, 1945	Construction of inner breakwater and removal of pinnacle rock and other material from the harbor to a depth of 12 feet and a harbor basin with a project depth of 10 feet.	*Report on file in office, Chief of Engineers by 2nd Endorsement dated 23 August 1943*
October 27, 1965	Extension of inner breakwater and dredging of a T-shaped harbor basin to a depth of 20 feet.	*House Doc. 264, 89th Congress, 1st Session*

1.1 Purpose and Need for Proposed Action

Crescent City Harbor has experienced excessive shoaling in the federal channels and areas maintained by the CCHD, resulting in reduced depths that limit navigation, especially for larger commercial vessels. The proposed maintenance dredging of the Crescent City Harbor will improve navigable access to the harbor for both recreational and commercial boat traffic by increasing the water depths in the federal channels to the congressionally authorized depth of -20 feet MLLW plus two feet of allowable overdepth in the Entrance Channel, and the maintenance depth of -15 feet MLLW plus two feet allowable overdepth in the Inner Harbor Basin and Marina Access Channel.

2 SCOPE OF ANALYSIS

This EA analyzes whether the proposed action will significantly affect the quality of the human environment. The scope of this project analysis is limited in time and space by the reasonably foreseeable direct, indirect, and cumulative impacts of the proposed action. Direct effects are caused by the action and occur at the same time and place as the action (40 C.F.R. §1508.1(i)(1)) while indirect effects are caused by the action, but may occur later in time or further removed in distance (40 C.F.R. § 1508.1(i)(2)). Cumulative effects "result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions" (40 C.F.R. § 1508.1(i)(3)).

The action area for this analysis includes the open-water areas of Crescent City Harbor federal channels, the Humboldt Open Ocean Disposal Site (HOODS), the Whaler Island Nearshore Site, and the Crescent City Dredge Pond, see ***Figure 3*** below. For certain potential impacts, such as construction-related noise, the scope of analysis also includes adjacent properties surrounding the project site. Additionally, the scope of analysis incorporates evaluation of potential cumulative impacts associated with past, present, and reasonably foreseeable future projects occur within the vicinity of the action area within the temporal scope of the action. In this analysis, the temporal scope of the action includes the dredging performance period and the associated period of indirect effects that could follow, estimated at approximately 2 to 6 months, as described in the resource sections below.

Given the variability between project years, this programmatic EA intends to cover ten calendar years of project actions consistent with those described below or the removal of 600,000 cubic yards of dredged material[1]. Once one of these markers has been reached, further NEPA analysis may be required. If a new placement site (such as a nearshore site, for example) becomes available, further NEPA analysis may be required to cover those actions.

[1] Calculated using the project average of 60,000 cubic yards per episode, times ten calendar years.

Figure 3. Placement Site Options.

3 PROPOSED ACTION AND ALTERNATIVES

3.1 Proposed Action

The Proposed Action is the maintenance dredging of the Crescent City Harbor Federal Channels, using hydraulic and mechanical dredge equipment, and in-water disposal of dredged material at the HOODS, Whaler Island Nearshore Site, Crescent City Dredge Pond, or a combination of the three placement sites. The specific dredging method and placement site (or sites) will depend on individual project factors like sediment characteristics, sediment suitability, site capacity, available funding, scheduling constraints, etc.

The dredging action will involve the removal of approximately 60,000 cubic yards of material (on average) from the Entrance Channel, Inner Harbor Basin, and Marina Access Channel to reach the maintenance depths of -20 feet, -15 feet, and -15 feet MLLW, respectively, with two feet of allowable overdepth.

In recognition of the California Department of Fish and Wildlife's (CDFW) preference, all in-water work (including dredging and placement) will occur within the environmental work window of July 1 through October 15, however, extensions to that window are often required through till November 15, provided that the heavy rains have not begun. The Proposed Action dredging duration typically requires two months, though this is highly dependent on individual year project needs.

As a USACE dredging project, the Proposed Action would be in compliance with the Federal Standard, 33 C.F.R. § 335.7. The Federal Standard requires that the dredged material disposal alternative or alternatives identified by the USACE represent the least costly alternatives consistent with sound engineering practices and meeting the environmental standards established by the 404(b)(1) evaluation process or ocean dumping criteria. Therefore, the specific disposal location and dredging method will likely be determined during the contracting process based on cost.

Proposed Action is composed of multiple dredging episodes. Therefore, this programmatic EA intends to cover ten calendar years of project actions consistent with those described below or the removal of 600,000 cubic yards of dredged material[2]. Once one of these markers has been reached, further NEPA analysis may be required. While this programmatic analysis ensures NEPA coverage consistent with the terms above, compliance would still be required for all other applicable environmental laws and regulations, such as the Clean Water Act, the Endangered Species Act, etc.

3.1.1 Hydraulic *(Cutterhead)* Dredging

A hydraulic dredge is a barge-type vessel that consists of an onboard pump(s), spud piles (long pipes), and a toothed cutterhead attached to a pipeline. The cutterhead is mounted to a ladder that can be lowered, raised, and angled to target material for dredging. The transport pipeline exits at the back (stern) of the dredge.

[2] Calculated using the project average of 60,000 cubic yards per episode, times ten calendar years.

Once the dredge is positioned, the ladder with cutterhead would be lowered to the bottom of the channel. The cutterhead would then slowly start to rotate and break up sediment along the seafloor, continuing from side to side in a sweeping arc. The hydraulic dredge would move along the channel self-propelled by walking with its spuds or controlled by tugboat, and a crew would maintain and operate the dredging equipment at all times. Skiffs and a tugboat would be used for crew transport, maintenance, and other operations associated with dredging activities.

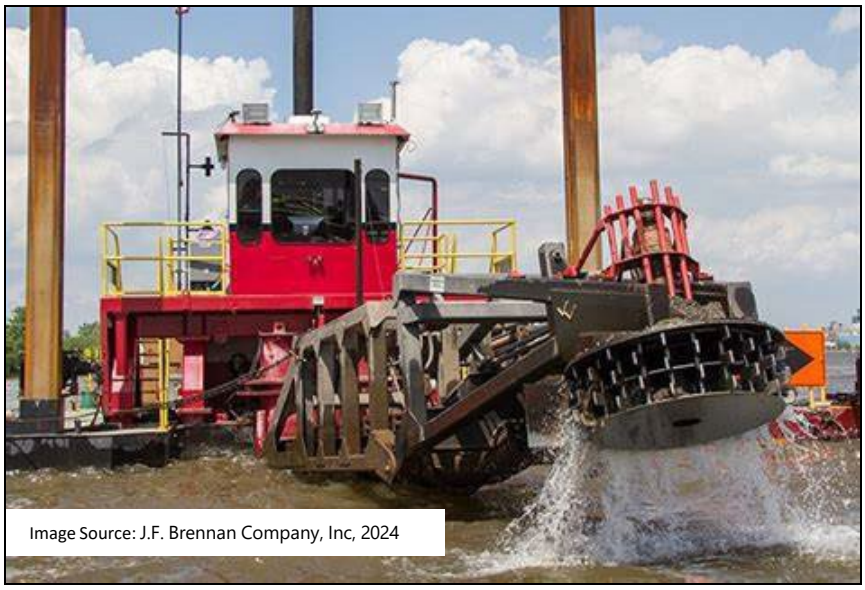

Figure 4. *Hydraulic Dredge Equipment*

The dredged material is expected to consist of 80% to 90% water and 10% to 20% solids by volume. This ratio is dependent upon several factors, such as physical characteristics of the dredged material, thickness of dredge cuts (e.g., thin cuts result in more water and less sediment), and transport distance.

Dredged material would be transported to a local placement site, like the Whaler Island Nearshore Site or the Crescent City Dredge Pond, via pipeline. It is not feasible to transport hydraulically dredged material via pipeline to HOODS given the extensive distance to the site; however, hydraulic dredge may still be used for the HOODS site by loading a dredge barge with material then transporting. While the placement of equipment will be within the project area discussed in this document, the exact route for the pipeline and placement equipment would be determined by the contractor and buoys would be positioned to warn boaters of the pipeline's presence. The pipeline would be made of durable plastic (PVC) or steel and would likely be submerged and anchored to the seafloor to ensure safe navigational access. Pipeline sections and anchors not in use would either be secured on a floating barge, capped and lashed together to float in the channel, or stored in designated staging areas. The length of the pipeline would vary based on which areas are being dredged and which placement site is being utilized. One booster pump may be needed to accommodate the maximum pumping distance.

***Figure 5**. Example of Pipeline Placement*

3.1.2 Mechanical (Clamshell) Dredging

A typical mechanical dredge consists of a crane mounted on a floating flat deck barge, with a dredging bucket (e.g. clamshell) on the end of the crane boom. The barge would have two to four spud piles to anchor the dredge, likely located at the corners. The mechanical dredge would move along the channel self-propelled by walking with its spuds or controlled by tugboat, and a crew would maintain and operate the dredging equipment at all times. Once the dredge is positioned, the spud piles would be anchored vertically into the seafloor. The mechanical dredge would then lower and raise the dredge bucket through the water column using a series of cables and winches. The weight of the dredge bucket allows it to sink into the sediment, with the cables restricting the clamshell from falling too deep or beyond the maximum allowable overdepth. The dredge bucket is then closed, raised up through the water column, and swung over to place material into a bottom dump or split hull barge. Unlike hydraulic cutterhead dredging, little additional water is entrained by mechanical dredging equipment.

When all the material within the swing reach of the mechanical dredge is removed, the spud piles would be raised and the tug would relocate the dredge equipment. The process would repeat until all required dredging is completed.

Once a haul barge is full, it would be transported by tug to the disposal site, such as HOODS. At the disposal site, the doors along the bottom of the barge would be opened, and the dredged sediment would be discharged into the site.

Figure 6. *Mechanical Dredge Equipment*

3.1.3 Proposed Action Sub-Alternative 1: Dredging and Disposal at the Humboldt Open Ocean Disposal Site

This alternative consists of dredging the Crescent City Harbor Federal Channels as described under the Proposed Action, with placement at the Humboldt Open Ocean Disposal Site (HOODS). The HOODS was designated as an open-ocean placement site by the U.S. Environmental Protection Agency (USEPA), Region 9 in 1995 per Section 102 of the Marine Protection, Research, and Sanctuaries Act (MPRSA). The site is located approximately 66 miles south of Crescent City Harbor and 3.5 miles northwest of the mouth of Humboldt Bay, see ***Figure 7***.

Figure 7. *Humboldt Open Ocean Disposal Site (HOODS) Location*

The USEPA, Region 9 periodically monitors HOODS to ensure that unexpected or significant negative effects are not occurring from past or continued use of the disposal site. That monitoring has consistently shown that no significant adverse effects result from disposal, though HOODS has periodically neared its maximum volume. See ***Figure 9*** for more information on sand mounding at HOODS. In 2020, the USEPA, Region 9 determined that the expansion of the HOODS site boundaries by one nautical mile to the north and one nautical mile to the west was appropriate, as shown in ***Figure 8,*** to provide additional capacity. The new HOODS boundaries became official on March 19, 2021.

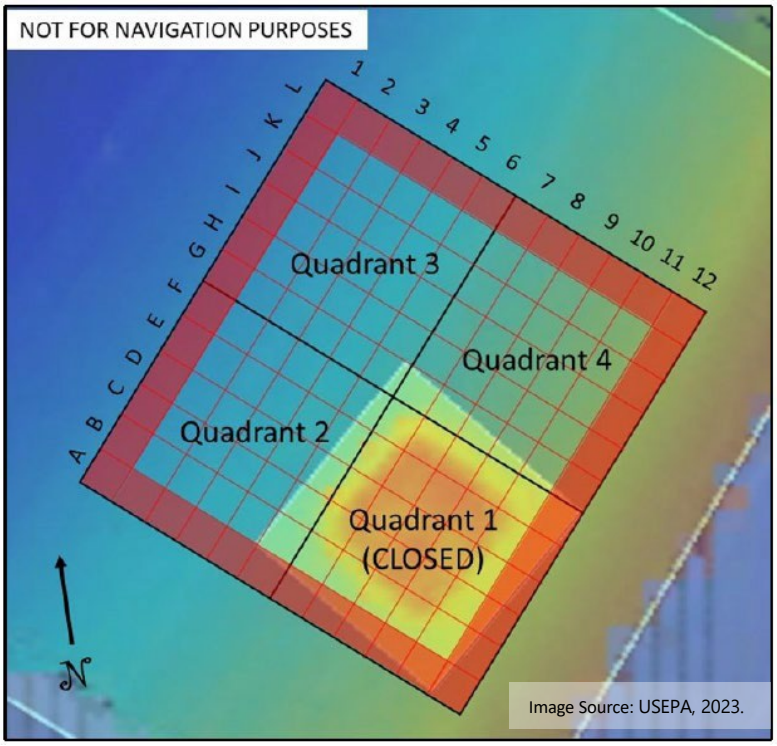

Figure 8. *General Map of the Expanded HOODS*

Figure 8, to the left, has been superimposed on colorized depth information (blue=deeper, yellow and red=shallower). The original HOODS boundary, shown as "Quadrant 1" of the expanded site, is now closed to further disposal (USEPA, 2023). The USEPA, Region 9 and USACE would determine which of the interior HOODS cells would be designated for sediment placement.

In 2015, eTrac completed a multibeam survey of HOODS and the adjacent area approximately 10 miles offshore. Data was collected down to a depth of 400-feet to establish the bathymetry for the site (eTrac, 2015). See ***Figure 9***, below, for the imagery collected.

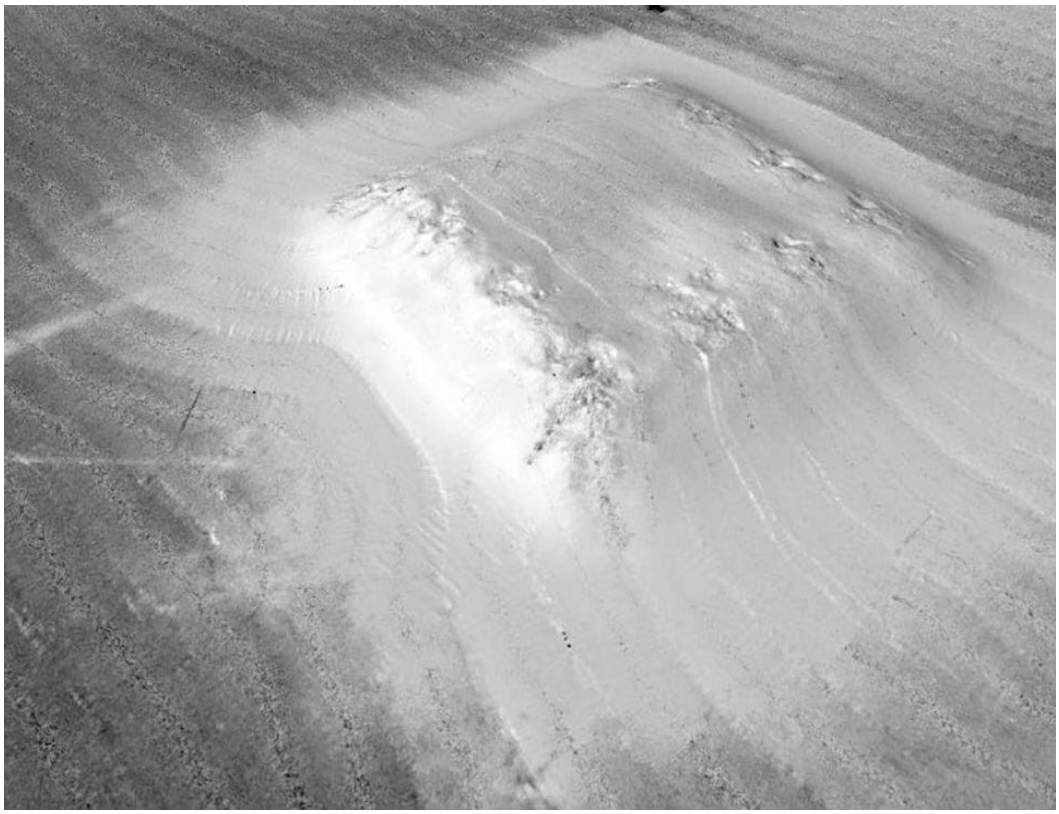

Figure 9. *Sand Mounding at the Original HOODS (Quadrant 1)*

Placement is limited to suitable dredged material from northern California dredging sites and can include sand and fine-grained sediments (USEPA 2006). However, because of the potential to use sandy material for beneficial use, it has been requested that placement of sandy material at HOODS only occur if no other cost-effective beneficial use options are available.

3.1.4 Proposed Action Sub-Alternative 2: Dredging and Disposal at the Whaler Island Nearshore Site

This alternative consists of dredging the Crescent City Harbor Federal Channels as described under the Proposed Action, with placement at the Whaler Island Nearshore Site. Whaler Island is a promontory that is adjacent to Crescent City Harbor, see ***Figure 3***. It covers approximately 5.5 acres of land located at the corner formed by the sand barrier on the eastern side of Crescent City Harbor and Inner Breakwater.

There is no set volume limit on the combined annual total of suitable federal and non-federal material that can be placed at Whaler Island; however, placement is limited to material that meets certain physical and chemical sediment standards, particularly for grain size and organic carbon content. Typically, for material to be suitable for placement at Whaler Island, the grain size should be greater than 75% sand and the total organic carbon (TOC) should be less than 2%. The sand grain size is not specified, but typically sands range from very coarse (-1 phi [2 millimeters]) to very fine (4 phi [0.0625 millimeters]).

3.1.5 Proposed Action Sub-Alternative 3: Dredging and Disposal at the Crescent City Dredge Pond

This alternative consists of dredging the Crescent City Harbor Federal Channels as described under the Proposed Action, with placement at the Crescent City Dredge Pond. This option was ultimately eliminated from further study as the site has reached capacity and the viability of beneficial use of material from the dredge pond (to create future capacity) is too uncertain for current planning. See below for more information.

In 1998, testing results for the Inner Harbor Basin Channel sediment failed the criteria for placement at Whaler Island due to a low percentage (34%) of sand content. CCHD's 1999 sampling results from the non-federal areas of the harbor also failed the criteria for placement at Whaler Island due to low percentages (51.7% to 56.6%) of sand content. In response, the CCHD formed an agreement with the USACE to create and place dredged material in the Crescent City dredge pond. The dredge pond was built with funding from the federal government and CCHD in 2000, and is owned by the CCHD. The dredge pond is located adjacent to the Crescent City Harbor on land just north of the Inner Boat Basin.

Placement at the Crescent City Dredge Pond occurred most recently in 2009, when predominantly fine-grained dredged material from the Inner Harbor Basin Channel was placed at the pond due to a low percentage of sand content.

Although the dredge pond has a total capacity of approximately 70,000 cubic yards, it is currently full and would need to be emptied of material in order to be used. In the recent past, the CCHD has engaged with several parties interested in beneficially using the soil stockpiled in the dredge pond, though permitting challenges have constrained the feasibility of these opportunities to date (e.g., levels of arsenic in the stockpiled soil that are similar to background levels in the region have prevented

unrestricted reuse). While beneficial reuse of the dredge pond material could still be an option, no specific beneficial reuse options have been identified.

Another option to restore capacity within the dredge pond would be to excavate the stockpiled soil and place it in a landfill. The excavated soils would be picked up by the Del Norte Solid Waste Management Authority (DNSWMA), transported to the Del Norte County Transfer Station approximately 1 mile from the dredge pond, and transferred to an appropriate landfill. Once the dredged material is picked-up by the DNSWMA, the handling and placement of the excavated material would become the responsibility of the DNSWMA.

Once the pond capacity is restored, the site could be used for the placement of finer sediments that would not be suitable for Whaler Island. To date, the necessary coordination (e.g. Waste Discharge Requirements concurrence from the North Coast Regional Water Quality Control Board (NCRWQCB)) has not been completed for placement of material from the dredge pond.

3.2 No Action Alternative

Under the No Action Alternative it is assumed that no federal maintenance dredging would take place, and shoaling would continue in the federally maintained channels. If no action were taken by the federal government to dredge the Entrance Channel, Inner Harbor Basin, and Marina Access Channel, then sediment would continue to accrete resulting in navigational hazards and access limitations to Crescent City Harbor. Commercial fishing boats, recreational boats, and the USCG would experience tidal delays in entering and exiting Crescent City Harbor, and could eventually lose access to some portions of the Harbor in the long-term future.

3.3 Alternatives Considered but Eliminated from Further Study

3.3.1 Rogue River Ocean Dredged Material Disposal Site

This alternative consists of dredging the Crescent City Harbor Federal Channels as described under the Proposed Action, with placement at the Rogue River Ocean Dredged Material Disposal Site (Rogue). This option was ultimately eliminated from further study as Rogue was designated to receive material only from locally sourced sediments from the Rogue River Navigation Channel and adjacent areas.

USEPA, Region 10 has indicated that in the long-term, only sandy material would be permitted for placement at the site, but that a one-time placement of fine-grained material would likely be permissible in the event that no other options were available for near-term maintenance dredging needs. Further correspondence with the USEPA, Region 10 in 2019 specified that only locally sourced material may be placed at Rogue, and as such the site is not available for placement of dredged material from Crescent City Harbor.

3.3.2 Chetco River Ocean Dredged Material Disposal and Nearshore Placement Site

This alternative consists of dredging the Crescent City Harbor Federal Channels as described under the Proposed Action, with placement at the Chetco River Ocean Dredged Material Disposal (Chetco) and Chetco Nearshore Placement Site. This option was ultimately eliminated from further study as Chetco

was designated to receive material only from locally sourced sediments from the Chetco Estuary and River and adjacent areas.

4 AFFECTED ENVIRONMENT AND CONSEQUENCES

4.1 Resources Not Described in Detail

4.1.1 Land Use, Socioeconomics, Public Facilities, and Utilities

The Crescent City Harbor facilities in and adjacent to the project area are classified as harbor or open space land uses (Crescent City, 2001). In addition to the Harbor, public facilities in the vicinity of the project action area include the small boat launch and adjacent public access beaches. The closest residents are approximately two to three blocks from the Harbor. Utilities and services common in the region include electrical lines, water and sewer, and waste management services. Neither the Proposed Action nor the No Action alternatives would change the existing land use classification. Neither the Proposed Action nor the No Action Alternative would affect any public facilities, utilities, or services. There would be no adverse effect to the socioeconomic conditions in the surrounding area; however, the Proposed Action would support the local economy by ensuring navigational access for commercial use.

4.1.2 Environmental Justice

“Environmental justice” means the 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 (USEPA, 2024). The area surrounding the Crescent City Harbor is considered disadvantaged due to high unemployment rates and low high school education percentages (Climate Economic Justice Screening Tool, 2024). However, the Proposed Action would not disproportionately adversely affect human health and the environment. Furthermore, the Proposed Action would not impede equitable access to a healthy, sustainable, and resilient environment.

4.1.3 Public Health and Safety

The Proposed Action would involve use of marine vessels as well as heavy construction equipment. Vessels used for dredging would follow the appropriate navigational safety measures to ensure public safety during dredging operations, such as posting public notice pre-construction and active construction boundaries during construction. As discussed in the “Water Quality” section, a spill-prevention plan would be developed prior to project implementation and spill response equipment would be onsite for immediate implementation. These practices would minimize the possibility of any accidental spills affecting public health and safety. Given these measures, no significant adverse effects to public health and safety are expected from the Proposed Action. The No Action Alternative would not alter the existing public health and safety conditions in the region of the project.

4.1.4 Transportation and Traffic

State Highway 101, which runs along the coast adjacent to the project site, is a vital traffic artery. However, dredging activities associated with the Proposed Action are not expected to affect ground transportation or traffic volumes, because as the dredging vessels will access the project site from the ocean. A minimal number of worker vehicle trips along Highway 101 may occur in association with the

Proposed Action and would be an insignificant addition to existing traffic levels on the highway. The No Action Alternative would not alter the existing transportation and traffic conditions in the area.

4.1.5 Noise

Dominant noise sources include residential and commercial noise from the surrounding upland area, beach recreation activities, vehicle noise on adjacent roads, recreation and commercial vessels navigating in the harbor and bay, and wave-generate sounds. The sound of wave action will vary with factors including wave height, period, frequency, angle of attack, season, and wind conditions. Given the general background noise levels, including those from existing boat and vehicular traffic, project noise impacts associated with the Proposed Action are not expected to be discernible from background noise levels. The No Action Alternative would not alter the existing noise levels in the area. A noise analysis on animal species is included in Biological Resources ***(Section 4.9)***.

4.1.6 Air Quality

The Crescent City Harbor project area lies within the North Coast Air Basin under the jurisdiction of the North Coast Unified Air Quality Management District (NCUAQMD). The NCUAQMD operates several local air quality monitoring stations within its tri-county jurisdiction of Humboldt, Del Norte, and Trinity Counties. Based on this air quality monitoring, Del Norte County is an attainment area or unclassified by the USEPA for all criteria pollutants for the National Ambient Air Quality Standards (NAAQS).

Further the proposed action, pursuant to 40 C.F.R. § 93.153(c)(2)(ix), as a maintenance dredging activity, it is not required to conduct a conformity analysis.

4.2 Aesthetics

4.2.1 Affected Environment & Baseline Condition

Aesthetic evaluations are inherently subjective, although certain views are widely held to be scenic. Crescent City Harbor is considered to be scenic due to its natural setting and built environment. The Harbor is set in a unique indentation in the northern California shoreline. The combination of the breakwater, the sand barrier, Whaler Island, and the Harbor's docking facilities create a visually pleasing atmosphere. Several picturesque sea stacks such as Fauntleroy Rock and Round Rock dot the area surrounding the Harbor. The adjacent areas within the Town of Crescent City are also picturesque. Additionally, the Battery Point Lighthouse is located just north of the Outer Breakwater and offers a famously scenic view, see ***Figure 10***.

Image Source: Marinas.com, 2024.

Figure 10. *Battery Point Lighthouse, Crescent City*

4.2.2 Environmental Effects

Significance Criteria

For aesthetics, a potential effect would be considered significant if the project would significantly change a landscape in a manner that permanently and adversely degrades an existing viewshed or alters the character of the viewshed by adding incompatible structures.

Effects of the Proposed Action

The Proposed Action could result in varying impacts depending on the opinion of the viewer/receptor. Viewers may consider the presence of the dredge to be an adverse impact, interrupting viewpoints from local land points and from vessels. Other viewers may consider the presence of the dredge to be a beneficial impact providing an interesting feature to the existing view.

If clamshell dredging were to be used, a barge would also be present for transportation of dredged material to HOODS. Given that the dredge and barge would only be temporarily present during dredging operations, this would be a short-term effect, and aesthetic impacts would be less than significant.

Aesthetics along the shoreline of the spit would be slightly degraded if hydraulic dredging were used, due to the presence of temporary pipeline laid across the roadway of Anchor Way to pump dredged material to Whaler Island for disposal. These impacts would be temporary given the pipeline would be installed for approximately 6-7 weeks and removed once dredging is complete. Therefore, impacts of the Proposed Action on aesthetics would be less than significant.

Effects of the No Action Alternative

The No Action Alternative would not cause any changes to the area's aesthetics. There would be no change to the local viewshed. Therefore, the No Action Alternative would have no impact on aesthetics.

4.3 Recreation

4.3.1 Affected Environment & Baseline Condition

Crescent City offers a wide variety of recreational activities. The coastal area and Redwood forests surrounding Crescent City provide habitat for a wide variety of birds. As a result, birding is a popular recreational activity. Water-related recreational activities in the Crescent City Harbor area include fishing, boating, and surfing. Bottom fishing, tuna fishing, crabbing, and salmon fishing are common activities conducted from Crescent City. The B Street Pier, located in the Harbor just east of the Breakwater, is also used for recreational crabbing. South beach, immediately south of the Harbor is a popular surfing location. At the north end of the beach, Whaler Island and the sand barrier provide a sheltered area that is a popular surfing site during spring and between winter storm fronts.

4.3.2 Environmental Effects

Significance Criteria

For recreation, a potential effect would be considered significant if the project results in a permanent loss of existing recreational uses, this could include the loss of recreational access points and parking as well.

Effects of the Proposed Action

During dredging operations, the cutterhead hydraulic dredge's pipeline would be placed on the bottom of any channel crossings to ensure that access is provided to recreational vessels and other vessels using the Harbor. The pipeline must cross Anchor Way Road, as shown in ***Figure 5***, to reach the placement site at Whaler Island. A ramp will be placed over the pipeline to maintain pedestrian and vehicular traffic. The actual placement at Whaler Island would require that access to the area be restricted. As a result, the area immediately adjacent to Whaler Island and the Sand Barrier would not be available for surfing during the approximate 6–7 weeks when hydraulic dredging would be conducted. However, the area immediately to the south (South Beach) would continue to be available. Given the availability of nearby recreational areas, impacts from the Proposed Action would be less than significant.

Clamshell dredging would differ from cutterhead dredging in that it would not involve use of a pipeline, and instead dredged material would be disposed via a secondary barge. This is not expected to cause access restrictions for recreational vessels using the channels.

The Proposed Action would maintain, sustain, and support recreational boating by keeping the approaches and entrance channels open and free of navigational hazards. Conducting the dredging of Crescent City Harbor would have long-term beneficial effects by ensuring that safe navigation is provided for recreational users of the harbor. Short-term impacts to recreational users due to restricted access will be negligible and insignificant. The proposed aquatic disposal at HOODS would not impact recreation.

Effects of the No Action Alternative

Under the No Action Alternative, USACE would not dredge the federal channels and thus, safe navigation access to the Crescent City Harbor would not be provided. As a result, there would be an adverse effect to recreational vessels, as they could be restricted from entry to the Harbor at low tides. Recreational benefits described above for the Proposed Action would not occur, unless another entity ensures that the channel is appropriately dredged.

4.4 Navigation

4.4.1 Affected Environment & Baseline Condition

Harbor traffic primarily consists of commercial fishing vessels, with commercial fishing activities representing 90 percent of the harbor's total commerce. A portion of the commercial fishing fleet consists of transient boats that use the harbor's Outer Boat Basin, which provides temporary moorage space for approximately 20 vessels. An additional 291 ships, ranging in length from 30 to 70 feet, may be more available in the Inner Boat Basin. A number of docks work in conjunction with the berthing

facilities, including Citizens Dock, which is the largest dock and is primarily used for uploading the commercial fishermen's catch and for refueling and loading ice. Other docks include docks A through H, which serve as moorage for boats 30 to 70 feet in length. The harbor also includes two docks with fish processing plants, as well as a marine repair facility. In addition to fishing and recreational boats, there is one 65-foot-long tourism-based charter boat that frequents the area year-round. The USCG also operates an 87-foot patrol boat and a 25-foot auxiliary response boat in Crescent City, and maintains berthing facilities for both vessels at the short dock located directly behind the Inner Breakwater.

4.4.2 Environmental Effects

Significance Criteria

For navigation, a potential effect would be considered significant if the Proposed Action results in a substantial reduction of current safety levels for vessels in the harbor. Safety impacts would be considered significant if activities present a navigational hazard to boat traffic or interfere with any emergency response or evacuation plans.

Effects of the Proposed Action

Maintenance dredging of the federal channels would restore shoaled areas to their authorized design depths and improve navigational safety in the harbor, which would be a beneficial effect on navigation. The number of moorings and slips in the harbor would remain unchanged by the Proposed Action. To ensure safe transit during maintenance dredging activities, appropriate coordination would be maintained with the CCHD and the USCG, and ingress and egress lanes would be established and regulated. Given the general background vessel traffic levels, dredging activities are not expected to significantly increase or impact vessel traffic levels. All vessels will be marked and lighted in accordance with USCG regulations and notices will be published in Local Notice to Mariners warning boat users about times, durations, and locations of construction activities. Vessel traffic should be able to easily navigate around any short-term obstacles created by construction traffic. Dredging will not impede access to any channels or entranceways, as discussed above in the recreation analysis. Therefore, impacts to vessel traffic are considered to be insignificant.

Effects of the No Action Alternative

Under the No Action Alternative, there would be no federal maintenance dredging in Crescent City Harbor and no beneficial effects would occur. The number of moorings and slips would remain unchanged; however, continued shoaling of the federal channels would compromise navigational safety and could affect the ability for vessels to access the Harbor, particularly during low tides. Any vessels attempting to navigate through the harbor in these unsafe conditions would have increased potential for stranding and associated risks. Additionally, the inability of USCG vessels to transit the harbor could compromise emergency response in the area. Therefore, the impacts of the No Action Alternative on navigation and navigational safety would be adverse.

4.5 Cultural and Historical Resources

4.5.1 Affected Environment & Baseline Condition

Cultural resources describe several different types of properties: precontact and historic archaeological sites; architectural properties such as buildings, bridges, and infrastructure; and resources of importance

to Native American Tribes (traditional cultural properties and sacred sites). There are two types of cultural resources that are of interest for operations and maintenance dredging actions: (a) archaeological sites associated with precontact Native American settlements that may be situated on the shoreline or submerged on the continental shelf; and (b) abandoned historic vessels that have sunk offshore, and historic shoreline structures associated with the early 20th maritime industry. A brief summary on both periods of time is written up below.

Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, 54 U.S.C. § 306108 (formerly 16 U.S.C. § 470f), requires federal agencies to take into account the effects of a proposed undertaking on properties that have been determined to be eligible for listing or is listed in the National Register of Historic Places (National Register). A historic property refers to cultural resources (e.g., land-based precontact or historical sites, maritime historical resources, including shipwrecks, buildings and structures on the shore or in the water, and cultural artifacts) that are 50 or more years old, possess integrity, and meet the criteria of the National Register found at 36 C.F.R. § 60.4. Additionally, the Abandoned Shipwreck Act (43 U.S.C. §§ 2101–06, et seq.) protects shipwrecks found in state waters.

For purposes of complying with Section 106, a federal agency will decide the Area of Potential Effects (APE) for the project or undertaking. The APE is defined as "the geographic areas or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist." Additionally, under 36 C.F.R. § 800.16(d), the APE is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking.

The criteria applied to evaluate properties for listing in the National Register (36 C.F.R. § 60.4) are outlined below: The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

A. That are associated with events that have made a significant contribution to the broad patterns of our history; or
B. That are associated with the lives of persons significant in our past; or
C. That embody the distinctive characteristics of a 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
D. That have yielded, or may be likely to yield, information important in prehistory or history.

Meeting one or more of the criteria for eligibility is not enough to determine a resource as eligible for listing in the NRHP. In order to meet eligibility, a resource must have also retained historic integrity of those features necessary to convey its significance (U.S. Department of the Interior 1997). There are seven aspects of integrity: Location, Design, Setting, Materials, Workmanship, Feeling, and Association. Not all aspects of integrity may be relevant to a particular resource.

USACE has completed Section 106 review for the undertaking on December 31, 1996 and defined the horizontal and vertical limits of the APE to cover the Proposed Action area for the Crescent City federal

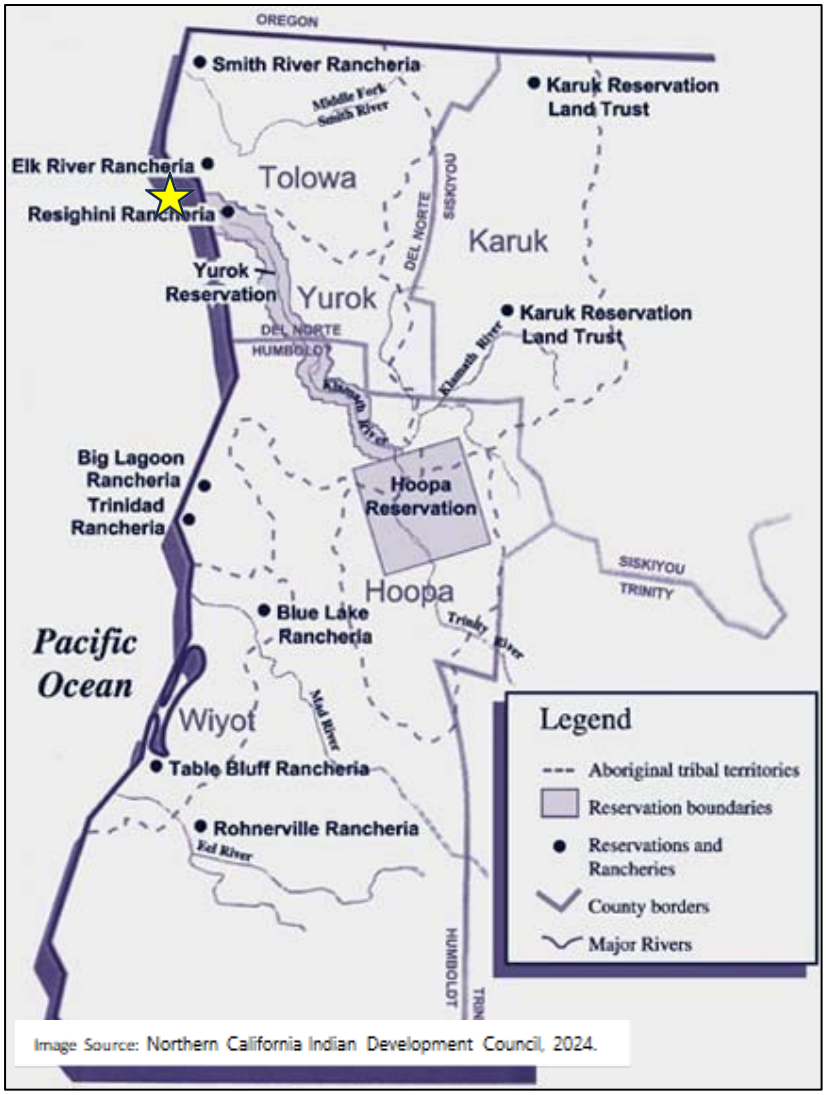

Figure 8. *Local Northwest California Tribes, with Project Location.*

channel dredging. The horizontal limits of the APE were encompassed by the Federal Entrance Channel, Inner Basin, and Marina Access Channel. Also included in the past analysis for the Proposed Action area was the dredged material placement sites. The vertical limits of the Proposed Action area is the maximum depth below the surface to which excavations will extend (-20 feet) including the additional 2-feet or allowable over depth in the Entrance Channel, Inner Harbor Basin, and Marina Access Channel. The vertical extent of the proposed Action was included in the APE for previous Section 106 review.

USACE has established policy and procedures for conducting underwater surveys for maintenance dredging and disposal activities (Dredging Guidance Letter No. 89-01, USACE, March 13, 1989). USACE is directed to make a reasonable and good faith effort to identify submerged archaeological resources that may be affected by project implementation. Typically, the review of project documents and research of historical records and other sources is sufficient to determine the potential for submerged resources to be present and whether there would likely be an effect or a need to evaluate the submerged resource as an eligible historic property. The policy states that underwater surveys to identify historical archaeological sites (e.g., shipwrecks, submerged archaeological sites, or other sunken maritime artifacts) are not required within the boundaries of previously dredged channels or previously used disposal areas unless USACE determines that there is a good reason to believe such resources exist and that they would be altered or destroyed as a result of project implementation.

A records search was conducted at the Northwest Information Center on February 10, 2015 (NWIC File No. 14-0915). The literature review included, but was not limited to, the National Register of Historic Places, the California Inventory of Historic Resources, California Historical Landmarks, locally listed historic buildings and sites. No precontact or historic cultural resources/historic properties were identified within the project's APE Two resources were identified outside of the project APE, but within a .25-mile radius of the project. The California State Lands Commission maintains a database of known

shipwrecks. In addition, the National Park Service maintains lists of shipwrecks determined to be listed or determined eligible for the NRHP. These databases were searched for any known shipwrecks located in the APE. Although several shipwrecks are located in Crescent City Harbor, and one is located near the mouth of the Harbor (CSLC 2016, NPS 2016), no shipwrecks included in the NRHP are located in the project area.

The project area is located within the ancestral lands of the Tolowa and Yurok, a group of the Athapascan language family. The Tolowa extended along the coastal strip southward from Smith River to below Crescent City where Yurok territory began, see ***Figure 11***. USACE will invite the following Federally Recognized Tribes affiliated with the Tolowa and Yurok to consult for this Draft EA: Tolowa Dee-ni' Nation, Elk Valley Rancheria, Confederated Tribes of Siletz, Trinidad Rancheria, Big Lagoon Rancheria, and Blue Lake Rancheria.

4.5.2 Environmental Effects

Significance Criteria

Section 106 outlines the process in which federal agencies are required to determine the effects of their undertakings on historic properties. Effects are considered to be adverse if they alter, directly or indirectly, any of the characteristics of a cultural resource that qualify that resource for the National Register so that the integrity is not diminished. A significant effect to cultural resources would occur if an action resulted in a substantial adverse change in the integrity of a historical resource. Impacts to cultural resources may be the result of physically altering, damaging, or destroying all or part of a resource, altering characteristics of the surrounding environment by introducing visual or audible elements that are out of character for the period the resource represents, or neglecting the resource to the extent that it deteriorates or is destroyed.

Effects of the Proposed Action

USACE completed Section 106 review on December 31, 1996 for maintenance dredging in Crescent City Harbor's Entrance Channel and Inner Harbor Channel. The review also included construction of the Marina Access Channel. USACE's finding of effects pursuant to 36 C.F.R. § 800.4(d)(1) was *No Historic Properties Affected* due to there being no submerged cultural resources or historic properties present within the APE. USACE has determined that no new analysis or surveys for submerged cultural resources was warranted for future maintenance dredging at the Crescent City Harbor channels.

The initial construction of the federal channel and the repeated maintenance dredging of the area has altered the seafloor to a point to where submerged cultural resources, if present prior to the Proposed Action, would be previously removed or destroyed. Maintenance dredging associated with the Proposed Action would be confined to the removal of sediments in the federal channels that have accumulated since the last dredging effort.

Literature review completed for this undertaking identified no previously recorded shipwrecks or submerged resources within the Proposed Action. Sediments deposited since the previous dredging activities would not contain in-situ archaeological resources. Based upon the greatly modified conditions

in the existing project channels from previous dredging actions, it is reasonable to conclude that there are no historic properties within the federal channels.

Dredged material transport would not involve sediment disturbance and would therefore not be expected to disturb cultural resources at the placement sites. The material dredged as part of the Proposed Action would be placed at existing placement sites on top of previously placed dredged material. Therefore, placement activities would not result in impacts to historical resources or unique archaeological resources, because the underlying native deposits would not be disturbed. Moreover, the Proposed Action would not include any demolition of existing structures nor introduce elements that could affect the historic setting of the built-environment. No built-environment historic resources were identified within the Proposed Action.

The mitigation measures below would be implemented if any inadvertent discoveries are found during dredging. If an inadvertent discovery is made, USACE would immediately halt all ground-disturbing or depositional activities within the area of the find. A USACE archaeologist or other qualified archaeologist would then ascertain the nature of the discovery, determine its significance as a site or an isolated finding, evaluate the cultural resource for eligibility on the National Register, and provide proper management recommendations pursuant to 36 C.F.R. § 800.13. USACE shall make reasonable efforts to avoid, minimize or mitigate adverse effects for unanticipated discoveries of historic properties and will follow 36 C.F.R. § 800.13 when appropriate.

If an inadvertent discovery is made containing human remains, USACE would immediately halt all ground-disturbing or depositional activities within the area of the find reasonably suspected to overlie adjacent remains. Following Cal. Pub. Res. Code § 7050.5, the coroner of the county in which the human remains are discovered will inspect the human remains to determine if they are in their authority. If the coroner recognizes the human remains are Native American, they shall contact within 24 hours the Native American Heritage Commission (NAHC). Upon notification by a county coroner, the NAHC shall notify the most likely descendants (MLD) pursuant to Cal. Pub. Res. Code § 5097.98 regarding the discovery of the Native American human remains. Within 48 hours of notification by the NAHC, the MLD shall inspect the site of the discovery of Native American human remains and recommend to the party responsible for the excavation work means for treating or disposition, with appropriate dignity, the human remains and any associated funerary objects. The owner of the land upon which Native American human remains were discovered, in the event that no descendant is identified, or the descendant fails to make a recommendation for disposition, or the landowner rejects the recommendation of the descendant, shall reinter the remains and burial items with appropriate dignity on the property in a location not subject to further disturbance.

Effects of the No Action Alternative

The No Action Alternative would not cause any disturbance to sediments in the Crescent City Harbor Federal Channels and would not result in any dredge material transport or placement at placement sites. Therefore, the No Action Alternative would have no impact on cultural resources.

4.6 Water Quality

This section discusses hydraulic, hydrology, and water quality conditions in the study area. It includes a discussion of the upland watershed and drainages, tides and currents, harbor circulation, wind waves, and water quality standards for the study area.

Accretion patterns and sedimentation are largely discussed in the Geology, Sedimentation, and Seismicity section (***Section 4.7***). Tsunami hazards, which are related to seismic activity, are also discussed in the Geology, Sedimentation, and Seismicity section. Potential impacts associated with the use of hazardous materials (such as gasoline, diesel fuel, cleaners, and solvents), and mobilization of contaminants in sediments, which may adversely affect water, are discussed in the Hazardous and Toxic Materials section (***Section 4.8***).

Groundwater supplies or groundwater recharge would not be impacted by the Proposed Action or No Action Alternatives because no municipal wells are located in the general vicinity of the study area. The project entails dredging and placement of dredged material, which would have no effect on flood hazards. Therefore, flood conditions and groundwater are not addressed in this document.

4.6.1 Affected Environment & Baseline Condition

Water quality factors of concern in Crescent City Harbor and in waters within or adjacent to placement sites include:

- Total suspended solids (turbidity)
- Dissolved oxygen
- Nutrients
- pH
- Salinity
- Temperature

The North Coast Regional Water Quality Control Board (NCRWQCB) issues receiving water limitations and monitoring requirements for water quality parameters during dredging and placement for the project area. For past dredging and placement of material from Crescent City Harbor, water quality certification was established through RWQCB Order R1-2000-59, which includes a Monitoring and Reporting Program that establishes monitoring requirements for turbidity, settleable solids, and toxicity, as well as biological resources.

Water quality sampling was also conducted in the harbor in October 2018 for the latest Sampling and Analysis Report (USACE 2024), including deionized wet tests and modified elutriate testing (MET). Deionized wet tests use water with a neutral pH which is passed through sediments and then analyzed for what dissolution of chemical species is expected should fresh water (e.g. rainwater) were to pass through the sediments. The MET is valuable for determining the potential for decant water from the placement of dredged material to adversely impact receiving waters. All dissolved metals from the MET were reported at concentrations below the water quality objectives of the California Toxics Rule and the USEPA's Section 304(a) criteria for Priority Toxic Pollutants. MET elutriate bioassay results showed that

none of the three channel samples exhibited toxicity to the mysid shrimp (*Americamysis bahia*) or were significantly different from the offshore reference site.

Hydrology and Hydraulics

Crescent City is located within the Lake Earl and Jordan Creek watershed. Drainage from the city flows through Lake Earl and Jordan Creek, in addition to other minor drainages, before discharging to the Pacific Ocean. Other minor drainages include Elk Creek, the mouth of which is within the Crescent City Harbor. Elk Creek contributes sediment deposition to Crescent City Harbor, although this is believed to be a relatively minor source of sediment (HydroPlan and Anchor QEA 2015). Although Elk Creek is considered to be a high-quality fisheries stream, local drainages convey urban runoff which can adversely affect water quality.

Tides and Currents

The tides at Crescent City Harbor are mixed semidiurnal tides with a great diurnal range of 6.9 feet and a mean tide level elevation of 3.7 feet MLLW. There are several ocean currents far offshore of Crescent City:

- The California Current, which flows southward throughout the year,
- The California Undercurrent, which flows northward underneath the California Current; and
- The northward flowing Davidson Current, which is typically most active in the fall and winter.

These currents are generally located seaward of the continental shelf and do not have an effect on nearshore circulation. Local observations indicate a northerly setting flow, which persists outside the harbor entrance throughout the year. Current speed varies seasonally, with maximum speeds typically occurring during the winter months.

Harbor Circulation

There are no recent measurements of circulation from within Crescent City Harbor, but circulation within the harbor is believed to be weak due to its sheltered nature. This assumption is supported by limited current measurements taken approximately 1 mile offshore, which show a decrease in speed moving towards the harbor, and by a crude numerical model that showed simple homogeneous flow throughout the harbor during the flood and ebb cycles, as well as eddy formation and confused flow during slack tide. Additionally, local observations from fishing vessels have not indicated any strong currents affecting navigation within the harbor (HydroPlan and Anchor QEA 2015).

Wind Generated Waves

The wave climate offshore of Crescent City Harbor is typical of the Northern California coast, with severe storm waves generated from the northwest to the south. Based on 15 years of buoy data, at a water depth of 150 feet, typical winter waves average 9 feet in height and 12 seconds in period, while summer

waves average 6 feet in height and 8 seconds in period. Winter storm waves can exceed 30 feet in height, with wave periods of up to 25 seconds (USACE 2006).

The wave climate adjacent to Crescent City Harbor is milder than in the open ocean, with considerable attenuation of waves from most directions. The exception involves waves arriving from the west southwest to south-southwest, as a nearby shoal often amplifies waves arriving from this direction by up to 30 percent of deep-water wave height (USACE 2006).

Significance Criteria

For water quality, a potential effect would be considered significant if:

- The project results in impairment of water quality of Crescent City Harbor.
- The project results in an elevated, long-term increase in turbidity of Crescent City Harbor above ambient conditions.
- The project results in a permanent change in substrate composition or character.
- The project results in permanent alteration to currents, circulation or drainage patterns within the dredge footprint or disposal site.
- The project results in exposing concentrations of constituents of concern in underlain sediment above ambient sediment quality conditions in the proposed dredging footprint.
- The project results in the placement of sediment with concentrations of constituents of concern above ambient concentrations at the aquatic disposal sites.

4.6.2 Environmental Effect

Effects of the Proposed Action

The Proposed Action would not have an appreciable effect on water circulation in the project area. Removal of sediment may slightly increase the volume of tidal exchange in the project area; however, this change would be minimal and neutral for existing tidal and current conditions in the project area and therefore would be less than significant. Wind generated wave conditions would not be affected by the Proposed Action. Impacts to hydrology would be considered less than significant.

In the short term, construction impacts from dredging and placement activities on water quality can include temporary, localized increases in turbidity; the potential for increased concentrations of dissolved chemicals and metals; lowered dissolved oxygen levels; or changes in temperature or pH due to resuspension of sediment and sediment-bound organic material. Such impacts associated with the Proposed Action would be temporary, generally confined to the dredging area, and would return relatively quickly to background levels following construction (Jones and Lee 1978; LaSalle 1990; Lee et al. 1978; Simenstad 1988). Dredged material placement studies have demonstrated turbidity levels returning to background conditions typically within about an hour (Jones and Lee 1978; Lee et al. 1978; Simenstad 1988), with contaminants released or taken up during placement typically following the turbidity pattern (Lee et al. 1978).

The USACE initiated consultation for the project with the NCRWQCB for Clean Water Act water quality coverage under the existing Waste Discharge Requirements (RWQCB Order R1-2000-59) associated with dredging and placement of material from the Crescent City Harbor. With concurrence from the NCRWQCB, the project will adhere to the water quality thresholds, best management practices (BMPs), and monitoring included in the order. These BMPs include:

- To ensure that contaminants are not accidently introduced into the waterway, the contractor would implement standard erosion and sediment controls and spill prevention and response measures in and around the proposed project area. The contractor responsible for operating the dredging equipment would be responsible for ensuring that such measures are adhered to.
- Floating debris will be removed from the water and disposed of properly.
- All dredged material will be handled and transported such that it does not re-enter surface waters outside of the protected immediate work area.
- Dredging at each project location will continue to be limited to the approved project depth plus overdepth.

For Mechanical (*Clamshell*) dredging:

- Multiple horizontal dredge cuts will be taken where a thick horizontal volume needs to be dredged in order to avoid overfilling the bucket and causing spillage.
- No overflow or decant water will be allowed to be discharged from any barge, with the exception of spillage incidental to clamshell dredge operations.

For Hydraulic (*Cutterhead*) dredging:

- Pipeline pumps will only be turned on when the cutterhead is on the seafloor or within 3 feet of the seafloor when priming pumps.
- Cutterhead will be monitored so that it maintains positive contact with the seafloor during suction dredging.
- Effluent monitoring requirements include daily measurements by grab sample for turbidity (as Nephelometric Turbidity Units or NTU) and settleable solids (as mL/L). Receiving water monitoring would also be collected daily for turbidity.

Vessels would be operated in compliance with all applicable regulations related to the prevention of water pollution by fuel, harmful substances, and accidental discharges. For mechanical dredging, the dredged material would be secured during transport, with precautions in place to minimize any risk of spills.

In addition, in 2024 USACE conducted sampling and testing of the material to be dredged (as described in the Geology, Sediments, and Seismicity section below). These analyses found no contaminated sediments that would preclude placement at the proposed placement sites (USACE 2024). More information on the sediment sampling results can be accessed in ***Appendix E.*** Past characterizations similarly did not identify the presence of any contaminated materials that would preclude placement at the proposed placement sites (ADH 2009).

The Proposed Action is unlikely to result in significant water quality impacts from turbidity, release of contaminants into the water column, and would follow BMPs and monitoring protocols to protect water

quality. Therefore, impacts to water quality from the Proposed Action are expected to be less than significant.

Effects of the No Action Alternative

The No Action Alternative would consist of no additional federal maintenance dredging. Changes to hydrology and hydraulics, wave currents, harbor circulation, and wind generated waves may occur as shoaling in the harbor accumulates, however the significance of these changes would be speculative until such a point where the impacts are realized.

4.7 Geology, Sedimentation, and Seismicity

4.7.1 Affected Environment & Baseline Condition

Geology

Crescent City Harbor lies adjacent to the Northern Coast and Klamath mountain ranges and within the Smith River Plain, an approximately 100-square-mile, rectangular-shaped coastal lowland. The harbor lies on the southern edge of a broad, low-relief marine terrace that is part of the North Coast Ranges geologic province. The harbor bedrock consists of sedimentary rocks of the Miocene St. George formation, marine sand and shale, and metamorphic and sedimentary rocks of the Cretaceous to Jurassic-aged Franciscan Complex, predominately Franciscan mélange and Franciscan sandstone in the project area. Overlying the bedrock is a terrace deposit composed of Pleistocene compacted marine sands and clays of the Battery formation. Geologically recent unconsolidated sand dunes and alluvial deposits are deposited thinly over these formations (Back 1957, Toppozada et al. 1995, USACE 2006, CGS 2012).

Sediment

The majority of deposited sediments in Crescent City Harbor are sourced from littoral transport of sediments into the harbor from the north and south. Composition of the sediment sources from north to south are fairly similar, with approximately equal (30% to 45%) proportions of rock fragments and quartz. Mean grain sizes range from fine to medium sands with a large range in sediment size distribution, from very well sorted (i.e., very poorly graded) to very well graded (i.e., very poorly sorted) (USACE 2006).

Sediment samples from the Crescent City Harbor Federal Channels have been subjected to a comprehensive suite of physical, conventional, and chemical analyses and biological tests based on applicable guidelines established in the Inland Testing Manual (USEPA,USACE 1998), the Ocean Testing Manual (USEPA, USACE 1991), and the Upland Testing Manual (USACE 2003). Previous sampling events (1993, 1998, 2003, 2009, 2011, 2018, 2024) indicate that dredged material from the Entrance Channel has predominantly consisted of sand with little organic matter, while dredged material from the Marina Access Channel has predominantly consisted of sand with moderate organic matter and dredged material from the Inner Harbor Basin Channel has predominantly consisted of fine grain material (silt) with high amounts of organic matter. The percent sand and total organic carbon (TOC) of sediment dredged from the Crescent City Harbor Federal Channels in the past are presented in ***Table 4***.

Table 5. *Historic Sand Content and Total Organic Carbon*

Sample Year	Entrance Channel		Inner Harbor Basin		Marina Access Channel	
	% Sand	%TOC	% Sand	%TOC	% Sand	%TOC
1993	94.00	0.10	49.00	5.60	--	--
1998	72.00	1.20	34.00	8.70	--	--
1999	--	--	--	--	88.90	6.04
2003	--	--	--	--	76.00	1.81
2009	87.40	0.80	46.40	10.80	80.00	6.10
2019	92.51	0.42	43.96	6.75	76.83	4.23
2024	91.38	1.09	90.97	4.77	94.06	3.74

In 1999 and 2003, the Inner Harbor Basin and Marina Access Channel were composited and analyzed. The Marina Access Channel was not analyzed prior to 1999 because it had not yet been designated as a federal channel.

Seismic Hazard

Crescent City Harbor resides in a moderately active seismic area on the leading edge of the North American Plate, approximately 50 miles east of the surface trace of the Cascadia Subduction Zone. The Cascadia Subduction Zone is approximately 750 miles long, extending from the Mendocino fracture zone to the Queen Charlotte transform fault off the shore of British Columbia. Regional seismicity is dominated by the subduction of the Gorda Plate underneath the North American Plate. Seismic activity is most likely to occur within the Gorda Plate. No active faults or fault zones are located immediately within the project site, and the closest active fault zone is the Little Salmon Fault located 112 miles away. This tectonic setting is very different than the more seismically active and well -known San Andreas Fault system to the south (Tucker 1981, Toppozada et al. 1995).

Other hazards associated with seismic activity, in addition to ground shaking and fault rupture, include landslides, liquefaction, and tsunamis. The harbor is at low risk for landslide or slope failure hazard due to the low relief of the area. Despite being flat land with a relatively high water table, the harbor exhibits low liquefaction potential because it is underlain by sedimentary or metamorphic rock or compacted marine sediments. The tsunami hazard in Crescent City Harbor is significant based on the historical record, which includes over 32 tsunamis since the tide gauge was installed in 1933. At least 12 of these produced run-up exceeding 1 meter and 5 caused serious damage, including the 1964 Alaskan tsunami which produced a 21-ft wave, caused $15 million of damage, and killed 10 people (Dengler et al. 2008; Tucker 1981, Toppozada et al. 1995).

Significance Criteria

A potential effect would be considered significant if the Proposed Action results in a substantial change in the existing geology, sedimentation, or seismicity in the harbor.

4.7.2 Environmental Effects

Effects of the Proposed Action

The Proposed Action includes maintenance dredging of the federal channels, which would restore shoaled areas to their design depths. The Proposed Action would not have the potential to expose people or structures to substantial adverse geological effects including rupture of a known fault, creation of unstable slopes, increase in the amount of liquefaction prone unconsolidated material in the project area, or change in the design of the Inner Boat Basin to affect its resistance to a 50-year tsunami event. Again, the Proposed Action would only remove the recently shoaled material since the last dredging episode from the federal channels. Therefore, impacts of the Proposed Action on geology and sediments would be less than significant.

Effects of the No Action Alternative

Under the No Action Alternative, there would be no federal maintenance dredging in Crescent City Harbor. Existing geologic, seismic, and sediment conditions would remain consistent with baseline conditions; however, littoral transport of sediment would cause continued deposition and shallowing of the navigation channels. There would be no impact on geology and sediment under the No Action Alternative.

4.8 Hazardous and Toxic Materials

4.8.1 Affected Environment & Baseline Condition

Hazardous materials known, or thought to occur at the project site include those associated with its marine functions and include lead-based paint, asbestos-containing materials, and treated piles (creosote or other chemicals). Newer portions of the harbor, including the recently rebuilt Inner Boat Basin, are less likely to contain these hazardous materials. Harbor operations require routine use, transport, or placement of potentially hazardous materials, such as gasoline, diesel fuel, cleaners, and solvents.

Crescent City Harbor operates in compliance with existing hazardous materials regulations, including complying with the USEPA's hazardous waste manifest system requirements for all hazardous waste transported in connection with operational activities; complying with requirements associated with hazardous wastes produced on site, including proper storage, labeling, and accumulation time limits; use of certified hazardous waste transportation companies and permitted facilities for any hazardous waste transport, treatment, storage, recycling, or placement.

According to a search of the California Department of Toxic Substances Control (DTSC), EnviroStor and the State Water Resources Control Board GeoTracker database websites (DTSC 2007; SWRCB 2015), there is a single listed open cleanup site within a 0.5-mile radius of Crescent City Harbor and Whaler Island. The open cleanup site is the Whiteley, Thomas J., Inc., drinking water well (Regional Board Case No. 1NDN009) located approximately 0.25 miles east of the harbor, which may be contaminated with diesel, gasoline, kerosene, or other petroleum.

As described above in ***Section 4.7***, sediment samples from the Crescent City Harbor Federal Channels have been previously sampled for sediment chemistry and toxicity. The data indicate that sediment from all three channels have met criteria specified by the various placement options, with the Entrance Channel predominantly consisting of sand with little organic matter, the Marina access channel has predominantly consisted of sand with moderate organic matter, and the Inner Harbor Basin Channel predominantly consisting of fine grain material with high amounts of organic matter.

Significance Criteria

A potential effect would be considered significant if the Proposed Action results in negative impacts to resources through the exposure to hazardous or toxic materials.

4.8.2 Environmental Effects

Effects of the Proposed Action

The Proposed Action would not alter or expand operations at Crescent City Harbor; facility operations would be similar to existing operational conditions. Existing infrastructure potentially containing hazardous materials (i.e., creosote-treated piles, asbestos containing materials, etc.) would be unaffected by the Proposed Action.

Accidental spills of oil, grease, or other petroleum products could occur during construction, as dredging includes operation of heavy machinery. The potential risk associated with the use of these products does not differ from the baseline conditions in the project area, where vessels navigate the waterways and vehicles access the adjacent upland areas. In order to minimize the risk of accidental spills, the contractor will implement a Spill Prevention, Control, and Countermeasures (SPCC) Plan during all construction activities to contain such products and ensure that the appropriate materials are maintained onsite during construction to respond to any gas, oil, or other leak or spill.

In the past, sediment characterization analyses have consistently confirmed that the sediment from the Crescent City Harbor Federal Channels is suitable for placement at the historic sites that have been used by USACE or the CCHD. Sediment samples were collected in 2024 from individual cores, composited, and analyzed for physical and conventional parameters (grain size, total organic carbon, sulfides, and total solids); chemical parameters, including the suite of heavy metals, organic compounds, and biological parameters, including water column toxicity, benthic bioassays, and bioaccumulation. From these analyses it was found that the sediments were safe for placement at the proposed placement sites, with no chemical species of interest having concentrations above background levels. Based on the results of these tests, no impacts due mobilization of contaminants from dredging and placement of dredged material are expected from the Proposed Action.

The Proposed Action is not located on a listed hazardous materials site, and it would not interfere with any ongoing management of listed hazardous material sites, including the Whiteley, Thomas J., Inc., drinking water well. Therefore, effects of the Proposed Action relative to hazardous materials and contaminants would be less than significant.

Effects of the No Action Alternative

The No Action Alternative would consist of no additional federal maintenance dredging. There would therefore be no change in the existing risk of mobilizing contaminants present in sediments, and there would be no potential impacts from accidental spills during construction. Crescent City Harbor operations would be unchanged from present conditions, although continued shoaling will impede navigation and reduce the harbor's functional capacity. This may result in a proportional decrease in the use of potentially hazardous materials associated with harbor operations, including use of gasoline, diesel fuel, cleaners, and solvents, due to reduced vessel traffic and associated activities. Use of these materials would continue to occur in compliance with applicable hazardous materials regulations, and potential hazardous materials impacts from operations would be largely unchanged from existing conditions. The No Action Alternative would not interfere with any ongoing management of listed hazardous materials sites, including the Whiteley, Thomas J., Inc., drinking water well. Consequently, there would be no impact on hazardous materials under the No Action Alternative.

4.9 Biological Resources

4.9.1 Affected Environment & Baseline Condition

Crescent City Harbor and the proposed dredged material placement sites are home to a number of fish and wildlife species as well as a variety of habitat communities. This section describes the biological resources and habitats within the study area.

The terrestrial environments of the study area include upland areas associated with Crescent City Harbor, like the Crescent City Dredge Pond and Whaler Island. For the purposes of this assessment, consideration of the terrestrial environment is limited to areas within and adjacent to Crescent City Harbor. These areas include developed areas, sandy beaches, reinforced shorelines and breakwaters, and rock outcroppings. While moderately to highly disturbed, these areas support a variety of species, and serve as a transitional habitat from the terrestrial to marine environments. Upland habitats with higher biological value within this area include the sandy beaches and intertidal flats associated within Crescent City Harbor and South Beach which extends south from the Whaler Island breakwater.

Beach and Dune areas occur within the project area above normal high tide lines within Crescent City Harbor and to the south of Whaler Island at South Beach. Sandy beach habitat includes dry backshore areas that are characterized by lower productivity than the adjacent intertidal habitat, but which provide primary habitat for a variety of species. Sandy well drained soils are the defining factor of this habitat community along with associated vegetated dunes. Plant species in these exposed coastal environments are adapted to strong winds, waves, and salt spray and often include native and non-native grasses, herbaceous vegetation and coastal shrub species such as beach bur (*Ambrosia chamissonis*), gumweed (*Grindelia willd*.), sea lavender (*Limonium P. mill*)., and wild radish (*Raphanus sativa*), as well as nonnative plants like iceplant (*Carpobrotus chilensis*) and sea rocket (*Cakile maritime*). While some sandy beach and dune areas in the vicinity of the project are disturbed by development, such habitat supports species of invertebrates; provides forage, resting, and nesting habitat for a variety of shorebirds, diving birds, gulls, terns, wading birds and waterfowl; and supports butterflies and other insects as well as small mammals.

The intertidal zone, also known as the foreshore, is the area between mean lower low water (MLLW) and mean higher high water (MHHW) that is alternately exposed during low tides and inundated during high tides. Sandy intertidal zones are characterized by soft bottom sands, shells, and occasionally cobble

in the area between the highest and lowest tides. As a transitional zone between upland and marine environments, intertidal flats are of high biological productivity and value, serving as breeding and feeding grounds for anadromous fish, marine fish, shorebirds and other seagoing birds, and both marine and terrestrial mammals (such as river otters). The sandy intertidal zone also provides important habitat for various organisms living under the surface of the sand, including clams, crabs, and other vertebrates and invertebrates.

Whaler Island is a 5.5-acre promontory within Crescent City Harbor. Its northern face (Harborside) is primarily composed of sparsely vegetated native rock outcroppings with scrub-shrub and a few small conifer trees at the pinnacle of the rocks. The outcropping is artificially reinforced on the eastern, western, and northern ends. A roadway connects the island to the mainland and is protected with large rip-rap armoring. The larger southern face of the island is relatively unaltered. The island is subject to winds and wave erosion. Though small in size, Whaler Island may be inhabited at various times of the year by nesting birds (migratory and resident), seals, and sea lions.

The aquatic environments found in the study area in Crescent City Harbor and the proposed dredge placement locations include nearshore marine and open-ocean environments. The estuarine environment, the brackish mixing zone within the Harbor, can be broken into two main zones: the subtidal zone and the permanently inundated deeper waters.

The nearshore subtidal zone experiences high wave energy and is generally occupied by small, mobile, deposit-feeding crustaceans and contains fewer species of invertebrates than in the finer sandy to mixed sediments offshore. Subtidal estuarine waters provide foraging and habitat for fish such as shiner surfperch (*Cymatogaster aggregate*), Starry flounder (*Platichthys stellatus*), and various smelt and sculpin species. Marine birds utilize open water estuarine and ocean habitat primarily for resting on the surface and diving for submerged food. Benthic habitat in nearshore marine areas is generally occupied by invertebrates such as polychaete worms (including *Mediomastus californiensis* and *Polydora kempi*), anemones, shrimp (*Neomysis rayii, Bathyleberis sp.,* and *Euphilomedes carcharodonta*), crabs (including *Hemigrapsus nudus*), bivalves (including *Macoma secta* and *Transennella tantilla*), Seastars (including *Amphiodia sp*.), and gammarid amphipods (including *Aoroides columbiae* and *Corophium acherusicum*), among other sessile and suspension feeding organisms.

Submerged aquatic vegetation often colonizes estuarine and nearshore environments and eelgrass (*Zostera marina*), a native estuarine aquatic grass can be found in shallow-water estuarine areas Crescent City Harbor. Eelgrass provides important breeding, feeding and rearing habitat for aquatic fish and organisms. It is unknown how extensive the eelgrass communities historically were in what is today Crescent City Harbor. However, patches of eelgrass remain within the shallow areas of the harbor.

The most common marine mammals in Crescent City Harbor are harbor seals (*Phoca vitulina*) and California sea lions (*Zalophus californianus*). Harbor seals generally forage near the shore in water that is up to 5 meters (16 feet) deep. Both seals and sea lions often haul out on docks in the harbor. Several species of whales and porpoises are commonly found in open ocean marine waters along the California coast (including gray whale (*Eschrichtius robustus*), humpback whale (*Megaptera novaeangliae*), blue whale (*Balaenoptera musculus*), and harbor porpoise (*Phocoena phocoena*), but are less likely to occur in the nearshore project action area.

The Humboldt Open Ocean Disposal Site (HOODS) is an existing open-ocean sediment placement site located 66 miles south of Crescent City Harbor, approximately 3 to 4 nautical miles offshore from

Eureka, CA in water depths of approximately 160-180 ft. The HOODS site has been used periodically as an interim dredged material placement site since September 1990. USEPA prepared an EIS in 1995 (USEPA 1995) for designation of the placement area. The Site Management and Monitoring Plan (SMMP) was updated in 2006. Placement of dredged material from the Proposed Action would be performed in compliance with the SMMP. Impacts of placement of dredged material at HOODS are addressed in the 1995 EIS; Crescent City dredged material will be placed in compliance with the SMMP. Therefore, impacts of placing dredged material from Crescent City at this site are not addressed in this EA.

Significance Criteria

An impact to aquatic habitat and species will be considered significant if:

- There is a net loss in value of a sensitive biological habitat including a marine mammal haul out site or breeding area, seabird rookery, or Area of Special Biological Significance;
- If the movement or migration of fish is impeded
- If there is a substantial loss in the habitat of any native fish, wildlife, or vegetation.

4.9.2 Environmental Effects

Effects of the Proposed Action

In general, both dredging and material placement activities have the potential to adversely affect aquatic habitat and organisms.

The proposed dredging and placement activities would primarily take place in the aquatic environment and thus dredging activities would not be expected to impact terrestrial habitat and organisms in the action area. However, the USFWS has expressed concern about aggradation of sand at the north end of South Beach. The concern is that aggrading sand along South Beach from placement of material at the Whaler Island placement site is impeding flow through the culverts under Highway 101 that drain the wetland areas where the federally listed Western lily (Endangered) has been documented to occur. Artificially high-water levels have been shown to reduce lily reproduction and survivability (USACE 2023). This study showed that sand placement at Whaler Island did *not* increase beach elevation and that other factors could be contributing to the culverts adjacent to the Crescent City Marsh clogging (USACE 2023). The monitoring found that placement of sandy material at Whaler Island did not increase beach elevation (at South Beach) and that other factors could be contributing to the culverts adjacent to the Crescent City Marsh clogging (USACE 2023). With proper on-site management, the project is not anticipated to result in adverse impacts to land resources. More information on this study in included in the appendices.

Potential impacts to aquatic environments associated with the Proposed Action include alteration of the nearshore and benthic aquatic environments and disturbance of aquatic species within the area to be dredged and within the Whaler Island placement area. Dredging activities remove soft bottom habitat and can thus cause removal/burial of benthic invertebrates, demersal fish eggs, or nonmotile larvae; altered water quality (e.g. turbidity, suspended sediment) leading to reduced visibility or clogging of fish gills; damage to submerged aquatic vegetation habitats; increased water depth resulting in a decrease in primary productivity; and/or damage to fishery or spawning grounds (SAIC, 2007).

Potential aquatic habitat impacts associated with dredging vessels and equipment may include: disturbance of seafloor surfaces from vessel anchors, disturbance of organisms due to increased movement and noise, and temporary displacement of mobile organisms. With hydraulic dredging and material pumping, pipeline placement, anchoring and/or removal also has the potential to damage aquatic habitats, crush sedentary organisms, or interfere with wildlife movement through habitat (SAIC, 2007). Effects to aquatic species may occur through direct contact with equipment or placed material as well as indirectly through effects on water quality and noise levels associated with dredging and placement activities.

Dredging in the federal channels will result in removal of soft bottom sediment in subtidal benthic habitat and potential removal or temporary burial of benthic invertebrates and nonmotile organisms. Any anchoring impacts to benthic habitat and organisms associated with the dredge equipment in aquatic habitat would likely be equivalent to existing anchoring impacts in the action area given the frequent vessel traffic. Moreover, SAIC (2007) suggest that anchor damage is likely to be less substantial on sandy seafloors like those associated with the proposed dredging area. Recovery of benthic habitat and recolonization by most benthic organisms would be expected occur by the following season.

Fish and shellfish organisms are most sensitive to water quality or removal/burial impacts during early life-history stages, such as the egg and larval stages as they have limited capability to avoid direct disturbance and water quality changes. Yet, the location of disturbance will change as the dredge moves and potential exposure durations of benthic and sessile organisms at a stationary point in or near the dredge footprint would be expected to be only on the order of one to a few days using a cutterhead hydraulic pipeline or clamshell dredge (SAIC, 2007). Moreover, because the material to be dredged is primarily sand, any suspended sediment would be expected to settle out quickly and be unlikely to significantly reduce visibility or clog fish gills for long periods.

Movement, visual disturbance, and operational noise from dredge equipment could cause marine mammals, fish, and birds to avoid close proximity to the dredging action area. Given the mobility of marine mammals, fish, and birds, the frequent vessel traffic in the project area under ambient conditions, the short dredging duration likely to be associated with the Proposed Action, and the abundance of similar habitat conditions around the dredging and placement site, significant adverse effects from dredge noise, movement, and visual disturbance are not expected.

Dredging has the potential to cause sedimentation and turbidity near eelgrass beds, which might block light from reaching the beds. Surveys of eelgrass beds in Crescent City Harbor were conducted for the Outer Boat Basin maintenance dredging, rock replacement, and dock replacement project (Merkel & Associates, Inc. 2018). The report indicates that the aerial extent of eelgrass in Crescent City Harbor has expanded since 2013 and that the size of the eelgrass beds in 2018 were approximately similar to what was observed in 2017. Thus, effects to aquatic habitats and species from dredging and placement activities associated with the proposed action are expected to be temporary, short in duration, and less than significant. The following minimization measures can be included to further reduce the impact to eelgrass populations:

- A buffer of 15-50 meters will be included, as practicable, to reduce shading impacts and to allow for greater circulation. This will also protect the eelgrass from potential boat maneuvering, grounding, or propeller damager.
- Areas within the 15-meter eelgrass buffer will be dredged at night to avoid the photosynthetic period.

- The hydraulic pipeline will be placed to avoid eelgrass when transporting sediments to the placement site.

Dredging and placement activities associated with the Proposed Action are likely to result in temporary, minor impacts to aquatic habitats and organisms in the action areas, but such impacts are not expected to be significant.

Effects of the No Action Alternative

Under the No Action Alternative, no additional federal maintenance dredging would occur. Therefore, no change to terrestrial or aquatic environments or effects to species utilizing these environments would occur under the No Action Alternative.

4.10 Threatened and Endangered Species and Protected Habitats

4.10.1 Affected Environment & Baseline Condition

A number of protected species and habitats have been documented to occur or could potentially occur within the vicinity of the Proposed Action. These species and habitats are protected under one or more federal regulations:

- Endangered Species Act
- Marine Mammal Protection Act
- Magnuson-Stevens Fishery Conservation and Management Act
- Migratory Bird Treaty Act

Significance Criteria

An impact to endangered species will be considered significant if there is a substantial effect to the species or loss of habitat (a substantial loss is defined as any change in a population which is detectable over natural variability for a period of five years or longer).

4.10.2 Environmental Effects

Effects of the Proposed Action

Endangered Species Act

A variety of protected species under jurisdiction of the Endangered Species Act (ESA) have been documented to occur or have the potential to occur within the study area. Their listing status under the ESA as well as designated critical habitats that could potentially occur within the study area are described in the following section. The geographic extent to which project actions could potentially affect protected species and their habitats under jurisdiction of the ESA, as well as the effects of the Proposed Action to those species and their protected habitats, is evaluated in the Biological Assessment (BA) (***Appendix D***) submitted to the USFWS and the NMFS in 2019 for consultation on the Proposed Action. The BA takes into consideration equipment proposed, timing and duration of work, sediment quality and quantity, noise generated during dredging, alterations of hydrology and benthic habitats and other factors.

Potential impacts of the proposed project to sensitive species in or near Crescent City Harbor generally are associated with the following factors:

- Disturbance in and near the shipping channels due to dredging activity and noise;
- Creation of turbidity plumes near dredging locations and placement areas; and
- Disturbance of up to ~60 acres of benthic habitat in the shipping channels from dredging, assuming an area of 500 ft x 5000 ft is dredged.

Impacts resulting from all three of the above factors are expected to be minor, temporary, and localized. Dredging activities and vessel noise are not expected to be different than ambient levels within the harbor. Turbidity plumes from actual dredging would be small and localized; no overflow or decant water from barges would be allowed that could cause larger turbidity plumes. The amount of benthic habitat disturbed would be very small compared to the total amount in the nearshore ocean area.

Marbled murrelet: Marbled murrelet is a small diving seabird that nests exclusively in large old-growth trees with large nesting platforms up to 50 miles inland from the coastline. There are two occurrences of designated critical habitat within coastal forested areas east of the Action Area: Jedediah Smith Redwood State Park and Del Norte Coast Redwoods State Park; which are located 2 and 3 miles, respectively, from Crescent City Harbor. As this project and its effects will be confined primarily to the Crescent City Harbor and locations immediately adjacent to it (except for the barge routes and HOODS), it will have no effect on nesting birds, eggs, or juveniles in nests.

This species is expected to utilize the nearshore areas within the Action Area for foraging, although given the level of boating activity at the Harbor, the marbled murrelet is not expected to regularly utilize the Harbor itself. Disturbance along the barge routes and at HOODS would be intermittent. Any birds that may be present during project activities likely would simply move some distance away to forage. Finally, the action area itself represents a very small portion of the total nearshore area available for marbled murrelet foraging. The proposed project is not likely to adversely affect the marbled murrelet.

Tidewater goby: Tidewater goby is a small fish that strictly inhabits brackish coastal water habitats entirely within California, ranging from Tillas Slough (mouth of the Smith River, Del Norte County) near the Oregon border south to Agua Hedionda Lagoon (northern San Diego County). The tidewater goby is documented to occur within the Elk Creek estuarine environment in Crescent City Harbor and could be present when maintenance dredging occurs.

Project dredging activities would occur in Crescent City Harbor shipping channels. These are significantly deeper (dredging depths would be -15 to -20 feet) and of higher salinity (i.e., seawater at 33 ppt) than those that tidewater goby prefer (less than 7 ft and 10 ppt, respectively). It is possible that high streamflow could wash individuals downstream into the harbor, but dredging would occur during drier periods and not when flows are high due to rain events. No critical habitat occurs within Crescent City Harbor or elsewhere in the action area. Due to the low likelihood of presence within the shipping channels, the proposed project is not likely to adversely affect tidewater goby.

Western lily: Western lily is a large, perennially flowering plant. This species occurs in a narrow band of coastal wetland habitat from approximately Coos Bay, OR southward to Eureka, CA. The Western lily occurs in early successional bogs or coastal scrub on poorly drained soils, usually those underlain by an iron pan or poorly permeable clay layer. Populations are found at low elevations, from almost sea level to about 300 feet (100 meters) in elevation and from ocean-facing bluffs to about 4 miles (6 kilometers) inland. The largest documented population of the Western lily currently numbers over one thousand flowering plants and occurs within the Crescent City Marsh just north of Highway 101 and east of the Whaler Island Jetty (Figure 2).

The United States Fish and Wildlife Service (USFWS) had concerns that sand placement at Whaler Island could aggregate along the beach (South Beach) adjacent to the Crescent City Marsh and potentially exacerbate drainage issues along South Beach. Crescent City Marsh provides habitat for the endangered western lily and artificially high-water levels have been shown to reduce their reproduction and survivability (USACE 2023). This study showed that sand placement at Whaler Island did *not* increase beach elevation and that other factors could be contributing to the culverts adjacent to the Crescent City Marsh clogging (USACE 2023). The monitoring found that placement of sandy material at Whaler Island did not increase beach elevation (at South Beach) and that other factors could be contributing to the culverts adjacent to the Crescent City Marsh clogging (USACE 2023). With proper on-site management, the project is not anticipated to result in adverse impacts to land resources.

Coho salmon: Adult coho salmon enter fresh water to spawn from September through January, and therefore may be exposed to the proposed dredging activities (i.e., in October and November). However, due to the localized nature of the dredging including impacts such as noise and turbidity, adults would simply be expected to move around the project area and continue their spawning migration due to their excellent mobility and swimming strength. Juveniles are not expected to be exposed to dredging as coho salmon migrating out of Elk Creek will have left the Harbor by early summer.

Effects to coho salmon critical habitat would be minor, temporary, and localized as described above (e.g., noise, turbidity, and disturbance of benthic habitat). Benthic organisms are not a major food item for rearing juveniles, and no lasting effects of the project are expected to affect the function of Crescent City Harbor as either migratory or rearing habitat. The proposed project is not likely to adversely affect SONCC coho salmon, or the designated critical habitat of this species.

Green sturgeon: All spawning by the southern DPS of North American green sturgeon occurs in the Sacramento River and San Joaquin River watersheds which anadromous fish must access through San Francisco Bay approximately 300 miles south of Crescent City (NMFS 2018). Eggs, larvae, and juveniles are expected to occur only in the spawning basins and hence are not expected to be present at all in Crescent City Harbor. However, adults and sub-adults may be present there in summer and fall (NMFS 2018) and therefore exposed to project dredging activities. Similar to adult salmon, these individuals are expected to be large (i.e., at least 90 cm in length; Miller et al. 2020) and strong enough to simply move away from the active project area due to the physical disturbance caused by dredging. Monitoring of cutterhead dredging in the Sacramento/Stockton Deepwater Ship Channel has detected occasional entrainment of only juvenile white sturgeon. the largest of which measured 43 cm in length (Mari-Gold Environmental Consulting Inc. and Novo Aquatic Sciences, Inc. 2017).

The proposed project is expected to temporarily disturb approximately 60 acres of habitat that may be used by green sturgeon for feeding, but the disturbed area is very small compared to the total amount of benthic, nearshore area available along the coast. Turbidity caused by dredging would be minor, temporary, and localized and is not considered to be a major concern for sturgeon (Stanford et al. 2009). Therefore, the proposed project is not likely to adversely affect the green sturgeon.

Eulachon: Eulachon are anadromous and spawn from December through June; therefore, adults migrating into Elk creek would not be exposed to project activities (i.e., in October and November), nor should larval fish that would be carried via streamflow downstream into the harbor. Juveniles may encounter the project, but they move into the open ocean during their first year, settling farther out on

the continental shelf where they are typically found near the bottom in waters 50–200 meters deep. In general, juveniles would not be expected to remain in Crescent City Harbor and exposure to project activities is anticipated to be low overall. Turbidity caused by dredging would be minor, temporary, and localized. Juvenile eulachon are planktonic feeders and would be minimally affected by the disturbance of the channel that would remove benthic food items. The proposed project is not likely to adversely affect the southern DPS of Eulachon.

The USACE has determined that the Proposed Action may affect, but is not likely to adversely affect, the California Coast (SONCC) coho salmon (*Oncorhyncus kisutch*; threatened), the southern distinct population segment (DPS) of North American green sturgeon (*Acipenser medirostris*; threatened), and the southern DPS of Eulachon (*Thaleichthys pacificus*; threatened), marbled murrelet (*Brachyramphus marmoratus*; threatened), tidewater goby (*Eucyclogobius newberryi*; endangered), and western lily (*Lilium occidentale*; endangered).

Marine Mammal Protection Act

The Marine Mammal Protection Act (MMPA) requires federal agencies to evaluate if a given project may have an effect on marine mammals within the project area and their habitat and if so, requires that an Incidental Harassment Authorization (IHA) or Incidental Take Authorization (ITA) be obtained. The impacts from dredging operations and placement of dredged material were evaluated to determine if an IHA or an ITA would be needed, and the impacts of the project on marine mammals and habitat were evaluated for compliance with NEPA.

An effect would be considered significant under NEPA if it resulted in long term impacts that were irreversible and lead to the decline of a mammal population or habitat. Impacts considered included those from underwater noise, effects on fisheries and stocks, ship strikes where vessels would hit a marine mammal and cause mortality, and the proximity to haul out locations and breeding habitat which could deter breeding behavior. Underwater noise associated with dredging may cause temporary avoidance of the area by marine mammals (ERDC 2019) though is not expected to interfere with other life processes that would normally take place in the vicinity of the project area which are anticipated to cause less than significant adverse impacts. Fisheries and stocks are not expected to be significantly impacted by the project which would cause an effect to marine mammals. No unusual mortality events (UME) from ship strikes with dredges have been reported in the NMFS UME database in the surrounding coastline (NMFS 2024). Marine mammal ship strikes during dredging or placement of sediments are not anticipated as dredging vessels are relatively slow moving and easy for marine mammals to avoid. No haul outs or other breeding habitat is known to exist in the vicinity of the project area such that no effects are anticipated for breeding behaviors. The results of the analysis are summarized below in ***Table 5***.

Based on the impacts analysis as summarized in ***Table 5***, no significant impacts to marine mammals or their habitat are anticipated from the project. Less than significant impacts are anticipated for each category that was considered for marine mammals and their habitat and as such, no IHA permit was filed for MMPA.

***Table 5**. Impacts Analysis Results for Marine Mammals*

Dredging Operations	
Resource/Effect Type	**Analysis Results**
Underwater Noise	Less than Significant Adverse Impacts
Fisheries and Stocks	Less than Significant Impacts
Ship Strikes	Less than Significant Impacts
Haul Outs and Breeding Habitat	Less than Significant Impacts

Placement of Dredged Material	
Resource/Effect Type	**Analysis Results**
Underwater Noise	Less than Significant Adverse Impacts
Fisheries and Stocks	Less than Significant Impacts
Ship Strikes	Less than Significant Impacts
Haul Outs and Breeding Habitat	Less than Significant Impacts

Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), requires federal agencies to consult with NMFS on activities that may adversely affect essential fish habitat (EFH). The act defines EFH as "those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity".

The proposed project area consists of tidally influenced open-water and benthic mudflat habitats, with nearby marsh habitat. Areas of eelgrass are present within the shallow waters of the harbor, including areas adjacent to the project. The proposed action may affect essential fish habitat (EFH) managed as part of the Pacific Groundfish Fishery Management Plan (FMP), Pacific Salmon FMP, and Pacific Coastal Pelagic Species FMP.

The Pacific Coast Groundfish FMP covers the groundfish fishery in California, Oregon, and Washington, and protects habitat for dozens of species of sharks and skates, roundfish, rockfish, and flatfish. The extent of Pacific Coast Groundfish EFH includes all waters and substrates with depths less than or equal to 3,500 meters (approximately 11,500 feet) to Mean Higher High Water (MHHW) level, or the upriver extent of saltwater intrusion in estuaries The entirety of the Crescent City Harbor below MHHW is designated as EFH for Pacific Coast Groundfish.
The Coastal Pelagic FMP protects and manages northern anchovy, Pacific sardine, Pacific (chub) mackerel, jack mackerel, market squid, and all krill species that occur in the West Coast exclusive economic zone. Coastal Pelagic EFH includes all marine and estuarine waters from the shoreline along the coasts of California, Oregon, and Washington; offshore to the limits of the exclusive economic zone; and above the thermocline, where sea surface temperatures range between 10 and 26 degrees Celsius. The entirety of the Crescent City Harbor below MHHW is designated as EFH for Coastal Pelagic Species.

The Pacific Coast Salmon FMP guides the management of commercial and recreational salmon fisheries off the coasts of Washington, Oregon, and California, and includes Chinook Salmon (Oncorhynchus tshawytscha) and Coho Salmon (O. kisutch). Pacific Coast Salmon freshwater EFH includes all rivers or creek currently or historically occupied by Chinook Salmon or Coho

Salmon. Estuarine and marine areas such as Crescent City Harbor are also included in this essential fish habitat designation. In estuarine and marine areas, Pacific Coast Salmon EFH extends from the nearshore and tidal submerged environments within state territorial waters out to the full extent of the exclusive economic zone offshore of California, north of Point Conception. The FMP also defines five Habitat Areas of Particular Concern for the Pacific Coast Salmon essential fish habitat: complex channels and floodplain habitats, thermal refugia, spawning habitat, estuaries, and marine and estuarine submerged aquatic vegetation.

The Pacific Coastal Pelagic FMP manages seven stocks off the West Coast, including four finfish species, one squid species, and eight krill species. The Pacific Coastal Pelagic FMP aims to promote efficiency and profitability in these fisheries while ensuring sustainability and adequate forage for potential predators. Krill are protected due to their vital role in the marine ecosystem.

A BA was prepared by the USACE for maintenance dredging of the Crescent City federal navigation channels in 2019, this included an EFH Assessment ***(Appendix D).*** Impacts to EFH may occur as a result of dredging and placement of dredging material which could result in degradation of EFH for breeding, rearing, feeding and migration of EFH species and habitats; placement of dredge material could result in temporary alteration of available habitat, food base, and rearing areas.

In the EFH assessment, USACE determined that the Proposed Action may adversely affect EFH for the fisheries present in the project area. The NMFS concurred with the USACE determination on March 26, 2019. The NMFS found that adverse effects would arise from temporarily degraded water quality due to suspended sediments and temporary reduction in benthic prey before recolonization. However, NMFS concluded that the high-wave environment at the Whaler Island placement site and HOODS would quickly clear the suspended sediments and recovery and recolonization of most benthic prey would occur by the following season. Therefore, NMFS concluded that no EFH conservation recommendations were warranted (***Appendix D***). Given this, impacts to EFH from the Proposed Action would be temporary, localized, and less than significant.

The Moss Landing Harbor District completed surveys of eelgrass beds in Crescent City Harbor in 2018 for the Outer Boat Basin maintenance dredging, rock replacement, and dock replacement project (Merkel & Associates, Inc. 2018). As part of the project, eelgrass transplanting occurred to mitigate dredging impacts to eelgrass beds. The latest eelgrass survey was conducted in 2018 as part of the Year 5 post-mitigation eelgrass monitoring (Merkel & Associates, Inc. 2018). The report indicates that the aerial extent of eelgrass in Crescent City Harbor has expanded since 2013 and that the size of the eelgrass beds in 2018 were approximately similar to what was observed in 2017.

Migratory Bird Treaty Act

The MBTA of 1918, as amended, implements various treaties and conventions between the United States and other countries, including Canada, Japan, Mexico, and Russia, for the protection of migratory birds (16 USC 703–712). The act classifies almost all species of birds as ‘migratory’ except for a few specific game and nonnative birds. Under the Act, taking, killing, or possessing migratory birds, or their eggs or nests, is unlawful.

California is noted for its high diversity of bird species given the state's position within the Pacific Flyway, other migratory corridors, climate, topographic and vegetative diversity, and proximity to varied habitat zones including the Pacific Ocean. A number of resident and highly migratory bird species would be expected to occur within all areas of the Proposed Action and could include terrestrial birds, shorebirds, waterfowl, and ocean-going species. Since the Proposed Action is located in open-water habitat and would not consist of any land-based activities, there would be no effects anticipated on migratory bird species.

Effects of the No Action Alternative

Under the No Action Alternative, no additional federal maintenance dredging would occur. Therefore, no change to terrestrial or aquatic environments or effects to species utilizing these environments would occur under the No Action Alternative.

4.11 Cumulative Effects

NEPA defines a cumulative effect as an effect on the environment that results from the incremental effect of an action when combined with other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions (40 C.F.R. § 1508.7).

The scope of this cumulative effects analysis is limited by the geographic and temporal scope of the potential effects that could result from the Proposed Action. As a result, environmental resources which were assessed above and resulted in no effects from the Proposed Action will not be assessed in this analysis. The geographic and temporal scope of the analysis is defined in Section 2.0.

4.11.1 Past, Present, and Reasonably Foreseeable Future Actions

This section briefly describes other projects in the Crescent City area. The exact construction timing and sequencing of these projects are not yet determined or may depend on uncertain funding sources. Consideration of each of these projects is necessary to evaluate the cumulative effects of the Proposed Action on environmental resources in the area.

Past activities that have occurred in Crescent City Harbor include jetty construction and maintenance and prior dredging of federal and non-federal areas within the harbor. Other future foreseeable activities that might have a cumulative effect in combination with the Proposed Action would be future maintenance dredging of the federal channels, maintenance dredging of the Coast Guard entrance channel and mooring area, and non-federal maintenance of the mooring areas operated by the Crescent City Harbor District. In the context of these past and foreseeable future actions in the vicinity of the proposed project, the Proposed Action is not expected to have significant incremental cumulative effects.

Federal Dredging and Placement

Maintenance dredging of the federal channels by the USACE is highly dependent on federal appropriations from Congress, and thus happens every four to seven years, on average. The federal

channels were last dredged by USACE in 2020. Past and future such dredging operations would result in similar effects to those described above for the Proposed Action.

Crescent City Harbor District Dredging and Placement

The Crescent City Harbor District independently removes approximately dredged material from berth areas and the non-federal inner channels. Some areas are dredged less frequently (up to every 10 years). The demand for dredging can increase during heavy rainfall years as more shoaling occurs in the navigation channels.

Most recently, the CCHD conducted some local dredging from the Inner Harbor Basin in 2013. Approximately 182,000 cubic yards of material was removed, much higher than the average due to the 2011 tsunami. The material from this dredging operation was placed at ocean disposal site, SF-DODS. The CCHD's dredging operations would result in similar effects to those described above for the Proposed Action.

4.11.2 Summary of Cumulative Effects

Aesthetics

Effects to aesthetics associated with the Proposed Action and the other local projects would be occurring at different times, as USACE and the CCHD likely wouldn't be dredging at the same time. As a result, while individually these projects would each have temporary effects on aesthetics, they would not combine to create a cumulative effect on aesthetics.

Recreation

Effects to recreation associated with the Proposed Action and the other local projects would be occurring at different times, as USACE and the CCHD likely wouldn't be dredging at the same time. As a result, while individually these projects would each have temporary effects on recreation, they would not combine to create a cumulative effect on recreation.

Navigation

The Proposed Action and the CCHD and prior or future federal dredging actions would not be anticipated to happen at the same time and therefore would not cumulatively contribute to effects on navigation. However, they would combine to cumulatively benefit navigation through improved access to the Crescent City Harbor.

Cultural and Historic Resources

Similar to the Proposed Action, CCHD and federal dredging and placement activities that occurred in the past and are reasonably foreseeable to occur in the future would not be anticipated to result in significant adverse effects to cultural resources. Initial dredging of the harbor and federal channels did not disturb cultural resources base on the Section 106 review completed in 1996. One shipwreck was identified at the mouth of the harbor and outside of the Proposed Action area. No submerged cultural

resources were identified within the channels and at the placement sites. Subsequent and future dredging would be confined to the removal of sediments in the channels that have accumulated since the last dredging effort. Sediments deposited since the previous dredging activities would not contain any in-situ archaeological resources or cultural material. Placement activities would not remove, damage, or have adverse effects towards a cultural resource. Therefore, additional impacts would not be expected from these episodes and the cumulative effects of the Proposed Action, in the context of past and future dredging episodes would be less than
significant.

Based on the potential effects of the past and reasonably foreseeable future actions, in relation to the Proposed Action, the cumulative effects of activities in the vicinity of the Crescent City Federal Channels or at the disposal site will not create significant negative impacts.

Water Quality

In the context of the past and reasonably foreseeable projects discussed above, the Proposed Action is not be anticipated to result in significant cumulative water quality effects. While dredging by USCE and the CCHD would have similar effects in adjacent (for dredging) or potentially equivalent (for placement) action areas, it is unlikely that USACE and the CCHD would be conducting dredging/placement activities at the same time. Therefore dredging and placement from USACE and CCHD would not be expected to have compounding effects on water quality from simultaneous actions. As assessed in the Water Quality section ***(Section 4.6)***, the tidal conditions in the project area create a dynamic enough environment that most water quality effects maintain or return to ambient conditions within a tidal cycle (e.g. turbidity values, and associated water quality depressions). As a result, there would not be additional significant cumulative effects on water quality from the Proposed Action in the context of past and future foreseeable actions.

Geology, Sedimentation, and Seismology

The Proposed Action and the CCHD and prior or future federal dredging actions would not be anticipated to happen at the same time and therefore would not cumulatively contribute to effects on geology, sedimentation, and seismology.

Hazardous and Toxic Materials

The Proposed Action and the CCHD and prior or future federal dredging actions would not be anticipated to happen at the same time and therefore would not cumulatively contribute to effects on hazardous and toxic materials.

Biological Resources

Similar to the Proposed Action, prior federal dredging episodes and CCHD dredging actions could have temporary impacts to biological resources during dredging activities. These impacts would be expected to cease with the completion of dredging and placement activities. Because CCHD and federal dredging activities would not be expected to occur at the same time, nor would dredging occur in the same geographic locations, species and habitats would not experience significant cumulative effects from multiple individual projects occurring at once.

Species and habitats would be expected to recover from temporary effects such as turbidity and benthic disturbance from dredging projects on the order of days to months and therefore, any turbidity or placement of material associated with the CCHD dredging would be expected to settle out prior to USACE initiating federal dredging. As a result, cumulative effects to biological resources are not anticipated to result from these actions occurring in the same calendar year.

5 ENVIRONMENTAL COMPLIANCE

Statute	Status of Compliance
National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. § 4321 *et seq.*) Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of the NEPA (40 C.F.R. §§ 1500-1508) dated July 1986	This EA has been prepared to disclose impacts and develop mitigation measures (where warranted) associated with the proposed maintenance dredging of the Crescent City Harbor Federal Channels, as discussed in the CEQ regulations on implementing NEPA (40 C.F.R. §§1500-1508). This document presents sufficient information regarding the impacts of the Proposed Action. The Draft EA was released for a 15-Day public and agency comment period from June 13 to June 28, 2024.
Clean Air Act, as amended (42 U.S.C. § 7401 *et seq.*)	In accordance with 40 C.F.R. § 51.853©(2)(ix), USACE has determined the proposed agency action is exempt from the requirement to prepare a conformity determination with the State Implementation Plan under the Clean Air Act (CAA) because the project consists of maintenance dredging, no new depths are required, and placement would be at an approved in-water placement site. As a result, compliance with the CAA is complete.
Clean Water Act, as amended (33 U.S.C. § 1251 *et seq.*) Executive Order 11990, Protection of Wetlands, (42 Fed. Reg. 26961, 1977) Rivers and Harbors Act of 1899 (33 U.S.C. § 403)	Pursuant to section 401 of the Clean Water Act (CWA), the proposed action will require a Certification from the Regional Water Quality Control Board (RWQCB) to ensure the project meets State water quality standards. Pursuant to section 404 of the CWA, USACE has prepared a 404(b)(1) analysis for the Proposed Action. The 404(b)(1) analysis is included in Appendix A. The Proposed Action was determined to represent the least environmentally damaging practicable alternative. No wetlands occur within the proposed project area.
National Oceanic and Atmospheric Administration Federal Consistency Regulation (15 C.F.R. Part 930) Coastal Zone Management Act of 1972 (16 U.S.C. § 1451 *et seq.*) California Coastal Act of 1976	USACE has submitted to the California Coastal Commission a Negative Determination (Appendix C) describing how the Proposed Action is consistent with the applicable Coastal Zone Management Plan, pursuant to the requirements of the Coastal Zone Management Act (CZMA).

Endangered Species Act as amended (16 U.S.C. § 1531 *et seq.*)	The USACE is in coordination with the USFWS and NMFS regarding impacts of the proposed dredging on federally listed species and critical habitats. The USACE has determined that the Proposed Action is not likely to adversely affect any federally listed endangered or threatened species, or their critical habitat (Appendix C). Any proposed minimization measures from USFWS and NMFS will be included as requirements of the dredging contract.
Fish and Wildlife Coordination Act (16 U.S.C. § 661 *et seq.*)	The Fish and Wildlife Coordination Act applies whenever "the waters of any stream or other body of water are proposed or authorized to be impounded, diverted, the channel deepened, or the stream or other body of water otherwise controlled or modified." The proposed maintenance dredging does not proposed to impound, divert, deepen, control, or modify any body of water beyond previously authorized depths. Therefore, the Fish and Wildlife Coordination Act does not apply.
Magnuson-Stevens Fishery Conservation and Management A–t – Fishery Conservation Amendments of 1996, (16 U.S.C. § 1801 *et seq.*) – Essential Fish Habitat (EFH)	The proposed action area includes EFH for three Fishery Management Plans. In compliance with the MSFMCA, an EFH assessment and consultation with NMFS regarding adverse effects to EFH from the Proposed Action has been prepared by USACE (Appendix C) and submitted to NMFS in order to obtain EFH conservation recommendations to avoid, minimize, mitigate, or otherwise offset any potential adverse effects to EFH.
Migratory Bird Treaty Act (16 U.S.C. §§ 703-711)	Since the proposed action is located in open-water habitat and would not consist of any land-based activities, there would be no effects anticipated on migratory bird species.
Marine Mammal Protection Act (16 U.S.C. § 1361 *et seq.)*	No significant impacts from disturbance or harassment of marine mammals is expected from the Proposed Action and therefore no MMPA IHA or ITA is being pursued.
National Marine Sanctuaries Act (16 U.S.C. § 1431 *et seq.*) Marine Protection Research and Sanctuaries Act of 1972 (33 U.S.C. § 1401 *et seq.*)	The Proposed Action area does not lie within a sanctuary, under the National Marine Sanctuaries Act (NMSA).
National Historic Preservation Act (16 U.S.C. § 470 and 36 C.F.R. Part 800): Protection of Historic Properties	Section 106 review was previously completed and USACE's finding of effects pursuant to 36 C.F.R. § 800.4(d)(1) was *No Historic Properties Affected*. No new analysis was warranted for maintenance dredging.
Executive Order 11593: Protection and Enhancement of the Cultural Environment Archaeological and Historic Preservation Act of 1974, (16 U.S.C. § 469 *et seq.*)	See above.
Federal Water Project Recreation Act (16 U.S.C. § 4601 *et seq.)* Abandoned Shipwreck Act of 1987 (43 U.S.C. § 2101 *et seq.*) Submerged Lands Act (Public Law 82-3167; 43 U.S.C. § 1301 *et seq.*)	The Proposed Action will not affect any archaeological resources or historic properties as none were identified within the Proposed Action areas. Mitigation measures and discovery protocols for unanticipated cultural resources identified during construction will be followed to avoid, minimize, or resolve impacts.

	The Proposed Action will not affect any abandoned shipwrecks as none were identified within the Proposed Action areas.

6 AGENCIES CONSULTED AND PUBLIC NOTIFICATION

The Draft EA was released for public review on June 13, 2024 for 15 days to agencies, organizations, and individuals known to have interest in the project; the following were notified of the availability. Copies of the Draft EA were also made available online.

A. Federal Agencies:

1. U.S. Environmental Protection Agency, Region 9
2. U.S. Coast Guard
3. U.S. Fish and Wildlife Service
4. National Marine Fisheries Service

B. State and Local Agencies:

1. California Coastal Commission
2. State Lands Commission
3. State Historic Preservation Officer
4. North Coast Regional Water Quality Control Board
5. North Coast Air Quality Management District
6. California Department of Fish and Wildlife

C. **Tribes:**

1. Tolowa Dee-ni' Nation
2. Elk Valley Rancheria
3. Confederated Tribes of Siletz Indians
4. Cher-Ae Heights Indian Community of the Trinidad Rancheria
5. Big Lagoon Rancheria
6. Blue Lake Rancheria

7 STATEMENT OF FINDINGS

Based on the information in this Programmatic EA, the proposed design refinements would have no significant adverse effects on the quality of the human environment. Mitigation consisting of BMPs, and other measures proposed in this EA are sufficient to reduce all potential direct, indirect, and cumulative effects to less than significant. Following receipt of public input, a determination will be made whether a FONSI is warranted or whether preparation of a supplemental EIS is necessary.

8 REFERENCES

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Appendix A

California Regional Water Quality Control Board, North Coast Region, Waste Discharge Requirements for Crescent City Harbor District Maintenance Dredging District Berthing Areas and Federal Channel.

California Regional Water Quality Control Board
North Coast Region

Order No. R1-2000-59
ID No. 1A76119ODN

WASTE DISCHARGE REQUIREMENTS

FOR

CRESCENT CITY HARBOR DISTRICT MAINTENANCE DREDGING DISTRICT BERTHING AREAS AND FEDERAL CHANNEL

Del Norte County

The California Regional Water Quality Control Board, North Coast Region, (hereinafter the Regional Water Board) finds that:

1. The Crescent City Harbor District (hereinafter discharger) submitted a Report of Waste Discharge dated December 14, 1999. The report describes maintenance dredging of Crescent City Harbor to maintain navigation within the harbor.

2. The discharger has described two locations for dredge material disposal. The areas are:

   a. A 15-acre upland disposal site, located northwest of the inner boat basin. During disposal operations, dredge materials are discharged to the pond by a suction cutter dredge and excess water is decanted and discharged back to the harbor. Small quantities of material are sometimes removed by a shore-based clamshell operation from various areas of the harbor, such as the vicinity of the boatlift facility and the launch ramp area, and trucked to the uplands deposition site.

   b. The beach and near-shore waters just east of the Whaler Island causeway.

   Utilization of the two disposal sites would be on the following schedule:

   a. The upland disposal site would be used on a year-round basis, subject to its capacity limitations and dredging needs within the harbor.

   b. The beach and near-shore waters to the east of the Whaler Island causeway would only be used between August 1 and December 31.

3. Dredging depth will vary throughout the harbor depending on the needs of the vessels using specific areas. The harbor has been divided in to five areas as shown on attachment A of this order and includes the following depths and volumes:

Area	Design Depth	Volume
1	-15 feet MLLW	will not be dredged this cycle
2	-15 feet MLLW	49,739 cubic yards
3	-12 & -15 feet MLLW	99,073 cubic yards
4	-15 feet MLLW	89,647 cubic yards
5	-10 & -15 MLLW	59,621 cubic yards

The total volume of dredging needed in the harbor is 298,080 cubic yards. Typically, areas are over-dredged by 2 feet; which would bring the total to 457,020 cubic yards.

4. The criteria for the evaluation of the disposal sites for dredged material include:

   a. chemical constituents
   b. physical characteristics
   c. bioassay results

   All three criteria have been used to determine the suitability of the dredged materials for the proposed disposal areas. The grain-size measurements in Areas 2, 4, and 5 show less than 60 percent sand. In Area 3, the grain-size measurements show that 90 percent of the material is sand and would be suitable for beach replenishment.

   No significant chemical constituents were detected in the samples collected throughout the harbor.

   Bioassay results show that in Area 3, survival was not statistically different than that of control tests. Areas 2, 4, and 5 showed a lower survival rate than the control tests. Area 2 was statistically lower, which indicates that the materials should not be discharged to the beach area, but are suitable for upland disposal. Areas 4 and 5 were not significantly different from the control test and should be suitable for beach replenishment.

5. The boatlift facility associated with the repair yard is located in Area 4. The area immediately surrounding the boatlift has historically shown elevated levels of copper. Dredged materials from this area are not suitable for beach disposal and all materials dredged from this area, unless shown to be suitable by specific testing, shall be discharged to the upland site.

6. The Regional Water Board's Water Quality Control Plan for the North Coast Region includes water quality objectives and receiving water limitations to protect beneficial uses and to prevent nuisances.

7. Crescent City Harbor is considered a bay pursuant to the Basin Plan. The beneficial uses for Crescent City Harbor include:

   a. navigation
   b. water contact recreation
   c. non contact water recreation
   d. commercial and sport fishing
   e. wildlife habitat
   f. marine habitat

g. migration of aquatic organisms
h. fish spawning, reproduction and/or early development
i. shellfish harvesting

8. The discharge is presently governed by Waste Discharge Requirements Order No. 92-103, adopted by the Regional Water Board on August 27, 1992.

9. Permitting of the proposed dredging is categorically exempt from provisions of the California Environmental Quality Act (Public Resources Code Section 21000 et seq.) under 14 California Code of Regulations Sections 15301 and 15304 as an existing facility and as an activity involving minor alterations to land (specifically, maintenance dredging), respectively.

10. The Regional Water Board has notified the discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for the discharge and has provided them with an opportunity to submit their written comments and recommendations.

11. The Regional Water Board, in a public meeting, heard and considered all comments pertaining to the discharge.

12. The permitted discharge is consistent with the provisions of State Water Resources Control Board Resolution No. 68-16, Statement of Policy with Respect to Maintaining High Quality Waters in California. The impact on existing water quality will be insignificant.

THEREFORE, IT IS HEREBY ORDERED that Waste Discharge Requirements (Order No. 92-103) are rescinded and the discharger, in order to meet the provisions contained in Division 7 of the California Water Code (CWC) and regulations adopted thereunder, shall upon the issuance of this Order comply with the following:

A. EFFLUENT LIMITATIONS:

1. The discharge of decant water from the dredge material settling pond shall not exceed the following limits:

Constituents	Units	30-day average
Suspended solids	mg/l	100
Settleable solids	ml/l	1.0

B. DISCHARGE PROHIBITIONS

1. The discharge of any waste not specifically regulated by this Order is prohibited.

2. Creation of a pollution, contamination, or nuisance, as defined by Section 13050 of the California Water Code, is prohibited.

3. The discharge of waste to land that is not under the control of the discharger is prohibited.

4. The discharge of dredge material from Area 2 to the beach replenishment area is prohibited. (The dredge material from this area may be discharged to the upland site.)

5. The discharge of dredge material from the area adjacent to the boatlift facility to the beach replenishment area is prohibited. (The dredge material from this area may be discharged to the upland site.)

6. The discharge rate of dredge material from Area 1 to the beach replenishment area is prohibited unless it can be shown by appropriate testing that the materials are suitable for beach disposal, per Finding 4. (The dredge material from this area may be discharged to the upland site.)

C. RECEIVING WATER LIMITATIONS:

1. Waters shall not contain substances in concentrations that result in deposition of material that cause nuisance or adversely affect beneficial uses.

2. The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause a nuisance or adversely affect beneficial uses.

3. Turbidity shall not be increased more than 20 percent above naturally occurring background levels. Allowable zones of dilution within which higher percentages can be tolerated may be defined for specific discharges upon the issuance of discharge permits or waiver thereof.

D. GENERAL PROVISIONS

1. A copy of this Order shall be maintained at the discharge facility and be available at all times to operating personnel.

2. Severability

Provisions of these waste discharge requirements are severable. If any provision of these requirements is found to be invalid, the remainder of these requirements shall not be affected.

3. Operation and Maintenance

The discharger shall maintain in good working order and operate as efficiently as possible any facility or control system installed by the discharger to achieve compliance with the waste discharge requirements.

4. Change in Discharge

The discharger shall promptly report to the Regional Water Board any material change in the character, location, or volume of the discharge.

5. Change in Ownership

In the event of any change in control or ownership of land or waste discharge facilities presently owned or controlled by the discharger, the discharger shall notify the succeeding owner or operator of the following items by letter, a copy of which shall be forwarded to the Regional Water Board:

a. existence of this Order, and
b. the status of the discharger's annual fee account

6. Vested Rights

This Order does not convey any property rights of any sort or any exclusive privileges. The requirements prescribed herein do not authorize the commission of any act causing injury to persons or property, nor protect the discharger from his liability under federal, State, or local laws, nor create a vested right for the discharger to continue the waste discharge.

7. Monitoring

The discharger shall comply with the Contingency Planning and Notification Requirements Order No. 74-151 and the Monitoring and Reporting Program No. R1-2000-59 and any modifications to these documents as specified by the Regional Water Board Executive Officer. Such documents are attached to this Order and incorporated herein. Chemical, bacteriological, and bioassay analyses shall be conducted at a laboratory certified for such analyses by the State Department of Health Services.

8. Inspections

The discharger shall permit authorized staff of the Regional Water Board:

a. entry upon premises in which an effluent source is located or in which any required records are kept;
b. access to copy any records required to be kept under terms and conditions of this Order;
c. inspection of monitoring equipment or records; and
d. sampling of any discharge.

9. Noncompliance

In the event the discharger is unable to comply with any of the conditions of this Order due to:

a. breakdown of waste treatment equipment,
b. accidents caused by human error or negligence, or
c. other causes such as acts of nature,

the discharger shall notify the Regional Water Board Executive Officer by telephone as soon as he or his agents have knowledge of the incident and confirm this notification in writing within two weeks of the telephonic notification. The written notification shall

include pertinent information explaining reasons for the noncompliance and shall indicate the steps taken to correct the problem and the dates thereof, and the steps being taken to prevent the problem from recurring.

10. Revision of Requirements

The Regional Water Board will review this Order periodically and may revise requirements when necessary.

The Regional Water Board requires the discharger to file a report of waste discharge at least 120 days before making any material change or proposed change in the character, location, or volume of the discharge.

Certification

I, Lee A. Michlin, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, North Coast Region, on August 25, 2000.

ORIGINAL SIGNED BY

Lee A. Michlin
Executive Officer

(ccharwdr2000)

California Regional Water Quality Control Board
North Coast Region

MONITORING AND REPORTING PROGRAM NO. R1-2000-59

FOR

CRESCENT CITY HARBOR DISTRICT
MAINTENANCE DREDGING

Del Norte County

Monitoring

The purpose of this monitoring program is to demonstrate that the requirements of Order No. R1-2000-59 are being met. The program calls for routine monitoring at regular intervals during dredging operations.

Effluent Monitoring

Representative samples shall be collected from the settling pond outfall and analyzed for the following:

Constituents	Units	Type of Sample	Frequency
Suspended solids	mg/l	Grab	Once weekly
Settleable solids	ml/l	Grab	Once weekly
Turbidity	NTU	Grab	Once weekly

Receiving Water Monitoring

Two samples shall be collected from the receiving waters. One shall be a background sample, taken from an area of the harbor unaffected by the discharge. The other shall be taken within 200 feet of the point of entrance of the discharge into the receiving waters. The samples shall be analyzed for the following:

Constituents	Units	Type of Sample	Frequency
Turbidity	NTU	Grab	Once weekly

Monitoring and Records

Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

The discharger shall calibrate and perform maintenance procedures in accordance with manufacturer's specifications on all monitoring instruments and equipment to ensure accurate measurements.

Records of monitoring information shall include:

i. The date, exact place, and time of sampling or measurements;
ii. The individual(s) who performed the sampling or measurements;
iii. The date(s) analyses were performed;
iv. The individual(s) who performed the analyses;
v. The analytical techniques or methods used;
vi. The results of such analyses;
vii. The method detection limit (MDL); and
viii. The practical quantitation level (PQL) or the limit of quantitation (LOQ).

Unless otherwise noted, all sampling and sample preservation shall be in accordance with the current edition of "Standard Methods for the Examination of Water and Wastewater" (American Public Health Association.)

All Permit applications, reports, or information submitted to the Regional Water Board, shall be signed by either a principal executive officer or ranking elected official of Crescent City Harbor District.

Any person signing a document under this monitoring program shall make the following certification:

> "I certify under penalty of perjury that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted, is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Reporting

Monitoring reports shall be submitted to the Board for each month on or before the 15th day of the following month. In reporting the data, the discharger shall arrange the date in tabular form so that the date, the constituents and the concentrations are readily discernable. The data shall be summarized in such a manner as to clearly illustrate

compliance with waste discharge requirements. During periods of no active dredging or disposal operations, the reports shall certify no discharge.

Ordered by ORIGINAL SIGNED BY
Lee A. Michlin
Executive Officer

August 25, 2000

(CrescityM&R)

Appendix B

Crescent City Harbor FY 2019 Maintenance Dredging South Beach Monitoring Report, November 2023.

CRESCENT CITY HARBOR

FY 2019 MAINTENANCE DREDGING
SOUTH BEACH MONITORING REPORT

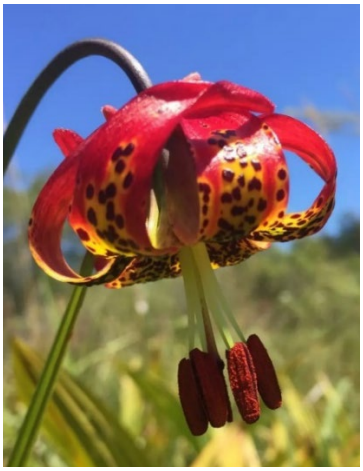
November 2023

U.S. Army Corps of Engineers
San Francisco District
Navigation & Operations Section
Environmental Services Branch

Crescent City Harbor O&M Dredging Effects Monitoring Report

Background

The San Francisco District, US Army Corps of Engineers (USACE) has been regularly dredging the Crescent City Harbor federal channels since 1936 at intervals ranging from one to seventeen years between episodes. In 2019, a dredging episode was initiated in the middle of October and was completed on November 15, 2019. During this dredging episode, sandy material was placed near Whaler Island at the nearshore placement site on the southeast side of the jetty. In February and March of 2019, coordination occurred with U.S. Fish and Wildlife (USFWS), California Coastal Commission, and California Division of Fish and Wildlife (CDFW) regarding USFWS concerns over USACE placement of dredged material at Whaler Island. Specifically, there was concern that aggrading sand along South Beach from the placement of material at the Whaler Island site would impede flow through the three culverts under Highway 101 that drain the Crescent City Marsh, which provides habitat for the endangered western lily (*Lilium occidentale*). The three culverts of concern are under the jurisdiction of the California Department of Transportation (Caltrans).



The western lily is a perennial plant that has crimson red flowers with yellow to green centers with purple spots. It requires a habitat that maintains adequate moisture to avoid both desiccation and prolonged inundation. It grows within a narrow strip along the Pacific coast in areas between Coos Bay, Oregon and Eureka, California. Crescent City Marsh supports the largest remaining population of western lilies. While western lily populations face threats such as overgrazing and successional change in vegetation, the most immediate threat at Crescent City Marsh is artificially elevated water levels, which has shown to reduce western lily reproduction. The marsh is located on the opposite side of Highway 101 from the South Beach area, and the Whaler Island placement site is located on the northern end of South Beach. Figure 1 shows the locations of the culverts relative to the placement site. Water flow through the northern and southern culverts is evident in Figure 1 by the visibly eroded channels extending across the beach.

The potential for beach aggradation from placement of dredged material at Whaler Island depends on several factors including transport of sediment by tides, wave height, the structure or pitch of the nearshore shoreline, and storm events. The potential effects to the western lily would also depend on the time of year beach aggradation occurs, if aggradation were to occur and if sand were able to stop water flow. If the culverts became blocked in winter when the plants are dormant, the duration of oversaturation may be better tolerated by dormant plants than if the plants became inundated during the warmer growing season. When the culverts were inspected during a significant rain event in 2011, no water was reaching the central culvert due to upstream drainage ditch blockage. This indicates that culvert flow conditions were in fact not impacting the drainage and consequentially water levels in the marsh. Water flow through the northern and southern culverts was observed to be unimpeded during the 2011 inspection.

USACE's position is that placement of sand near Whaler Island does not impact the existing culverts draining the marsh. In order to verify this position, USACE agreed to monitor beach profiles after the placement of sandy material near Whaler Island.

Figure 1. Map of the monitoring site. The three culvert locations shown with yellow pins are between the Crescent City Marsh and South Beach. The Whaler Island placement site adjacent to the Crescent City Harbor is indicated with a purple polygon.

Methods

Five transects across South Beach were monitored for elevation changes after dredging operations placed sandy material near Whaler Island. Extending to the water's edge, transects were established from the three culvert outflows (north, central, and south transects) and between the culverts at equidistant spacing (north-central and south-central transects). The northern and southern culverts have short channels leading to the beach. Transects follow the center line of the channels to the extent possible until the beginning of the beach. At that point, the transects follow a straight line to the water's edge.

Each transect was land surveyed quarterly at low tide for one year. Surveys were conducted in 2019 on June 18, September 4, and November 15, and in 2020 on February 7, and June 3. The surveys from June and September 2019 occurred before the dredging event, so they represent baseline conditions. The June 2019 survey results will be referenced as the initial condition.

In addition to the above effort, the culverts were inspected daily during the placement of dredge material. The inspections were documented in the dredging project daily reports, and there were no signs of culvert blockage reported during site operations.

Results

The evolution of the beach profiles over time by transect are shown in Figure 2, and figures showing the South Beach elevations on each individual survey date are included in the Appendix. The lowest recorded elevation was -1.85 ft at the waterside end of the south-central transect in February 2020, and the highest elevation was 18.07 ft at the landside end of the same transect in June 2019.

Beach profiles remained largely the same over time. The shape of transects closely followed the initial pattern except for a few sand mounds that formed and dissipated throughout the course of the year. These transient, local changes in elevation are the most notable shifts from the initial condition, but all these mounds first appeared in September 2019, a baseline condition. The greatest changes in elevation from the initial profile were observed at the approximate centers of the north-central and central transects in September and November 2019, but such changes were diminished by the final survey in June 2020. This is shown in the north-central and central transect boxes of Figure 2 by the separation the orange and green lines representing September and November 2019, respectively, from the initial condition in red, while the final condition represented in purple remains relatively close to the red line.

Between the initial and final condition, the maximum change in elevation was approximately 2 ft near the midpoint of the north-central transect. Between consecutive surveys, the greatest change in elevation occurred between June 2019 and September 2019, the baseline conditions, and resulted in an approximately 4 ft local increase in elevation near the midpoint of the central transect. These elevation changes are evinced by the same separations of lines in Figure 2 as described previously.

Discussion

South Beach elevations were not significantly impacted by the dredging that occurred during October and November 2019. After multiple tidal cycles and season changes, little to no movement of sand was observed. Any local increases in sand elevation were within the natural variability in elevation documented as baseline conditions (June-September 2019).

While transect measurements did not cover the same extent for all survey dates due to variable site conditions, the measurements at the upper beach show no increase in elevations over time.

It was expected that the most measurable changes in beach elevation would occur at the northern end of South Beach, closest to the Whaler Island placement site. This did not occur. The north transect profile remained relatively consistent, and the only significant increase in elevation occurred in September 2019, prior to dredging.

The measured changes in elevation indicate that placed dredge material did not migrate to the culverts at the top of the beach over time. If sandy material placed at Whaler Island impacted the culverts at South Beach, either the elevation across the beach would have risen over time or there would have been a local elevation increase at the waterside followed by a local increase toward the landside at a later survey date. Neither pattern was observed.

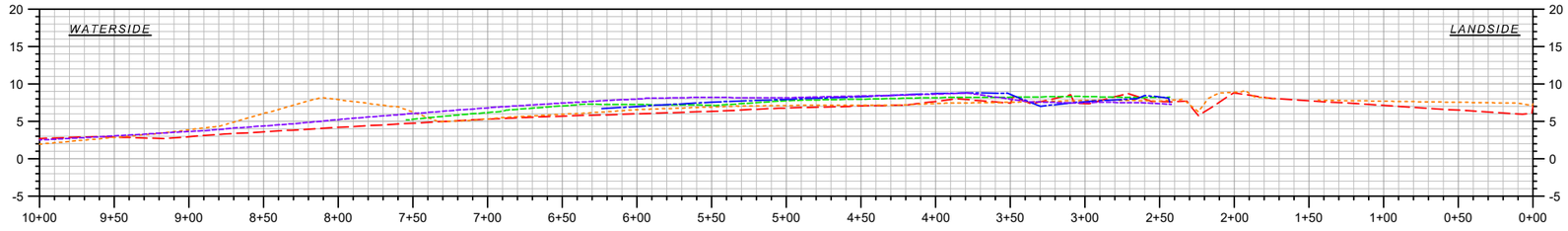
While disposal of dredge material near Whaler Island has not resulted in the accumulation of sand at the culverts, the drainage at Crescent City Marsh may still need to be addressed. It is possible that inhibited flows could be a result of debris accumulated upstream of the culverts rather than downstream at the

beach, where elevations have been largely stable. As noted in the most recent Western Lily Five-year Review (USFWS, 2019), further collaboration between the USFWS, CDFW, and Caltrans could enable more efficient management of the marsh drainage.

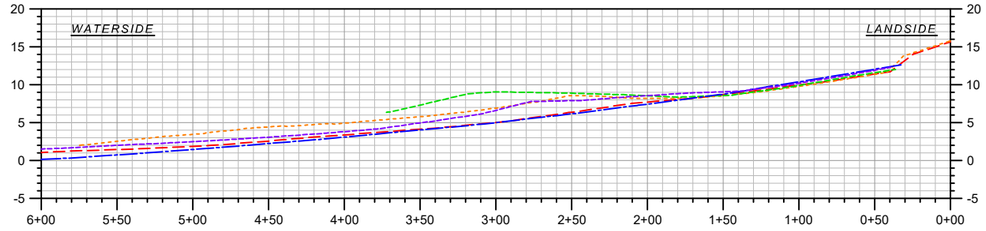
Conclusion

One-year of monitoring has shown that the placement of sandy material at Whaler Island did not result in accretion of material at South Beach. This concludes the agreed upon monitoring effort for the 2019 dredge episode at Crescent City Harbor.

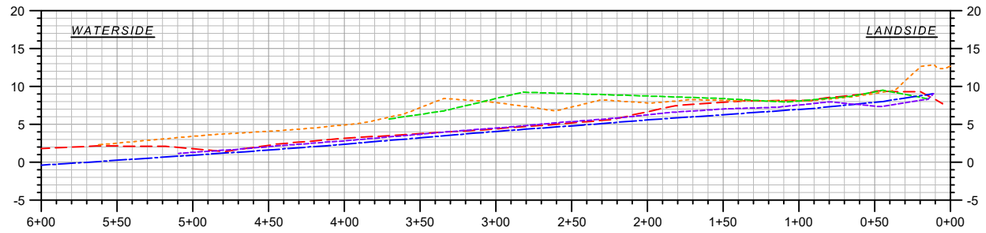
Figure 2. South Beach Profiles



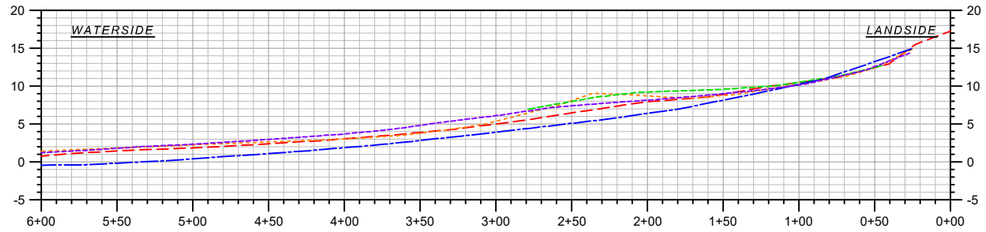
NORTH TRANSECT PROFILE
EXAGGERATION = 1H:5V



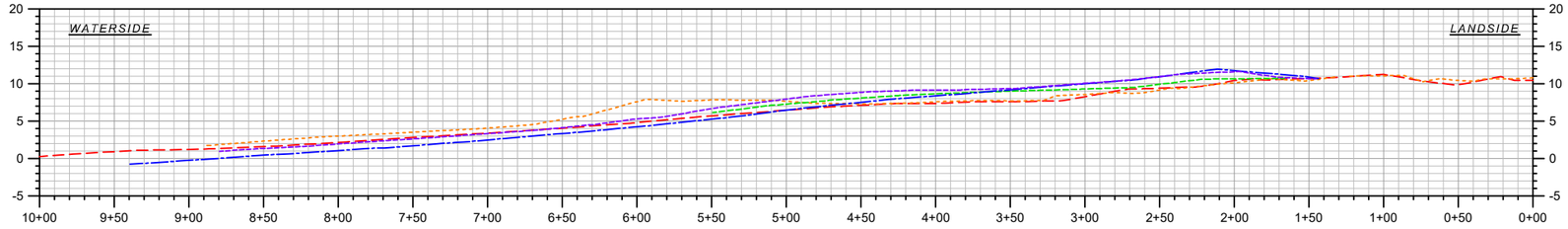
NORTH-CENTRAL TRANSECT PROFILE
EXAGGERATION = 1H:5V



CENTRAL TRANSECT PROFILE
EXAGGERATION = 1H:5V



SOUTH-CENTRAL TRANSECT PROFILE
EXAGGERATION = 1H:5V



SOUTH TRANSECT PROFILE
EXAGGERATION = 1H:5V

PROFILE LEGEND:

- 18 JUN 2019 SURVEY
- 04 SEP 2019 SURVEY
- 15 NOV 2019 SURVEY
- 07 FEB 2020 SURVEY
- 03 JUN 2020 SURVEY

50' 0' 50' 100'

GRAPHIC SCALE

US Army Corps of Engineers®

DATE | DESCRIPTION | MARK

DESIGNED BY: E. KELLER
DRAWN BY: L. KWONG
CHECKED BY: P. CHEN
SUBMITTED BY: J. ZOULAS
SIZE: ANSI D
ISSUE DATE: SEPTEMBER 2020
SOLICITATION NO:
CONTRACT NO:
PROJECT NO:

U.S. ARMY CORPS OF ENGINEERS
SAN FRANCISCO DISTRICT
450 GOLDEN GATE AVE, 4TH FLOOR
SAN FRANCISCO, CA 94102-3404

DEL NORTE COUNTY, CALIFORNIA
CRESCENT CITY HARBOR

MONITORING TRANSECT LOCATIONS
PROFILE VIEW

SHEET ID

05 OF 05

STUDY

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References

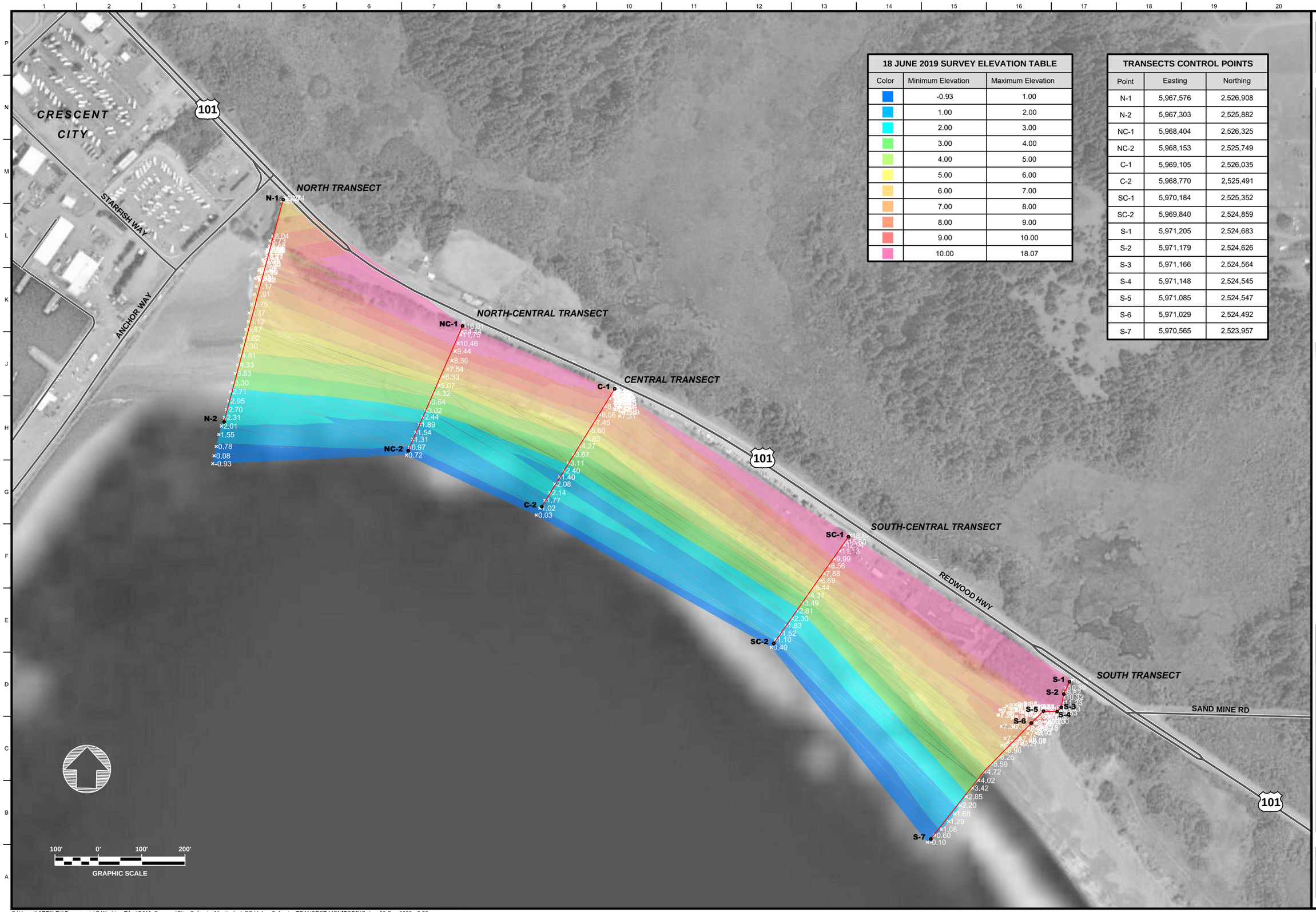
USACE (United States Army Corps of Engineers), 2019. 2019 Crescent City Harbor Federal Channels Maintenance Dredging Environmental Assessment.

USFWS (United States Fish and Wildlife Service) Arcata Field Office, 2009. 2009. Lilium occidentale (Western lily) 5 Year Review: Summary and Evaluation.

USFWS (United States Fish and Wildlife Service) Arcata Field Office, 2019. Western lily (Lilium occidentale) 5-Year Review.

USFWS (United States Fish and Wildlife Service) Arcata Field Office, 2021. Western lily [Photo].

Appendix



18 JUNE 2019 SURVEY ELEVATION TABLE

Color	Minimum Elevation	Maximum Elevation
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	4.00	5.00
	5.00	6.00
	6.00	7.00
	7.00	8.00
	8.00	9.00
	9.00	10.00
	10.00	18.07

TRANSECTS CONTROL POINTS

Point	Easting	Northing
N-1	5,967,576	2,526,908
N-2	5,967,303	2,525,882
NC-1	5,968,404	2,526,325
NC-2	5,968,153	2,525,749
C-1	5,969,105	2,526,035
C-2	5,968,770	2,525,491
SC-1	5,970,184	2,525,352
SC-2	5,969,840	2,524,859
S-1	5,971,205	2,524,683
S-2	5,971,179	2,524,626
S-3	5,971,166	2,524,564
S-4	5,971,148	2,524,545
S-5	5,971,085	2,524,547
S-6	5,971,029	2,524,492
S-7	5,970,565	2,523,957

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: E. KELLER
DRAWN BY: L. KWONG
CHECKED BY: P. CHEN
SUBMITTED BY: J. ZOULAS
ISSUE DATE: SEPTEMBER 2020
SOLICITATION NO:
CONTRACT NO:
PROJECT NO:
SIZE: ANSI D

U.S. ARMY CORPS OF ENGINEERS
SAN FRANCISCO DISTRICT
450 GOLDEN GATE AVE, 4TH FLOOR
SAN FRANCISCO, CA 94102-3404

DEL NORTE COUNTY, CALIFORNIA
CRESCENT CITY HARBOR

MONITORING TRANSECT LOCATIONS
18 JUNE 2019 SURVEY

SHEET ID

01 OF 05

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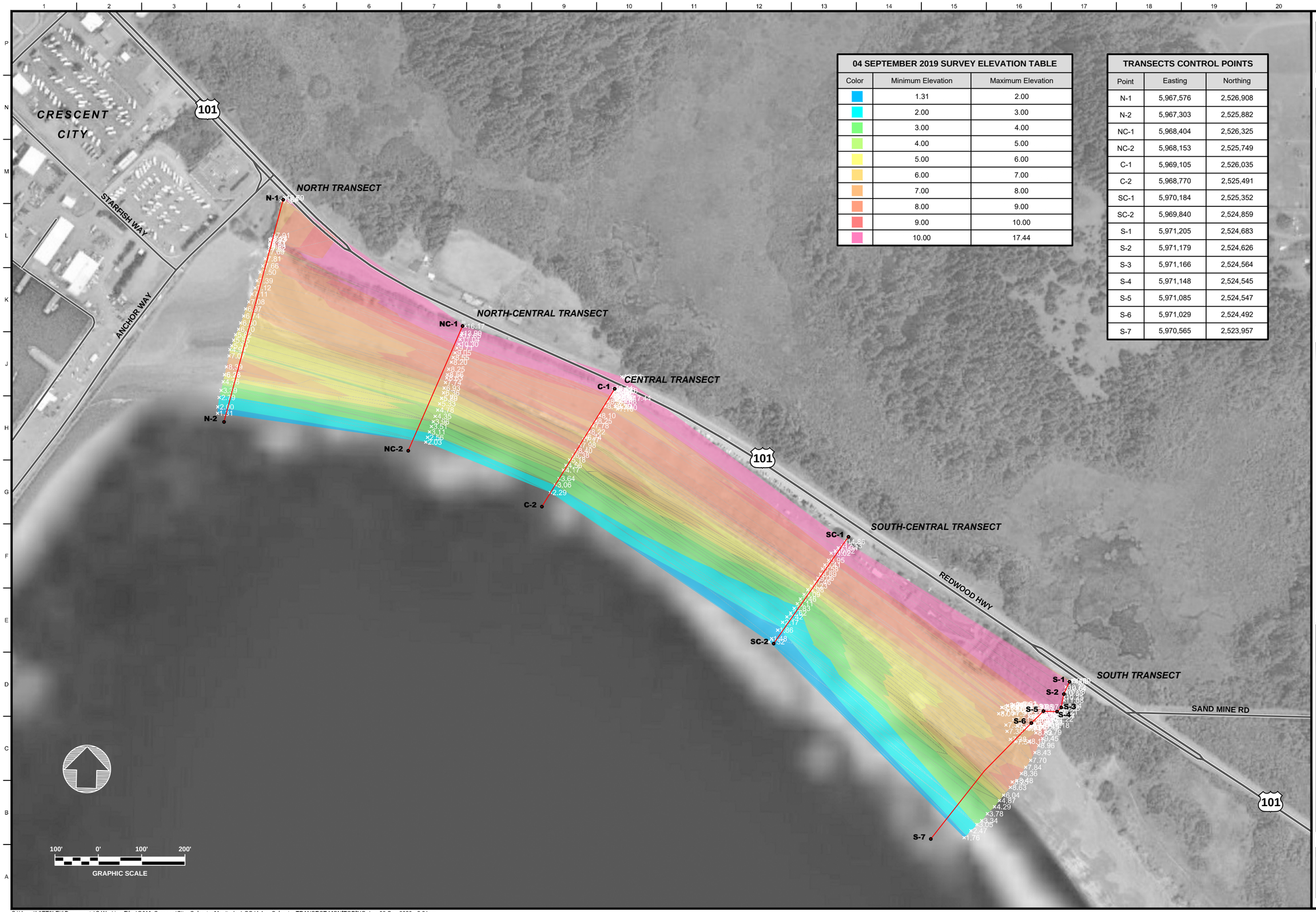
STUDY



04 SEPTEMBER 2019 SURVEY ELEVATION TABLE		
Color	Minimum Elevation	Maximum Elevation
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	2.00	3.00
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	5.00	6.00
	6.00	7.00
	7.00	8.00
	8.00	9.00
	9.00	10.00
	10.00	17.44

TRANSECTS CONTROL POINTS		
Point	Easting	Northing
N-1	5,967,576	2,526,908
N-2	5,967,303	2,525,882
NC-1	5,968,404	2,526,325
NC-2	5,968,153	2,525,749
C-1	5,969,105	2,526,035
C-2	5,968,770	2,525,491
SC-1	5,970,184	2,525,352
SC-2	5,969,840	2,524,859
S-1	5,971,205	2,524,683
S-2	5,971,179	2,524,626
S-3	5,971,166	2,524,564
S-4	5,971,148	2,524,545
S-5	5,971,085	2,524,547
S-6	5,971,029	2,524,492
S-7	5,970,565	2,523,957

US Army Corps of Engineers®

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DESIGNED BY: E. KELLER
DRAWN BY: L. KWONG
CHECKED BY: P. CHEN
SUBMITTED BY: J. ZOULAS
SIZE: ANSI D
ISSUE DATE: SEPTEMBER 2020
SOLICITATION NO:
CONTRACT NO:
PROJECT NO:

U.S. ARMY CORPS OF ENGINEERS
SAN FRANCISCO DISTRICT
450 GOLDEN GATE AVE, 4TH FLOOR
SAN FRANCISCO, CA 94102-3404

DEL NORTE COUNTY, CALIFORNIA
CRESCENT CITY HARBOR

MONITORING TRANSECT LOCATIONS
04 SEPTEMBER 2019 SURVEY

SHEET ID

02 OF 05

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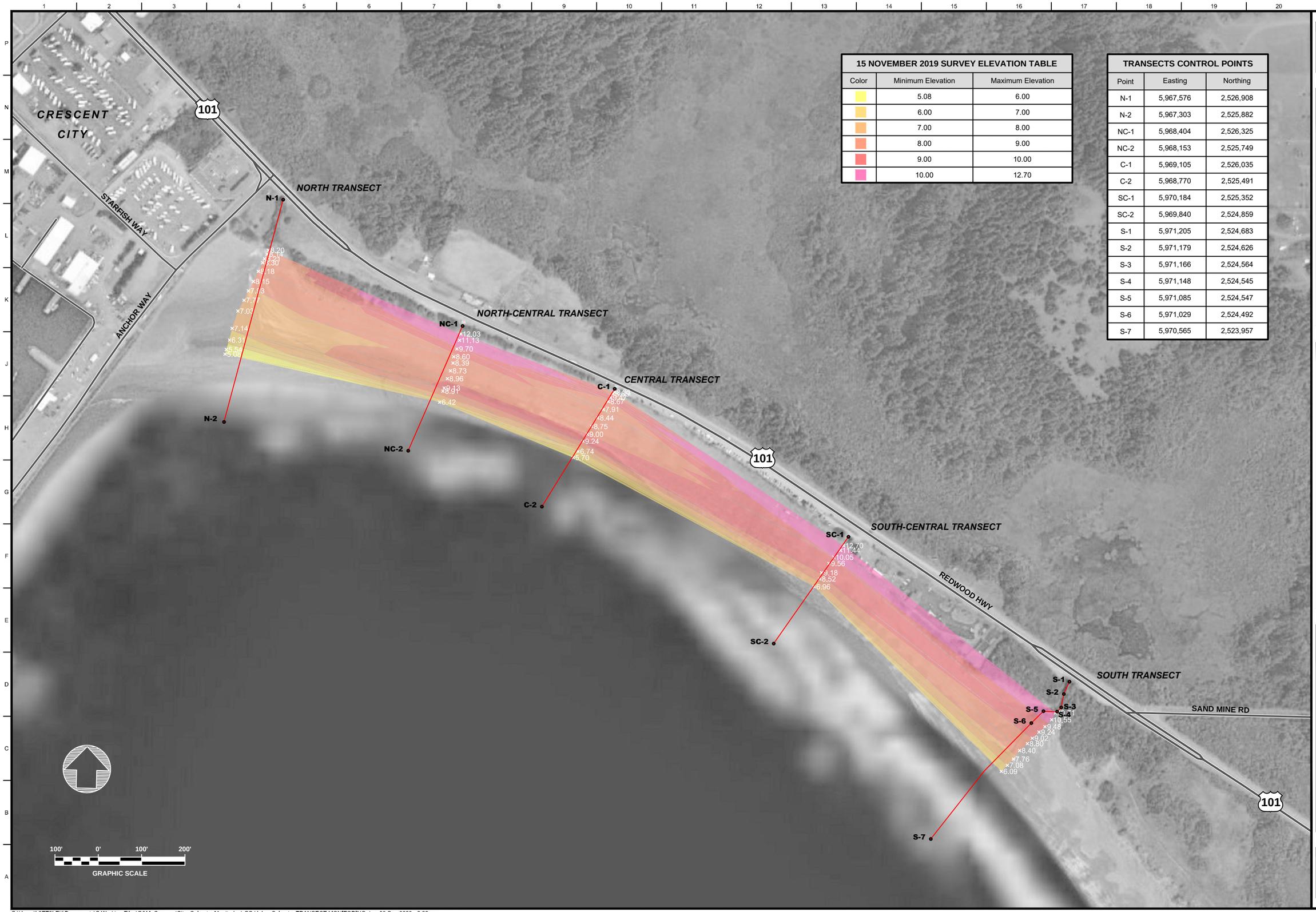
STUDY



15 NOVEMBER 2019 SURVEY ELEVATION TABLE

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	6.00	7.00
	7.00	8.00
	8.00	9.00
	9.00	10.00
	10.00	12.70

TRANSECTS CONTROL POINTS

Point	Easting	Northing
N-1	5,967,576	2,526,908
N-2	5,967,303	2,525,882
NC-1	5,968,404	2,526,325
NC-2	5,968,153	2,525,749
C-1	5,969,105	2,526,035
C-2	5,968,770	2,525,491
SC-1	5,970,184	2,525,352
SC-2	5,969,840	2,524,859
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S-7	5,970,565	2,523,957

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SIZE: ANSI D
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U.S. ARMY CORPS OF ENGINEERS
SAN FRANCISCO DISTRICT
450 GOLDEN GATE AVE, 4TH FLOOR
SAN FRANCISCO, CA 94102-3404

DEL NORTE COUNTY, CALIFORNIA
CRESCENT CITY HARBOR

MONITORING TRANSECT LOCATIONS
15 NOVEMBER 2019 SURVEY

SHEET ID

03 OF 05

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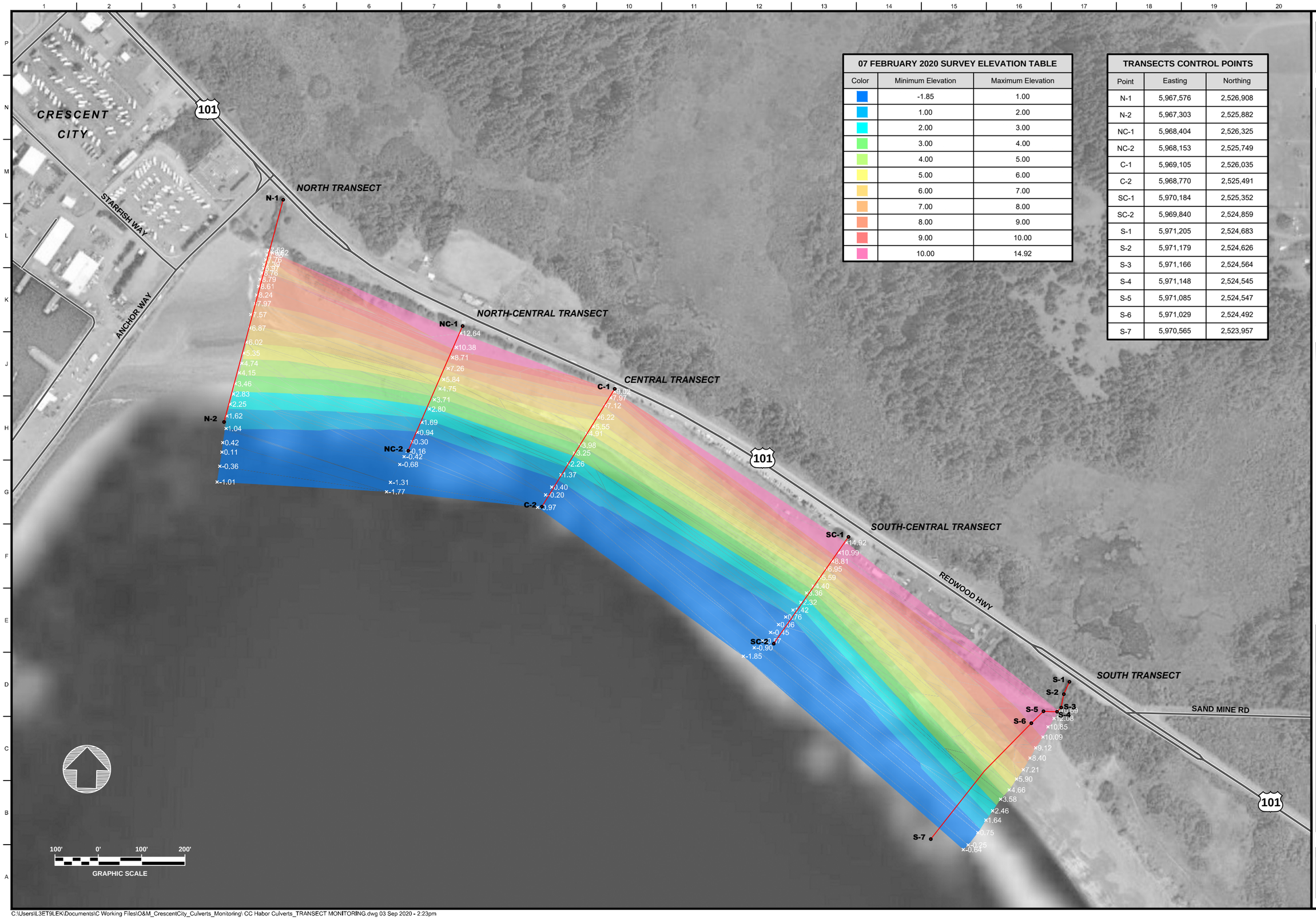

07 FEBRUARY 2020 SURVEY ELEVATION TABLE

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	6.00	7.00
	7.00	8.00
	8.00	9.00
	9.00	10.00
	10.00	14.92

TRANSECTS CONTROL POINTS

Point	Easting	Northing
N-1	5,967,576	2,526,908
N-2	5,967,303	2,525,882
NC-1	5,968,404	2,526,325
NC-2	5,968,153	2,525,749
C-1	5,969,105	2,526,035
C-2	5,968,770	2,525,491
SC-1	5,970,184	2,525,352
SC-2	5,969,840	2,524,859
S-1	5,971,205	2,524,683
S-2	5,971,179	2,524,626
S-3	5,971,166	2,524,564
S-4	5,971,148	2,524,545
S-5	5,971,085	2,524,547
S-6	5,971,029	2,524,492
S-7	5,970,565	2,523,957

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DATE | DESCRIPTION | MARK

ISSUE DATE: SEPTEMBER 2020
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CONTRACT NO:
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DESIGNED BY: E. KELLER
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CHECKED BY: P. CHEN
SUBMITTED BY: J. ZOULAS
SIZE: ANSI D

U.S. ARMY CORPS OF ENGINEERS
SAN FRANCISCO DISTRICT
450 GOLDEN GATE AVE, 41H FLOOR
SAN FRANCISCO, CA 94102-3404

DEL NORTE COUNTY, CALIFORNIA
CRESCENT CITY HARBOR

MONITORING TRANSECT LOCATIONS
07 FEBRUARY 2020 SURVEY

SHEET ID

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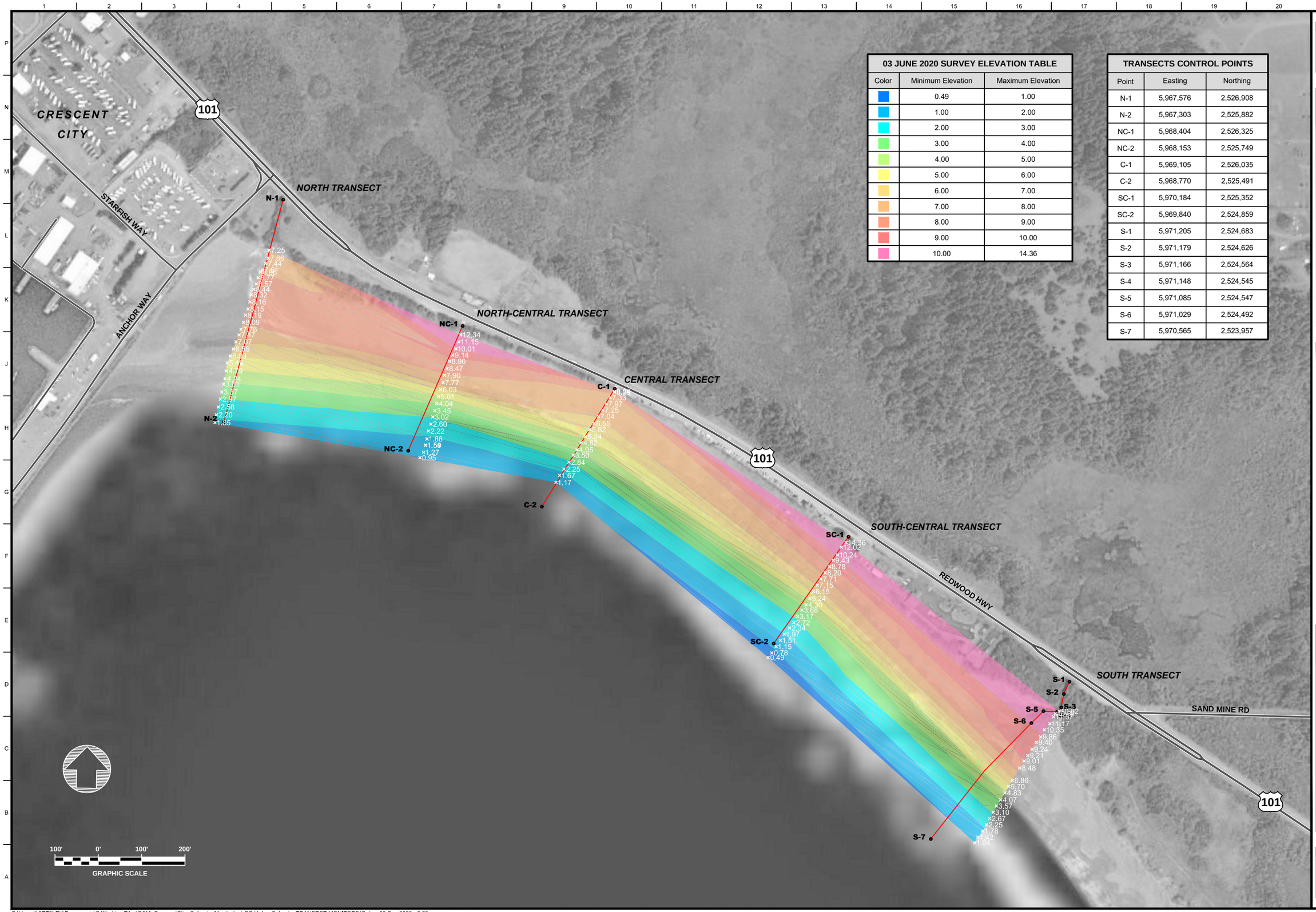

03 JUNE 2020 SURVEY ELEVATION TABLE

Color	Minimum Elevation	Maximum Elevation
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	3.00	4.00
	4.00	5.00
	5.00	6.00
	6.00	7.00
	7.00	8.00
	8.00	9.00
	9.00	10.00
	10.00	14.36

TRANSECTS CONTROL POINTS

Point	Easting	Northing
N-1	5,967,576	2,526,908
N-2	5,967,303	2,525,882
NC-1	5,968,404	2,526,325
NC-2	5,968,153	2,525,749
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S-7	5,970,565	2,523,957

US Army Corps of Engineers®

DATE | DESCRIPTION | MARK

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SUBMITTED BY: J. ZOULAS
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U.S. ARMY CORPS OF ENGINEERS
SAN FRANCISCO DISTRICT
450 GOLDEN GATE AVE, 4TH FLOOR
SAN FRANCISCO, CA 94102-3404

DEL NORTE COUNTY, CALIFORNIA
CRESCENT CITY HARBOR

MONITORING TRANSECT LOCATIONS
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STUDY

Appendix C

Crescent City Harbor FY 2024 Agency Consultations.

United States Department of the Interior
U.S. FISH AND WILDLIFE SERVICE
Ecological Services
Arcata Fish and Wildlife Office
1655 Heindon Road
Arcata, California 95521
Phone: 707-822-7201 Fax: 707-822-8411

In Reply Refer to:
AFWO-2024-0100879

Sent electronically

Ellie L. Covington
Environmental Navigations and Operations Section Chief
U.S. Army Corps of Engineers
San Francisco District
Ellie.L.Covington@usace.army.mil

Dear Ellie Covington:

Thank you for your Biological Assessment (Assessment) and letter dated May 2, 2024. In your letter, you requested informal consultation with the U.S. Fish and Wildlife Service (Service) on the proposed Crescent City Harbor Federal Navigation Channel Maintenance Dredging Project (proposed project) in Del Norte County, California. At issue are the proposed project's effects on the federally endangered tidewater goby (*Eucyclogobius newberryi*) and western lily (*Lilium occidentale*) and the federally threatened marbled murrelet (*Brachyramphus marmoratus*). This response is provided under the authority of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq*.) (Act), and in accordance with the implementing regulations pertaining to interagency cooperation (50 CFR 402).

The federal action on which we are consulting is the maintenance dredging of the Crescent City Harbor federal navigation channels and transport of dredged material via pipeline to Whaler Island or by dredge boat to Humboldt Open Ocean Disposal Site (HOODS). Pursuant to 50 CFR 402.12(j), you submitted a biological assessment for our review and requested concurrence with the findings presented therein. These findings conclude that the proposed project may affect, and is not likely to adversely affect tidewater goby, western lily, and marbled murrelet.

We concur with your determination on the tidewater goby, western lily, and marbled murrelet based on the rationale and conservation measures provided in your Assessment and supporting materials that will be implemented to avoid and minimize potential adverse effects. Those rationales and conservation measures are summarized below:

1) Because the project area is confined primarily to the Crescent City Harbor and locations immediately adjacent to it (except for the barge route and HOODS), it will have no effect on nesting marbled murrelets, eggs, or juveniles in nests, which occur in large old-growth trees.

2) Given the level of boat activity at the Crescent City Harbor, the marbled murrelet is not expected to regularly utilize the Harbor itself. Along the barge route and at HOODS there could be intermittent disturbance, but any birds present in the area would likely move a small distance away to forage. Additionally, the action area represents a very small portion of the total nearshore habitat area available for marbled murrelet foraging, and therefore impacts to potential foraging are considered insignificant and discountable.

3) This project will occur entirely within the marine environment, where tidewater goby are unlikely to be present, as their habitat primarily consists of estuarine environments such as coastal lagoons, sloughs, and salt marshes. Although they may disperse into the ocean during rare stochastic events such as a lagoon breaching, and they do occupy neighboring Elk Creek which drains into the harbor, these types of events are unlikely to occur during the dry season when this work will occur.

4) Even if tidewater goby were present in the action area, they would not remain in the project area for more than a short period of time because the depth and salinity levels are unsuitable for breeding and foraging. Therefore, the possibility of direct effects on tidewater gobies is considered discountable, and there will be no effects to suitable habitat.

5) The U.S. Army Corps of Engineers (Corps') has monitored the effects of sediment deposition on Whaler Island for a whole year and with these results they have determined that this activity will not impact the drainage of Crescent City Marsh where the western lily occurs. The Corps' plans to follow all standard erosion and sediment control measures to prevent any appreciable increase in beach elevation that could possibly block the culverts that help drain the Crescent City Marsh. Therefore, any possible effects to the Crescent City Marsh population of western lilies are expected to be avoided.

This concludes our informal consultation on the actions described in your Assessment received on May 2, 2024. It will be necessary to contact our office if: (1) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this consultation; (2) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this consultation; (3) a new species is listed or critical habitat designated that may be affected by the action; or (4) the proposed project proponent is unable to implement all of the conservation measures as proposed in the Assessment.

In future communications or if you have any questions regarding this letter, please contact Bradley Nissen, at Bradley_nissen@fws.gov.

Sincerely,

Vicky Ryan
Acting Field Supervisor

CALIFORNIA COASTAL COMMISSION
ENERGY, OCEAN RESOURCES AND FEDERAL CONSISTENCY
455 MARKET STREET, SUITE 300
SAN FRANCISCO, CA 94105
VOICE (415) 904-5260

July 11, 2024

Savannah Fahning
Environmental Manager
U.S. Army Corps of Engineers
San Francisco District
601 Startare Dr #100
Eureka, CA 95501
Via e-mail to: savannah.r.fahning@usace.army.mil

Re: Negative Determination No. ND-0019-24: Crescent City Harbor Federal Navigation Maintenance Dredging (Del Norte County)

Dear Ms. Fahning:

We have reviewed the above-referenced negative determination submitted by the U.S. Army Corps of Engineers (USACE) for maintenance dredging of up to approximately 115,000 cubic yards (including up to two feet of overdepth) from the federal navigation channels at Crescent City Harbor (Del Norte County), specifically the Entrance Channel, the Inner Harbor Basin Channel, and the Marina Access Channel, with placement at the nearshore area off of Whaler Island (i.e., northeast of Whaler Island and adjacent to the existing jetty), or at the EPA-designated offshore disposal site Humboldt Offshore Ocean Disposal Site (HOODS) offshore the Humboldt Bay area.

Sediment samples were collected and analyzed for this project, assessing physical, chemical, and biological parameters. USACE has consulted with the U.S Fish and Wildlife Service to assure that measures are in place to minimize effects on federally-listed species and other sensitive wildlife and resources. Consultation with the Environmental Protection Agency and National Marine Fisheries Service are on-going and project approvals for the North Coast Regional Water Quality Control Board are still outstanding. USACE will notify Commission staff of any significant project changes that arise out of any of these processes.

The proposed project includes measures to protect water quality during dredging and disposal operations by minimizing localized increases in turbidity through the use of a hydraulic cutterhead dredge, implementing best management practices during operations. Additionally, where the pipeline goes over land, over Anchor Way, the USACE has agreed to install a ramp over/around the pipeline to allow vehicular and pedestrian traffic to continue during project operations.

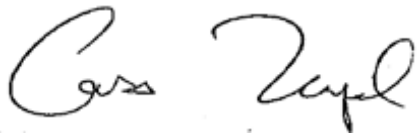
In past reviews of USACE Crescent City dredge episodes, the Commission had identified concerns over the potential for beach or nearshore disposal to adversely affect sensitive habitat within the Crescent City Marsh (which contains the federally listed as endangered western lily, *Lillium occidentale*) via the potential clogging of the culverts crossing under

Highway 1 with dredged material passing downcoast from Whaler Island, which could cause adverse hydrological effects on the marsh system. USACE conducted beach aggradation monitoring of South Beach on either side of their 2019 Crescent City Harbor dredging episode and they concluded that the placement of sandy material at Whaler Island from that episode did not result in accretion of material at South Beach. While monitoring associated with these concerns is not proposed during the 2024 dredging episode, future dredging may require monitoring if further concerns are raised.

Under the federal consistency regulations, a negative determination can be submitted for an activity "which is the same as or similar to activities for which consistency determinations have been prepared in the past." The Commission staff agrees with the Corps that this project is similar to the previously-authorized maintenance dredging projects at Crescent City Harbor, including ND-053-10, CD-060-09, CD-081-98, CD-080-98, and ND-0013-19.

The USACE has determined that this project would have no adverse effect on coastal resources for the reasons identified in Negative Determination No. ND-0019-24. The Coastal Commission staff agrees that the proposed project will not adversely affect coastal zone resources. We therefore **concur** with your negative determination made pursuant to 15 CFR Section 930.35 of the NOAA implementing regulations. Please contact Walt Deppe at Walt.Deppe@coastal.ca.gov if you have any questions regarding this matter.

Sincerely,



CASSIDY TEUFEL
Federal Consistency Coordinator
(for)

Dr. Kate Huckelbridge
Executive Director

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
1655 Heindon Road
Arcata, California 95521-4573

May 1, 2019 **Refer to NMFS No:** WCRO-2019-00192

Katerina Galacatos
Acting Chief, Regulatory Division
U.S Army Corps of Engineers
San Francisco District
450 Golden Gate Avenue
San Francisco, California 94102

Re: Endangered Species Act Section 7(a)(2) Concurrence Letter and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the 2019-2028 Crescent City Harbor Maintenance Dredging Project in Crescent City, Del Norte County, California.

Dear Ms. Galacatos:

On April 3, 2019, NOAA's National Marine Fisheries Service (NMFS) received your final documents regarding your request for a written concurrence that the proposed U.S Army Corps of Engineers (Corps) issuance of permits under Section 404 of the Clean Water Act, Section 10 of the Rivers and Harbors Act, and Section 103 of the Marine Sanctuaries Act to the Crescent City Harbor District (District) to maintain recreational and commercial vessel facilities within the Crescent City Harbor is not likely to adversely affect (NLAA) species listed as threatened or endangered or critical habitats designated under the Endangered Species Act (ESA). This response to your request was prepared by NMFS pursuant to section 7(a)(2) of the ESA, implementing regulations at 50 CFR 402, and agency guidance for preparation of letters of concurrence.

NMFS also reviewed the proposed action for potential effects on essential fish habitat (EFH) designated under the Magnuson-Stevens Fishery Conservation and Management Act (MSA), including conservation measures and any determination made regarding the potential effects of the action. This review was pursuant to section 305(b) of the MSA, implementing regulations at 50 CFR 600.920, and agency guidance for use of the ESA consultation process to complete EFH consultation.

This letter underwent pre-dissemination review using standards for utility, integrity, and objectivity in compliance with applicable guidelines issued under the Data Quality Act (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001, Public Law 106-554). A complete record of this consultation is on file at the Northern California Office in Arcata, CA.

Proposed Action and Action Area

The District proposes to perform maintenance dredging of the existing docks, facilities and channels within Crescent City Harbor (Harbor), Del Norte County, California (Project). The Project entails dredging approximately 1,500,000 cubic yards of sediment from the approximately 75.6 acres of Harbor dredge area over the life of the 10-year permits (outer harbor and inner harbor) using a clamshell dredge and/or a hydraulic cutter dredge with pipeline. Prior to dredging, the Corps will provide NMFS the results of sediment testing for contaminants and a dredge plan prior to each dredging event.

Maintenance dredging and disposal activities are proposed to take place between July 1 and October 15th. In the event of an emergency that closes the Harbor (e.g., from tsunami-related damage) because of abnormal sediment accumulation, the District may dredge outside the July 1 to October 15th period. However, only the minimum amount of sediment removal necessary to restore Harbor operations will be authorized by the Corps. Additionally, actions will be implemented to eliminate the potential impacts to herring spawning, including erecting silt curtains and employing a biological monitor to shut down operations if herring spawning is detected when dredging occurs outside of July 1 to October 15th. Dredging is expected to take up to 12 weeks.

The action area for the Project includes the Harbor, the Whaler Island and dredge pond disposal sites at the Harbor, South Beach in Crescent City from the Harbor south to Cushing Creek, the 66-mile barge route to HOODS and the HOODS disposal site in the open ocean 66 miles south of the Harbor. Noise and turbidity from dredging and sediment transport are expected to extend up to 1 nautical mile beyond the Harbor, barge route, and disposal sites.

Action Agency's Effects Determination

Available information indicates the following listed species (Evolutionarily Significant Units [ESU]) under the jurisdiction of NMFS may be affected by the proposed project:

> **Southern Oregon/Northern California Coast (SONCC) coho salmon** (*Oncorhyncus kisutch*)
>
> Threatened (70 FR 37160; June 28, 2005)
> Critical habitat (64 FR 24049; May 5, 1999)

The Corps determined the Project may affect, but is not likely to adversely affect SONCC coho salmon and their designated critical habitat. The Corps' rationale for their determination includes the timing of the Project (July 1 to October 15th) when coho salmon are not expected to be present; areas proposed for dredging and disposal have been previously used and considered to be disturbed; temporary nature of the Project; availability of suitable habitat elsewhere; and rapid recolonization of infaunal species. The Corps has also determined that the Project may adversely affect EFH.

SONCC Coho Salmon Life History: Coho salmon have a generally simple 3-year life history. The adults typically migrate from the ocean and into the Harbor towards their freshwater spawning grounds in Elk Creek in the fall, and spawn by mid-winter. Adults die after spawning. The eggs are buried in nests, called redds, in the rivers and streams where the adults spawn. The eggs incubate in the gravel until fish hatch and emerge from the gravel the following spring as fry. These 0+ age fish typically rear in freshwater for about 15 months before migrating to the ocean primarily during the months March through May. The juveniles go through a physiological change during the transition

from fresh to salt water called smoltification. Coho salmon typically rear in the ocean for two growing seasons, returning to their natal streams as 3-year old fish to renew the cycle.
Juvenile coho salmon use of the Harbor is not known, although they are present in Elk Creek which flows into the Harbor. The Harbor is artificially constructed and includes significant alterations and infrastructure constructed to accommodate a robust port which limits suitable habitat for coho salmon. We expect that the Harbor provides limited rearing habitat for rearing juveniles and holding adult coho salmon and mostly provides migratory habitat. We expect that residence times for juvenile coho salmon outmigrating through the Harbor is likely less than the 10 to 12 days juvenile coho salmon typically spend in the much larger and richer habitat in Humboldt Bay to the south (Pinnix 2013). Therefore, we expect exposure of coho salmon to the dredging operations to be unlikely because of the July 1 through October 15th Project implementation period which suggests most, if not all, coho salmon migrating out of Elk Creek will have left the Harbor.

Consultation History
NMFS bases its consultation on the information provided by the Corps including the April 3, 2019, updated biological assessment. The Corps requested NMFS' concurrence that the Project, as proposed, is not likely to adversely affect SONCC coho salmon or their designated critical habitat. The Corps also determined that the Project might adversely affect species and their habitats identified under the Pacific Coast Salmon Fishery Management Plan (FMP), Pacific Coast Groundfish FMP, and Coastal Pelagic FMP. On April 3, 2019, NMFS initiated informal consultation as described above.

ENDANGERED SPECIES ACT

Effects of the Action
Under the ESA, "effects of the action" means the direct and indirect effects of an action on the listed species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action (50 CFR 402.02). The applicable standard to find that a proposed action is not likely to adversely affect listed species or critical habitat is that all of the effects of the action are expected to be discountable, insignificant, or completely beneficial. Beneficial effects are contemporaneous positive effects without any adverse effects to the species or critical habitat. Insignificant effects relate to the size of the impact and should never reach the scale where take occurs. Discountable effects are those extremely unlikely to occur.

Effects on Coho Salmon Critical Habitat
The critical habitat designations for SONCC coho salmon use the term primary constituent element or essential feature. The new critical habitat regulations (81 FR 7414) replace this term with physical or biological features (PBFs). This shift in terminology does not change the approach used in conducting our analysis, whether the original designation identified primary constituent elements, physical or biological features, or essential features. In this consultation, we use the term PBF to mean primary constituent element or essential feature, as appropriate for the specific critical habitat.

Within the range of the SONCC coho salmon, the life cycle of the species can be separated into five PBFs or essential habitat types: (1) juvenile summer and winter rearing areas, (2) juvenile migration corridors, (3) areas for growth and development to adulthood, (4) adult migration corridors, and (5) spawning areas. Areas 1 and 5 are often located in small headwater streams and side channels, while

areas 2 and 4 include these tributaries as well as mainstem reaches and estuarine zones. Growth and development to adulthood (area 3) occurs primarily in near- and off-shore marine waters, although final maturation takes place in freshwater tributaries when the adults return to spawn. Within these areas, essential features of coho salmon critical habitat include adequate: (1) substrate, (2) water quality, (3) water quantity, (4) water temperature, (5) water velocity, (6) cover/shelter, (7) food, (8) riparian vegetation, (9) space, and (10) safe passage conditions (NMFS 1999). The PBFs of coho salmon critical habitat associated with this project relate to: areas for growth and development to adulthood. The essential features that may be affected by the proposed action include water quality and prey resources (food).

Water Quality PBF
The proposed action includes activities that could degrade the water quality PBF for coho salmon. Degraded water quality is expected to result from increased turbidity from disturbance of sediment and the incidental fallback of sediment from the dredge operations and dredge spoil discharge. Implementation of the minimization measures, which are included in the proposed action, will ensure any effects of turbidity are minimized. The dredging methods will minimize the extent and duration of turbid conditions, which are expected to extend no more than 200-feet from work areas. Because work will only occur in one discrete location at any time, the majority of the action area will remain undisturbed during project activities. NMFS expects that the temporary reduction in water quality in the Harbor will not affect the conservation value of critical habitat as water quality will recover to pre-dredge conditions very soon after dredging ceases and much sooner than when coho salmon would be present. Therefore the effects of dredging on water quality is insignificant.

Prey/Forage Resources (Food) PBF
The proposed action will result in the temporary loss of some benthic food resources within the area of the dredge footprint of the Project. Additionally, some benthic food resources may be smothered at dredge disposal sites. Given the proposed work window, the majority of the disturbance to prey resources in the action area will occur during times when coho salmon use of the action area is very low. As coho salmon use of the action area increases in the spring months the following year, the dredge and spoil disposal areas would have had several months to recover and be recolonized by benthic organisms. The preferred prey resources for juvenile coho salmon (Dungeness crab larvae, Pacific herring larvae, harpacticoid copepods, etc) would not be affected by the Project. Because prey resources are not expected to be significantly affected, NMFS does not expect any adverse effects to the Prey Resource PBF.

Effects to Coho Salmon Individuals
The Project has the potential to affect all life stages of the listed coho salmon occurring in the action area due to entrainment in the dredge devices; reduced fitness resulting from temporary increases in turbidity; reduced fitness resulting from temporary reduction in benthic prey; and disturbance from vessel traffic. The effects caused by these project components have been reduced or minimized by incorporating the minimization measures described in the *Proposed Action* section.

Entrainment in Dredge Devices
There is a very remote possibility that a juvenile coho salmon could be entrained during dredging and removed along with the dredge spoils. However, the work will occur when listed coho salmon use of the action area where dredging will occur is very low or absent, thus minimizing exposure of juveniles and adults to dredging. If an emergency occurs which requires dredging to occur outside

the July 1 to October 15th period, we expect that the likelihood of impacting individual coho salmon is still unlikely because the dredging would be limited in scope and duration to only what is necessary to restore harbor function and coho salmon occupancy in the action area is expected to be low even during peak migration based on the reasons described above. Additionally, NMFS expects that coho salmon will avoid the work areas if present, thus the possible effects of entrainment are discountable.

Turbidity

As previously described in the *Effects to Critical Habitat* section, operation of the dredging and sediment disposal is expected to reduce water quality through the suspension of sediments and the resulting temporary increases in turbidity. Turbid waters are expected to extend no more than 1 nautical mile from work sites, and work is expected to be limited to only one portion of the action area at a time. Turbidity from dredge disposal sites at both Whaler Island and HOODS is expected to rapidly disspate due to ocean currents and the large mixing area. The work will occur when coho salmon use of the action area in the Harbor is low, or nonexistent thus minimizing exposure of both juveniles and adults. Coho salmon may be found using the HOODS site during the Project implementation. However, coho salmon will be able to avoid the work areas as ample suitable habitat is available within the action area at HOODS. Coho salmon are not expected to be within the vicinity of the Whaler Island disposal site when the Project is occurring. Therefore, NMFS expects no adverse effect to listed salmonids resulting from turbidity.

Benthic Prey Reduction

The proposed action will result in the temporary loss of some benthic food resources within the area of the dredge footprint of the Project and may also be smothered when dredge sediments are deposited. Given the proposed work window, the majority of the disturbance to prey resources in the action area will occur during times when coho salmon use of the action area is very low. As coho salmon use of the action area increases in the spring months the following year, the dredged and deposition areas would have had several months to recover and be recolonized by benthic organisms. Furthermore, the preferred prey resources for juvenile coho salmon (Dungeness crab larvae, Pacific herring larvae, harpacticoid copepods, etc) would not be affected by the Project. Because prey resources are not expected to be significantly affected, NMFS does not expect any fitness related consequences to individuals. Therefore, NMFS expects the effects of a temporary reduction in benthic prey to be insignificant.

Disturbance from Vessel Traffic

As described in the *Proposed Action* section, an increase in sound and disturbance related to the dredging work itself, in addition to the barges, scows, or tugs needed to transport dredge spoils is expected. The Fisheries Hydroacoustic Working Group (FHWG) has developed injury threshold criteria for listed fish species (FHWG 2008). The FHWG identified sound pressure levels of 206 dB-peak (peak decibels) at 10 m as being injurious to fish. Accumulated sound exposure levels (SEL) at 10 m of 187 dB for fishes that are greater than 2 grams are considered to cause temporary shifts in hearing, resulting in temporarily decreased fitness (i.e., reduced foraging success, reduced ability to detect and avoid predators) (FHWG 2008). The low level acoustics produced by vessels or from operation of the dredge are not likely to result in any negative physiological response or injury to any of the life stages of coho salmon. Vessel traffic may startle individual fish on the rare occasion when vessel traffic comes into close proximity of individuals. This brief startle response is not

expected to result in any fitness consequence or increase rates of predation. Therefore, vessel traffic and associated disturbance is not expected to adversely affect SONCC coho salmon.

Aggregated Effects to Individual Salmon
There is little potential for combined effects given the size and location of where most of the activities are proposed to occur. For example, if a listed coho salmon is startled by vessel traffic, it would leave and flee into other suitable habitat nearby before experiencing any sediment-related effects. NMFS concludes that all of the effects caused by the Project, when evaluated as a whole for the potential for combined or synergistic effects, would have an insignificant effect on individual coho salmon.

Conclusion
Based on this analysis, NMFS concurs with the Corps that the proposed action is not likely to adversely affect the SONCC coho salmon or their designated critical habitat.

Reinitiation of Consultation
Reinitiation of consultation is required and shall be requested by the Corps or by NMFS, where discretionary Federal involvement or control over the action has been retained or is authorized by law and (1) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (2) the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this concurrence letter; or if (3) a new species is listed or critical habitat designated that may be affected by the identified action (50 CFR 402.16). This concludes the ESA portion of this consultation.

MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

Under the MSA, this consultation is intended to promote the protection, conservation and enhancement of EFH as necessary to support sustainable fisheries and the managed species' contribution to a healthy ecosystem. For the purposes of the MSA, EFH means "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity", and includes the associated physical, chemical, and biological properties that are used by fish (50 CFR 600.10), and "adverse effect" means any impact which reduces either the quality or quantity of EFH (50 CFR 600.910(a)). Adverse effects may include direct, indirect, site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions.

This analysis is based, in part, on the EFH assessment provided by the Corps (2018) and descriptions of EFH for Pacific coast groundfish (PFMC 2012), coastal pelagic species (PFMC 1998), and Pacific coast salmon (PFMC 2014) contained in the FMPs developed by the Pacific Fishery Management Council and approved by the Secretary of Commerce.

Essential Fish Habitat Affected by the Project
The Pacific Fisheries Management Council (PFMC) has delineated EFH for Pacific Coast Salmon (PFMC 2014), Pacific Groundfish (PFMC 2012), and Coastal Pelagics (PFMC 1998) FMPs. EFH is defined in the MSA as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. NMFS regulations further define waters to include aquatic areas and their

associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; substrate to include sediment, hard bottom, structures underlying the waters, and associated biological communities; necessary to mean the habitat required to support a sustainable fishery and the managed species contribution to a healthy ecosystem; and spawning, breeding, feeding, or growth to maturity to cover a species' full life cycle (50 CFR § 600.10).

In estuarine and marine areas, Pacific Coast Salmon EFH extends from the nearshore and tidal submerged environments within state territorial waters out to the full extent (200 miles) of the U.S. Exclusive Economic Zone (EEZ) offshore of Washington, Oregon, and California north of Point Conception to the Canadian border (PFMC 2014). The Pacific Groundfish EFH includes all waters from the mean high water line, and the upriver extent of saltwater intrusion in river mouths, along the coasts of Washington, Oregon, and California seaward to the boundary of the EEZ (PFMC 2012). The east-west geographic boundary of Coastal Pelagic EFH is defined to be all marine and estuarine waters from the shoreline along the coasts of California, Oregon, and Washington offshore to the limits of the EEZ and above the thermocline where sea surface temperatures range between 10°C and 26°C. The southern extent of EFH for Coastal Pelagics is the United States-Mexico maritime boundary. The northern boundary of the range of Coastal Pelagics is the position of the 10°C isotherm, which varies both seasonally and annually (PFMC 1998). Thus, the proposed project occurs within EFH for various Federally-managed species in the Pacific Coast Salmon, Pacific Groundfish, and Coastal Pelagics FMPs.

Adverse Effects on Essential Fish Habitat

NMFS determined the proposed action would adversely affect EFH for Pacific Coast Salmon, Pacific Coast Groundfish, and Coastal Pelagic Species Fishery Management Plans as follows:

- Temporarily degraded water quality within the action area due to the generation of suspended sediment caused by dredging and disposal activities
- Temporary reduction in benthic prey after the dredging and disposal is complete and before recovery and recolonization occur

Adverse Effects to Water Quality

There is an expected temporary increase in turbidity during the dredging and spoil disposal. Brief episodes of turbidity will occur at HOODS and Whaler Island resulting from the disposal of dredge spoils. The high current and wind environment at HOODS and Whaler Island is expected to quickly ameliorate suspended sediments and turbidity. In addition, the duration of exposure will be temporary, which would reduce the duration of any adverse effects.

Effects of Reduction in Benthic Habitat/Prey

The proposed action will result in the temporary loss of some benthic food resources within the area of the dredge footprint of the Project. After dredging, the benthic environment will likely be largely devoid of life and will recover and be recolonized over time by benthic fauna and infauna. Most benthic species will have recovered or recolonized the area by the following season. Although recovery and recolonization may occur in several months, repeated annual dredging may cause adverse effects as the dredge area may not recover in between dredging efforts.

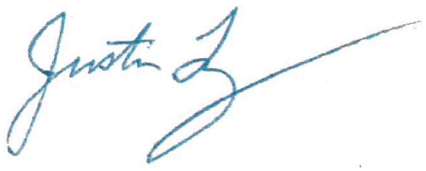
Effects to Eelgrass

NMFS does not expect eelgrass to occur in the work sites because of inadequate depths (eelgrass habitat occurs in higher elevations in the Harbor) and light conditions, as the dredge area is deeper than eelgrass usually resides. Additionally, eel grass has previously been relocated from the dredge sites to mitigation sites during dredging that occurred in 2011 and 2013 (PWA 2018). Eel grass areas used for re-located eel grass for mitigation have been successful in terms of mitigating the effects of the previous removals and dredging operations as the mitigation areas have exceeded growth in aerial extent expected following replanting (PWA 2018). No additional eel grass removals are expected for the next ten years of the permit, but if eel grass does recolonize the dredge locations the existing mitigation areas are expected to compensate. Therefore, no effects to eelgrass are expected from the dredging.

NMFS has determined that no conservation recommendations are warranted. The Corps must reinitiate EFH consultation with NMFS if the proposed action is substantially revised in a way that may adversely affect EFH, or if new information becomes available that affects the basis for NMFS' EFH conservation recommendations (50 CFR 600. 920(l)). This concludes the MSA portion of this consultation.

Please direct questions regarding this letter to Dan Free at (707) 825-5164 or Dan.Free@noaa.gov.

Sincerely,



Justin Ly
North Coast Branch Chief

cc: Debra O'Leary, Corps of Engineers
Rebecca Garwood, CDFW
ARN File # 51422WCR2019AR00069

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California Regional Water Quality Control Board
North Coast Region

Order No. R1-2000-59
ID No. 1A76119ODN

WASTE DISCHARGE REQUIREMENTS

FOR

CRESCENT CITY HARBOR DISTRICT MAINTENANCE DREDGING DISTRICT BERTHING AREAS AND FEDERAL CHANNEL

Del Norte County

The California Regional Water Quality Control Board, North Coast Region, (hereinafter the Regional Water Board) finds that:

1. The Crescent City Harbor District (hereinafter discharger) submitted a Report of Waste Discharge dated December 14, 1999. The report describes maintenance dredging of Crescent City Harbor to maintain navigation within the harbor.

2. The discharger has described two locations for dredge material disposal. The areas are:

   a. A 15-acre upland disposal site, located northwest of the inner boat basin. During disposal operations, dredge materials are discharged to the pond by a suction cutter dredge and excess water is decanted and discharged back to the harbor. Small quantities of material are sometimes removed by a shore-based clamshell operation from various areas of the harbor, such as the vicinity of the boatlift facility and the launch ramp area, and trucked to the uplands deposition site.

   b. The beach and near-shore waters just east of the Whaler Island causeway.

   Utilization of the two disposal sites would be on the following schedule:

   a. The upland disposal site would be used on a year-round basis, subject to its capacity limitations and dredging needs within the harbor.

   b. The beach and near-shore waters to the east of the Whaler Island causeway would only be used between August 1 and December 31.

3. Dredging depth will vary throughout the harbor depending on the needs of the vessels using specific areas. The harbor has been divided in to five areas as shown on attachment A of this order and includes the following depths and volumes:

Area	Design Depth	Volume
1	-15 feet MLLW	will not be dredged this cycle
2	-15 feet MLLW	49,739 cubic yards
3	-12 & -15 feet MLLW	99,073 cubic yards
4	-15 feet MLLW	89,647 cubic yards
5	-10 & -15 MLLW	59,621 cubic yards

The total volume of dredging needed in the harbor is 298,080 cubic yards. Typically, areas are over-dredged by 2 feet; which would bring the total to 457,020 cubic yards.

4. The criteria for the evaluation of the disposal sites for dredged material include:

   a. chemical constituents
   b. physical characteristics
   c. bioassay results

   All three criteria have been used to determine the suitability of the dredged materials for the proposed disposal areas. The grain-size measurements in Areas 2, 4, and 5 show less than 60 percent sand. In Area 3, the grain-size measurements show that 90 percent of the material is sand and would be suitable for beach replenishment.

   No significant chemical constituents were detected in the samples collected throughout the harbor.

   Bioassay results show that in Area 3, survival was not statistically different than that of control tests. Areas 2, 4, and 5 showed a lower survival rate than the control tests. Area 2 was statistically lower, which indicates that the materials should not be discharged to the beach area, but are suitable for upland disposal. Areas 4 and 5 were not significantly different from the control test and should be suitable for beach replenishment.

5. The boatlift facility associated with the repair yard is located in Area 4. The area immediately surrounding the boatlift has historically shown elevated levels of copper. Dredged materials from this area are not suitable for beach disposal and all materials dredged from this area, unless shown to be suitable by specific testing, shall be discharged to the upland site.

6. The Regional Water Board's Water Quality Control Plan for the North Coast Region includes water quality objectives and receiving water limitations to protect beneficial uses and to prevent nuisances.

7. Crescent City Harbor is considered a bay pursuant to the Basin Plan. The beneficial uses for Crescent City Harbor include:

   a. navigation
   b. water contact recreation
   c. non contact water recreation
   d. commercial and sport fishing
   e. wildlife habitat
   f. marine habitat

g. migration of aquatic organisms
h. fish spawning, reproduction and/or early development
i. shellfish harvesting

8. The discharge is presently governed by Waste Discharge Requirements Order No. 92-103, adopted by the Regional Water Board on August 27, 1992.

9. Permitting of the proposed dredging is categorically exempt from provisions of the California Environmental Quality Act (Public Resources Code Section 21000 et seq.) under 14 California Code of Regulations Sections 15301 and 15304 as an existing facility and as an activity involving minor alterations to land (specifically, maintenance dredging), respectively.

10. The Regional Water Board has notified the discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for the discharge and has provided them with an opportunity to submit their written comments and recommendations.

11. The Regional Water Board, in a public meeting, heard and considered all comments pertaining to the discharge.

12. The permitted discharge is consistent with the provisions of State Water Resources Control Board Resolution No. 68-16, Statement of Policy with Respect to Maintaining High Quality Waters in California. The impact on existing water quality will be insignificant.

THEREFORE, IT IS HEREBY ORDERED that Waste Discharge Requirements (Order No. 92-103) are rescinded and the discharger, in order to meet the provisions contained in Division 7 of the California Water Code (CWC) and regulations adopted thereunder, shall upon the issuance of this Order comply with the following:

A. EFFLUENT LIMITATIONS:

1. The discharge of decant water from the dredge material settling pond shall not exceed the following limits:

Constituents	Units	30-day average
Suspended solids	mg/l	100
Settleable solids	ml/l	1.0

B. DISCHARGE PROHIBITIONS

1. The discharge of any waste not specifically regulated by this Order is prohibited.

2. Creation of a pollution, contamination, or nuisance, as defined by Section 13050 of the California Water Code, is prohibited.

3. The discharge of waste to land that is not under the control of the discharger is prohibited.

4. The discharge of dredge material from Area 2 to the beach replenishment area is prohibited. (The dredge material from this area may be discharged to the upland site.)

5. The discharge of dredge material from the area adjacent to the boatlift facility to the beach replenishment area is prohibited. (The dredge material from this area may be discharged to the upland site.)

6. The discharge rate of dredge material from Area 1 to the beach replenishment area is prohibited unless it can be shown by appropriate testing that the materials are suitable for beach disposal, per Finding 4. (The dredge material from this area may be discharged to the upland site.)

C. RECEIVING WATER LIMITATIONS:

1. Waters shall not contain substances in concentrations that result in deposition of material that cause nuisance or adversely affect beneficial uses.

2. The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause a nuisance or adversely affect beneficial uses.

3. Turbidity shall not be increased more than 20 percent above naturally occurring background levels. Allowable zones of dilution within which higher percentages can be tolerated may be defined for specific discharges upon the issuance of discharge permits or waiver thereof.

D. GENERAL PROVISIONS

1. A copy of this Order shall be maintained at the discharge facility and be available at all times to operating personnel.

2. Severability

Provisions of these waste discharge requirements are severable. If any provision of these requirements is found to be invalid, the remainder of these requirements shall not be affected.

3. Operation and Maintenance

The discharger shall maintain in good working order and operate as efficiently as possible any facility or control system installed by the discharger to achieve compliance with the waste discharge requirements.

4. Change in Discharge

The discharger shall promptly report to the Regional Water Board any material change in the character, location, or volume of the discharge.

5. Change in Ownership

In the event of any change in control or ownership of land or waste discharge facilities presently owned or controlled by the discharger, the discharger shall notify the succeeding owner or operator of the following items by letter, a copy of which shall be forwarded to the Regional Water Board:

a. existence of this Order, and
b. the status of the discharger's annual fee account

6. Vested Rights

This Order does not convey any property rights of any sort or any exclusive privileges. The requirements prescribed herein do not authorize the commission of any act causing injury to persons or property, nor protect the discharger from his liability under federal, State, or local laws, nor create a vested right for the discharger to continue the waste discharge.

7. Monitoring

The discharger shall comply with the Contingency Planning and Notification Requirements Order No. 74-151 and the Monitoring and Reporting Program No. R1-2000-59 and any modifications to these documents as specified by the Regional Water Board Executive Officer. Such documents are attached to this Order and incorporated herein. Chemical, bacteriological, and bioassay analyses shall be conducted at a laboratory certified for such analyses by the State Department of Health Services.

8. Inspections

The discharger shall permit authorized staff of the Regional Water Board:

a. entry upon premises in which an effluent source is located or in which any required records are kept;
b. access to copy any records required to be kept under terms and conditions of this Order;
c. inspection of monitoring equipment or records; and
d. sampling of any discharge.

9. Noncompliance

In the event the discharger is unable to comply with any of the conditions of this Order due to:

a. breakdown of waste treatment equipment,
b. accidents caused by human error or negligence, or
c. other causes such as acts of nature,

the discharger shall notify the Regional Water Board Executive Officer by telephone as soon as he or his agents have knowledge of the incident and confirm this notification in writing within two weeks of the telephonic notification. The written notification shall

include pertinent information explaining reasons for the noncompliance and shall indicate the steps taken to correct the problem and the dates thereof, and the steps being taken to prevent the problem from recurring.

10. Revision of Requirements

The Regional Water Board will review this Order periodically and may revise requirements when necessary.

The Regional Water Board requires the discharger to file a report of waste discharge at least 120 days before making any material change or proposed change in the character, location, or volume of the discharge.

Certification

I, Lee A. Michlin, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, North Coast Region, on August 25, 2000.

ORIGINAL SIGNED BY

Lee A. Michlin
Executive Officer

(ccharwdr2000)

California Regional Water Quality Control Board
North Coast Region

MONITORING AND REPORTING PROGRAM NO. R1-2000-59

FOR

CRESCENT CITY HARBOR DISTRICT
MAINTENANCE DREDGING

Del Norte County

Monitoring

The purpose of this monitoring program is to demonstrate that the requirements of Order No. R1-2000-59 are being met. The program calls for routine monitoring at regular intervals during dredging operations.

Effluent Monitoring

Representative samples shall be collected from the settling pond outfall and analyzed for the following:

Constituents	Units	Type of Sample	Frequency
Suspended solids	mg/l	Grab	Once weekly
Settleable solids	ml/l	Grab	Once weekly
Turbidity	NTU	Grab	Once weekly

Receiving Water Monitoring

Two samples shall be collected from the receiving waters. One shall be a background sample, taken from an area of the harbor unaffected by the discharge. The other shall be taken within 200 feet of the point of entrance of the discharge into the receiving waters. The samples shall be analyzed for the following:

Constituents	Units	Type of Sample	Frequency
Turbidity	NTU	Grab	Once weekly

Monitoring and Records

Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

The discharger shall calibrate and perform maintenance procedures in accordance with manufacturer's specifications on all monitoring instruments and equipment to ensure accurate measurements.

Records of monitoring information shall include:

i. The date, exact place, and time of sampling or measurements;
ii. The individual(s) who performed the sampling or measurements;
iii. The date(s) analyses were performed;
iv. The individual(s) who performed the analyses;
v. The analytical techniques or methods used;
vi. The results of such analyses;
vii. The method detection limit (MDL); and
viii. The practical quantitation level (PQL) or the limit of quantitation (LOQ).

Unless otherwise noted, all sampling and sample preservation shall be in accordance with the current edition of "Standard Methods for the Examination of Water and Wastewater" (American Public Health Association.)

All Permit applications, reports, or information submitted to the Regional Water Board, shall be signed by either a principal executive officer or ranking elected official of Crescent City Harbor District.

Any person signing a document under this monitoring program shall make the following certification:

> "I certify under penalty of perjury that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted, is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Reporting

Monitoring reports shall be submitted to the Board for each month on or before the 15th day of the following month. In reporting the data, the discharger shall arrange the date in tabular form so that the date, the constituents and the concentrations are readily discernable. The data shall be summarized in such a manner as to clearly illustrate

compliance with waste discharge requirements. During periods of no active dredging or disposal operations, the reports shall certify no discharge.

Ordered by ORIGINAL SIGNED BY
Lee A. Michlin
Executive Officer

August 25, 2000

(CrescityM&R)

Appendix D

Biological Assessment: Crescent City Harbor Federal Navigation Channels FY 2019 Maintenance Dredging.

BIOLOGICAL ASSESSMENT

Crescent City Harbor Federal Navigation Channels

2019 Maintenance Dredging

April 2019

U.S Army Corps of Engineers
San Francisco District
Planning Branch, Environmental Section

1 Introduction

1.1 Background

The U.S. Army Corps of Engineers (USACE) proposes to perform maintenance dredging of the existing federal navigation channels within Crescent City Harbor in Del Norte County, CA (***Figure 1***). Over time, shoaling of these navigation channels has resulted in reduced channel depths, limiting navigation especially for large commercial vessels. The purpose of the proposed project (Project) is to perform maintenance dredging within the existing navigation channels to restore them to their original authorized depths, providing continued safe and reliable commercial and recreational navigation. Maintenance dredging of the federal navigation channels has been conducted since 1936 at intervals ranging from one to seventeen years.

The Project entails dredging all three channel components within Crescent City Harbor (Outer Channel, Inner Channel, and Access Channel), thereby removing a total of approximately 118,000 cubic yards (CY) of shoaled sediment from the Harbor (including 2-feet of allowable overdepth) according to the most recent survey that was conducted 19 February 2019.

Maintenance dredging and disposal activities are proposed to take place in mid/late summer to early fall of 2019. The Crescent City Harbor District is the non-federal sponsor for the Project.

A number of federally listed species and designated critical habitats under jurisdiction of the National Marine Fisheries Services (NMFS) and the U.S. Fish and Wildlife Service (USFWS) have been documented or are suspected to occur within the Project Area, and are presented in ***Table 1*** along with a summary of effect determination.

1.2 Project Area

Crescent City Harbor (***Figure 2***) is a small commercial Harbor located on the Northern California coast, approximately 280 miles north of San Francisco and 17 miles south of the Oregon border. The Harbor occupies a natural indentation in the coastline and is protected by a manmade 4,700-foot rubble mound outer breakwater to the west; a 2,400-foot manmade sand barrier to the east; a 1,600 foot inner breakwater to the south; and the topography of the coastline to the north (***Figure 3***). Crescent City Harbor is a shallow draft federally designated Critical Harbor of Refuge, supporting a U.S. Coast Guard search and rescue station, commercial and sport fishing, waterfront industry, and recreational boating.

Elk Creek is a freshwater tributary that discharges under Highway 101 into Crescent City Harbor near the center of the Harbor's shoreline. The headwaters of Elk Creek originate in the Smith Redwood State Park, a protected and relatively intact forested area east of Crescent City. The Harbor's opening faces southeast and is approximately 2,000 feet (609 meters) across, encompassing an area of approximately 420 acres. South Beach is located east of the sand barrier to Whaler Island, extending southeastward along the coastline in between US101 and the Pacific Ocean.

HOODS is located approximately 66 miles south of Crescent City Harbor (***Figure 1***).

Figure 1. Project vicinity map

Table 1. Species with potential to occur within the project vicinity

Common Name	Scientific Name	Federal Status	Juris-diction	Potential to Occur in Action Area	Effect Determi-nation ^
BIRDS					
Marbled murrelet	*Brachyramphus marmoratus*	Threatened	USFWS	Uplands/nearshore/open ocean. Potential to utilize marine and Harbor portion of Action Area.	NLAA
Northern Spotted owl	*Strix occidentalis caurina*	Threatened	USFWS	Forested uplands. No suitable forested habitat within Action Area. Not documented to utilize marine or estuarine areas.	NE
Short-Tailed albatross	*Phoebastria albatrus*	Endangered	USFWS	Nearshore/open ocean. Limited sightings on west coast US, possible transient or at-sea foraging.	NE
Western snowy plover	*Charadrius nivosus*	Threatened	USFWS	Beach areas, dunes. Potentially suitable habitat at South Beach but USFWS surveys have not recorded use of beach.	NE
Yellow-Billed Cuckoo	*Coccyzus americanus*	Threatened	USFWS	Mature deciduous riparian areas. No suitable habitat within Action Area.	NE
FISH					
Eulachon	*Thaleichthys pacificus*	Threatened	NMFS	Freshwater/estuarine/ nearshore/open ocean. Documented runs north of Action Area in Smith River, no documented spawning in Elk Creek. Limited or transient use in Harbor possible but unlikely.	NE
North American green sturgeon	*Acipenser medirostris*	Threatened	NMFS	Freshwater/estuarine/ nearshore/open ocean. May forage within Harbor or immediately offshore.	NLAA
Southern Oregon/Northern California Coast coho salmon	*Oncorhynchus kisutch*	Threatened	NMFS	Freshwater/estuarine/ nearshore/open ocean Documented to occur in Elk Creek, Harbor nearshore and open oceans environments	NLAA
Tidewater goby	*Eucyclogobius newberryi*	Endangered	NMFS	Estuarine/nearshore. Documented to occur within Elk Creek shallow water habitats	NLAA
INVERTEBRATES					
Oregon Silverspot butterfly	*Speyeria zerene hippolyta*	Threatened	USFWS	Uplands	NE

Common Name	Scientific Name	Federal Status	Juris-diction	Potential to Occur in Action Area	Effect Determi-nation ^
MAMMALS					
Steller sea lion	*Eumetopias jubatus*	Threatened / MMPA	NMFS	Beaches/Rocks/Nearshore/open ocean. Documented to occur in Harbor nearshore and open oceans environments	NLAA
Southern sea otter	*Enhydra lutris nereis*	Threatened / MMPA	NMFS	Beaches/Rocks/Nearshore/open ocean	NE
Gray whale	*Eschrichtius robustus*	Endangered / MMPA	NMFS	Nearshore/open ocean	NE
Blue whale	*Balaenoptera musculus*	Endangered / MMPA Depleted	NMFS	Open Ocean	NE
Fin whale	*Balaenoptera physalus*	Endangered / MMPA Depleted	NMFS	Open Ocean	NE
Humpback whale	*Megaptera noveangliae*	Endangered (Proposed Threatened) / MMPA Depleted	NMFS	Open Ocean	NE
Sei whale	*Balaenoptera borealis*	Endangered / MMPA Depleted	NMFS	Open Ocean	NE
REPTILES					
Loggerhead turtle	*Caretta caretta*	Threatened	NMFS	Open Ocean	NE
Green turtle	*Chelonia mydas*	Endangered	NMFS	Open Ocean	NE
Leatherback turtle	*Dermochelys coriacea*	Endangered	NMFS	Open Ocean	NE
Olive (Pacific) ridley	*Lepidochelys olivecea*	Endangered	NMFS	Open Ocean	NE
PLANTS					
Western Lily	*Lilium occidentale*	Endangered	USFWS	Uplands/wetlands. Largest known population occurs in coastal wetland complex immediately southeast of Harbor and east of Highway 101	NLAA

^ NE = No Effect; NLAA = Not Likely to Adversely Affect.

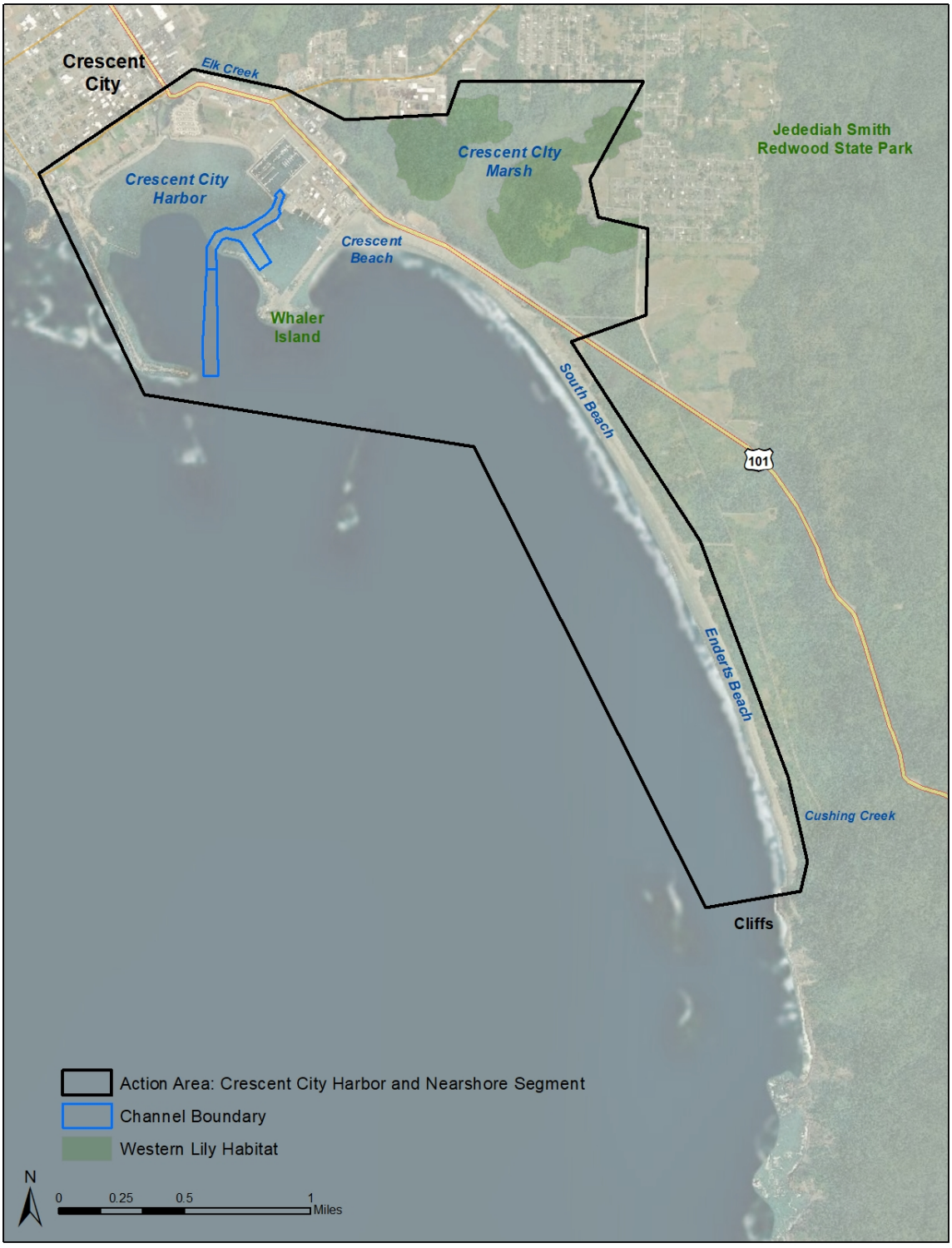

Figure 2. Crescent City Harbor Action Area

Figure 3. Project area detail

1.3 Project History

1.3.1 Documentation of Relevant Correspondence

1. 2016. An Administrative Draft Environmental Assessment was prepared for the USACE in 2016 (HydroPlan and Anchor QEA, 2016).
2. 2015. A Dredged Material Management Plan (DMMP) was prepared for Crescent City Harbor in 2015 (HydroPlan and Anchor QEA 2015). The purpose of the DMMP was to evaluate alternatives and recommend a plan for management of dredged material for the next 20 years or more of maintenance dredging.
3. 2009. Letter from USFWS to the California Coastal Commission Staff regarding the Consistency Determination Concurrence for potential effects to the Western lily from the proposed action. (USFWS 2009a)
4. 2009. California Coastal Commission Staff Recommendation on Consistency Determination Concurrence. (California Coastal Commission 2009)

1.3.2 Federal Action History

The Crescent City Harbor Entrance and Inner Harbor Basin Channels were first dredged under the USACE O&M Program in 1936. Since that time, maintenance dredging of the two channels has been conducted in 1937, 1938, 1939, 1956, 1957, 1964, 1965, 1976, 1982, 1983, 1988, 1993, and 1998, at intervals ranging from one to seventeen years between episodes. In 1999, only the Entrance Channel was dredged and in 2000, the Access Channel was deepened and became a federal channel. The Access Channel was last dredged in 2009 and the Inner Harbor Basin and Entrance Channels were last dredged in 2011. Due to funding and placement/ disposal site capacity constraints, the Inner Harbor Basin Channel and Entrance Channel were only dredged to -14 feet MLLW (with 1 foot of overdepth) in 2011, instead of the typically maintained -15 and -20 feet MLLW, respectively.

A hopper dredge was used to dredge the channels from 1936 to 1939. After 1956, all dredging was performed with a cutterhead dredge and hydraulic pipeline, aside from the use of a hopper dredge for a portion of the channels in 1982. Based on dredged material volumes from 1936 to 2011, a total of approximately 896,600 CY has been dredged from the Crescent City Harbor federal channels. ***Table 2*** summarizes the dredged volumes from the Crescent City Harbor federal channels since 1936.

1.3.3 Consultation History

- 1998. SWR-2001-2772. Crescent City Harbor Federal Channel Extension and Deepening Project. Informal combined. Arcata, CA NMFS Office. Project put on hold, no resolution as of 8/6/1998 (per J. Ambrosius). NMFS response date: 8/06/1998.

Table 2. Crescent City Harbor Federal Channels historical maintenance dredging volumes and disposal sites

Year	Channels	Volume (CY)	Disposal Site
1936	Inner Harbor Basin and Entrance Channels	48,449	Unknown
1937	Inner Harbor Basin and Entrance Channels	27,756	Unknown
1938	Inner Harbor Basin and Entrance Channels	16,353	Unknown
1939	Inner Harbor Basin and Entrance Channels	58,396	Unknown
1956/1957	Inner Harbor Basin and Entrance Channels	120,466	Unknown
1964/1965	Inner Harbor Basin and Entrance Channels	187,372[b]	Unknown
1976	Inner Harbor Basin and Entrance Channels	61,013	SF-1
1982	Inner Harbor Basin and Entrance Channels	125,319	SF-1
1983	Inner Harbor Basin and Entrance Channels	40,221	SF-1
1988	Inner Harbor Basin and Entrance Channels	62,192	Whaler Island
1990	HOODS established	NA	NA
1993	Inner Harbor Basin and Entrance Channels	37,487	Whaler Island
1999/2000	Entrance Channel and Access Channel	35,000	Whaler Island & Dredge Ponds
2002	Crescent City Floating Dock Relocation	NA	NA
2005	USCG Dorado Moorings Repair	NA	NA
2009	Access Channel	34,947	Whaler Island & Dredge Ponds
2011	Various Tsunami related repairs (boat basin/docks)	NA	NA
2011[a]	Inner Harbor Basin and Entrance Channels	41,630	Whaler Island & Dredge Ponds
Total		**896,601**	

Note:

a. Due to funding and placement/disposal site capacity constraints, the Inner Harbor Basin and Entrance channels were only dredged to -14 feet MLLW (with 1 foot of overdepth) in 2011, instead of the typically maintained -15 and -20 feet MLLW, respectively.

b. The 1964 tsunami may have contributed to the larger than usual volume.

2 Description of Action and Action Area

2.1 Federal Action and Legal Authority

Interagency coordination, as defined in Section 7 of the Endangered Species Act (ESA), requires all federal agencies to consult with the USFWS and NMFS, collectively referred to as the Services, if a federal action agency determines that any action it funds, authorizes, or carries

out may affect an ESA-listed species or designated critical habitat. The USACE is preparing this Biological Assessment (BA) because the project is proposed for federal funding, will impact a water of the U.S., and may affect federally listed species under the jurisdiction of NMFS and USFWS. The purpose of this BA is to evaluate the effects of the project on species under the jurisdiction of the NMFS and USFWS that are listed or proposed for listing under the ESA. This BA also evaluates potential impacts to Essential Fish Habitat (EFH), as defined by the Magnuson-Stevens Fishery Conservation and Management Act as amended by the Sustainable Fisheries Act of 1996.

2.2 Project Purpose and Objectives

The USACE proposes to conduct maintenance dredging of the Crescent City Harbor Federal Navigation Channels for the purpose of restoring them to their original authorized depths. The Project entails dredging the Outer Channel (also referred to as the Entrance Channel), Inner Channel, and Access Channel (***Figure 3***), with the purpose being to return these channels to their authorized depths for safe and reliable commercial and recreational navigation. The dredged material will be disposed of at approved dredged material placement sites, including either the existing upland disposal site (if it can be excavated) or HOODS for the fine material, and Whaler Island, the nearshore beach nourishment placement location, for sandy material. Construction is proposed to occur in 2019.

The existing federal project for the improvement of the Crescent City Harbor was authorized by the Rivers and Harbors Act of 1918, based on the report printed in House Document 434 of the 64th Congress, First Session, and provided for construction of a rubble mound outer breakwater. The Crescent City Harbor District is the non-federal sponsor for the project.

2.3 Project Description

2.3.1 Description of Project Activities

USACE proposes to conduct maintenance dredging of the existing federal navigation channels within Crescent City Harbor to their authorized depths. There are currently three federally constructed and maintained navigation channels in Crescent City Harbor. The Inner Harbor Basin Channel extends 2,200 feet (670 meters) along the inside and around the tip of the inner breakwater, where it connects to the Entrance Channel, a 200-foot (61 meters) wide channel that extends 2,200 feet (670 meters) to the outer breakwater. The Marina Access Channel is 140-210 feet (42-64 meters) wide and extends 1,200 feet (365 meters) from the Inner Harbor Basin Channel to the small boat basin.

Each of the three channels is authorized to a depth of -20 feet mean lower low water (MLLW), with the Entrance Channel maintained to -20 feet MLLW, and the Inner Harbor Basin and Access Channel each maintained to -15 feet MLLW. To maintain these depths efficiently, project authorization also includes an additional 2 feet (0.6 meters) of allowable overdepth.

The proposed action involves using a cutterhead dredge and hydraulic pipeline to pump up to 95,000 CY of sandy sediment from the Entrance Channel and Marina Access Channel to be placed nearshore off of Whaler Island. A clamshell dredge would excavate up to 23,000 CY of siltier sediment from the Inner Harbor Basin, with this material being taken to Humboldt Open Ocean Disposal Site (HOODS) for disposal. The total amount of dredged material, therefore, is 95,000 + 23,000 = 118,000 CY (these estimates include two feet of allowable overdepth).

The project footprint of the proposed dredged area, including the Entrance, Inner and Access Channels, is approximately 26 acres. The total area for the dredged material placement site at Whaler Island is 5.5 acres, whereas potentially, the total acreage available at the HOODS disposal site is 850 acres.

Hydraulic (Cutterhead) Dredging

Sandy sediment proposed to be placed at the Whaler Island beach nourishment site would be dredged primarily from the Entrance Channel by a 1,500 to 2,500 horsepower hydraulic cutterhead suction dredge. A hydraulic dredge is a barge-type vessel that consists of onboard pump(s), spud piles (long vertical pipes), and a toothed cutterhead attached to a pipeline. The cutterhead is mounted to a ladder that can be lowered, raised, and angled to target material for dredging. The transport pipeline exits the back (stern) of the dredge.

Once the dredge is positioned, the ladder with cutterhead is lowered to the bottom of the channel. The cutterhead would then slowly start to rotate and break up sediment along the seafloor, continuing from side to side in a sweeping arc. The hydraulic dredge would move along the channel, self-propelled by walking with its spuds or controlled by tugboat, and a crew would maintain and operate the dredging equipment at all times. Skiffs and a tugboat (with a total of about 500 horsepower) would be used for crew transport, maintenance, and other operations associated with dredging activities.

The dredged slurry is expected to consist of 80 to 90% water and 10 to 20% solids by volume. This ratio is dependent upon several factors, such as physical characteristics of the dredged material, thickness of dredge cuts (e.g., thin cuts result in more water and less sediment), and transport distance.

The dredge pipeline would transport dredged slurry to the Whaler Island beach nourishment site. The pipeline would be made of durable polyvinyl chloride (PVC) pipe or steel and would likely float on pontoons or floats. Depending on which areas are being dredged, the length of the pipeline would range from 1,500 to 3,000 feet (457-914 meters). If navigational access over the pipeline is required, one or more sections of the pipeline system can be submerged and anchored to the bottom of the seafloor. Pipeline sections and anchors not in use would either be secured on a floating barge, capped and lashed together to float in the channel, or stored in designated staging areas. One booster pump may be needed to accommodate the maximum pumping distance. The contractor would determine the preferred route for the pipeline from

the dredge site to the placement site, and buoys would be positioned to warn boaters of the pipeline's presence. The hydraulic dredging duration is estimated to be approximately 6 weeks.

Mechanical (Clamshell) Dredging

Fine-grained silty sediment dredged from the Inner Harbor and sandy sediment from the Access Channels would be dredged by an approximately 500 horsepower mechanical dredge. A typical mechanical dredge consists of a crane mounted on a floating flat deck barge, with a dredging bucket (e.g., clamshell) on the end of the crane boom. The barge would have 2 to 4 spud piles to anchor the dredge, likely located at the corners. The mechanical dredge would move along the channel self-propelled by walking with its spuds or controlled by tugboat (approximately 500 horsepower), and a crew would maintain and operate the dredging equipment at all times.

Once the dredge is positioned, the spud piles would be anchored vertically into the seafloor. The mechanical dredge, typically powered by a diesel generator, would then lower and raise the dredge bucket through the water column using a series of cables and winches. The weight of the dredge bucket allows it to sink into the sediment, with the cables restricting the clamshell from falling too deep or beyond the maximum allowable overdepth. The dredge bucket is then closed, raised up through the water column, and swung over to place material into a bottom dump or split hull barge. Unlike hydraulic dredging, little additional water is entrained by mechanical dredging equipment (LTMS 1998).

If disposal Option B is chosen, then once a haul barge is full, it would be transported by a larger tug (approx. 3,000 horsepower) 66 miles south to HOODS. The doors along the bottom of the barge would be opened, and the dredged sediment would be disposed at the site. The duration of mechanical dredging is also estimated to be about 6 weeks, to be carried out simultaneously with the hydraulic dredging.

2.3.2 Timing and Duration

For calendar year 2019, the USACE proposes to maintenance dredge the federal navigation channels at Crescent City Harbor within the environmental work window, which is July 1 – October 15, as established by the CDFW, and which USACE recognizes as a matter of comity. USACE also requests an extension of the CDFW work window to November 15, provided that heavy rains have not yet begun.

The work, from the Notice to Proceed (NTP) order to the contractor, will consist of two parts. The first part is preliminary, taking up to 8-weeks for written submittals (Environmental Protection Plan, Safety Plan, Quality Control Plan, etc.) and for mob. The second part involves in-water construction activity, both hydraulic and mechanical, and is scheduled to last up to 6 weeks. The in-water activity will consist of 3 weeks for dredging and 3 weeks for contractor survey, the clean-up of high spots, and demob.

As currently scheduled, the contract award, and NTP, is planned for early- to mid-August 2019. Because inclement weather with rough seas is expected in October, it is SPN's hope that in-water work can be completed by the end of September. Even so, SPN still seeks to extend the work window out to November 15 (barring heavy rains), and acknowledges that it may become necessary to postpone some dredging activities into calendar year 2020.

2.3.3 Description of Proposed Conservation Measures

A number of avoidance, minimization and conservation measures will be implemented as part of the proposed action in order to minimize impacts to federally listed species within the vicinity, and include:

Water Quality

The USACE will conduct water quality monitoring during dredging in accordance with the North Coast Regional Water Quality Control Board's (RWQCB's) Monitoring and Reporting Program No. R1-2000-59 (hereafter referred to as the monitoring program). The monitoring program involves:

Sampling

- On the first day that dredged material is placed at the Whaler Island site, a chronic toxicity bioassay will be conducted using a sample of the discharge.
- Receiving water samples in the vicinity of the Whaler Island site will be collected daily, within one hour of high tide, and tested for turbidity. One sample will be taken near the ice house at the end of Citizens Dock Road and the other will be taken within 200 feet (61 meters) of the point of entrance of the discharge into the Ocean.

Vessel Operations

- Vessels will be operated in compliance with all applicable regulations related to the prevention of water pollution by fuel, harmful substances, and accidental discharges. If Option B is chosen, the dredged material will be secured during transport to HOODS, with precautions in place to minimize any risk of spills.
- To ensure that contaminants are not accidently introduced into the waterway, the contractor will implement standard erosion and sediment controls and spill prevention and response measures in and around the proposed project area. The contractor responsible for operating the dredging equipment would be responsible for ensuring that such measures are adhered to.
- Floating debris will be removed from the water and disposed of properly.
- All dredged material will be handled and transported such that it does not re-enter surface waters outside of the immediate protected work area.

Dredging Activities

- Dredging at each project location will continue to be limited to the approved project depth plus allowable overdepth.
- If Option B is chosen, best management practices (BMP) for mechanical dredging will

include:
    - Multiple horizontal dredge cuts will be taken where a thick horizontal volume needs to be dredged, in order to avoid overfilling the bucket and causing spillage.
    - No overflow or decant water will be allowed to be discharged from any barge.
- Hydraulic dredging BMP measures will include:
    - Pipeline pumps will only be turned on when the cutterhead intakes are on the seafloor or within 3 feet (0.9 meters) of the seafloor when priming pumps.
    - Cutterhead intakes will be monitored so that they maintain positive contact with the seafloor during suction dredging.

Beach Aggradation

- Beach aggradation caused by placement of dredged material could in theory reduce flow from Crescent City Marsh, home of the largest remaining stand of Western lily, thereby causing an adverse impact. The Project proposes daily monitoring of the beach area downstream of the culverts that drain the marsh under Highway 101 during dredged material placement activities at Whaler Island. If it appears aggradation of the beach is interfering with flow through the culverts, a channel will be excavated from the culvert outlets, across the beach to open water. Prior to, and following placement of dredged material at Whaler Island, beach profile surveys will evaluate potential long-term changes to beach elevation in the area of the three Highway 101 culverts along the northern end of South Beach (***Appendix A – South Beach Aggradation Monitoring Plan***). Survey results will be submitted to the Arcata office of the USFWS.
- A biological survey of the Whaler Island site will be conducted during the summer following use of the site for dredged material placement. Two observation sites will be established: one on the seaward side of the groin extending southeasterly from Whaler Island, and the other on the opposite side of the groin. For each observation site, the marine biologist conducting the survey will quantify and report the density of colonization for each marine species observed.

2.4 Action Area

The Action Area (***Figures 2 and 3***) is defined as all areas that could potentially be affected by the proposed project action, and includes all physical, biological, and chemical direct and indirect effects, both direct and indirect, and is not limited to the actual work area (project footprint). Sources of disturbance that could potentially effect listed or proposed-listed species or their critical habitat and define the boundaries of the Action Area include: turbidity; sedimentation; beach aggradation; terrestrial and underwater noise; and visual disturbance.

The Action Area takes into consideration the geographic extent of effects from the proposed action that are both temporary (effects occurring during dredging/disposal activities) and longer term and/or permanent in nature (effects occurring over time, such as habitat alterations as a result of project activities). The proposed Project may result in both direct and

indirect effects resulting from dredging the navigation channels and placement of material at the dredged material placement sites. Direct and indirect effects factor into the size of the Action Area and include the geographic extent of effects resulting from the project action until they are indistinguishable from background levels.

The Action Area includes the following locations:

- Crescent City Harbor,
- Whaler Island nearshore disposal site on the southeast side of the jetty,
- South Beach from Crescent City Harbor southeast to Cushing Creek (covering Enderts Beach),
- Crescent City Marsh wetland complex upslope from South Beach southeast to the furthest of three culverts across Highway 101 (at approximately Sand Mine Rd),
- HOODS dredged material disposal site;
- The barge routes to/from Crescent City to HOODS.

2.4.1 Turbidity

As a result of the dredge and placement activities, sediment is expected to become suspended within the water column during dredging of the navigation channel, and may result in turbid water surrounding the dredge equipment and extending outward in any direction. The size, intensity, and duration of the turbidity plume will depend on the dredge method (mechanical or cutterhead), particle size of the dredged material (larger sand particles will settle faster than silt), tides and ambient turbidity levels at the time of the dredging event. Some turbidity is likely to result as material is dredged from the Crescent City Harbor. Because the Harbor is predominately surrounded by breakwater levees, the anticipated turbidity plume resulting from the dredging activities is expected to be relatively contained within the Harbor's 420 acres, though the precise direction and extent of the turbidity plume will depend primarily on the direction of currents. Turbidity from placement of dredged material at the Whaler Island placement site may be carried along the shallow water of the beach or be carried seaward depending on the direction of nearshore currents and tides. It is estimated that any turbidity would settle to background levels at a distance of 0.5 nautical mile southward and westward from the Whaler Island placement area. Similarly, the anticipated turbidity plume resulting from the disposal of dredged material at the HOODS disposal site is conservatively estimated to settle out approximately 0.5 nautical mile in each direction from the release area. Turbidity at the disposal site would be expected to be greater near the bottom.

2.4.2 Sedimentation

Sedimentation of benthic habitats within the dredged and placement/disposal sites is expected to occur to varying degrees as a result of dredging and disposal activities and may be temporary or permanent depending on the depth of material placed and ocean currents. Of the disposal/ placement sites only Whaler Island has been identified to receive a known quantity of dredged material (up to 95,000 CY) across its 5.5 acres. Less material (up to 23,000 CY) is proposed for open ocean disposal at HOODS. At HOODS, any sedimentation would be contained within the

boundary of the disposal site limits due to EPA requirements to release material within specified quadrants or cells. The total area potentially available for disposal is 850 acres at HOODS.

2.4.3 Beach Aggradation

Placement of up to 95,000 CY of sandy dredged material at Whaler Island may potentially result in beach aggradation (increased beach height) along South Beach. This portion of the Action Area extends along the shoreline from the Whaler Island Jetty southeast to approximately Cushing Creek, approximately 3.5 miles southeast along South Beach to a natural cliff formation, demarcating the southern end of South Beach. It is unlikely that beaches northwest of the Harbor would experience aggradation from placed material at Whaler Island, as any sediment movement northward would likely be interrupted by the western jetty and/or dispersed by nearshore ocean currents. Therefore the beach portion of the Action Area is limited to the Whaler Island jetty, southeastward to the cliffs south of Cushing Creek.

The low elevation wetlands on the eastern side of Highway 101 and west of Bluff Road are included in the Action Area due to the potential for effects of beach aggradation altering or impeding the hydrologic regime of small tributaries or drainages that drain these wetlands through three culverts under Highway 101. Therefore, the Action Area includes all areas potentially affected by beach aggradation (should it occur) including Crescent City Marsh, and South Beach from Whaler Island Jetty to the cliffs immediately south of Cushing Creek.

2.4.4 Terrestrial Noise

Terrestrial (or in air) noise is anticipated to result from operations of the dredge vessel in all project areas throughout the project duration while the vessel is in operation. Crescent City Harbor is an active marine harbor with moderate to high commercial and recreational vessel activity. Ambient noise from multiple shore-based receptor sites was documented to be between 67-81 decibels (dBA) (***Appendix B – Crescent City Harbor Terrestrial Noise Analysis***).

Terrestrial noise estimated from the vessel within the harbor for dredging of the navigation channels and placement at Whaler Island has been calculated at 3 dBA above ambient noise levels taken from multiple shore-based locations surrounding the Harbor (***Appendix B – Crescent City Harbor Terrestrial Noise Analysis***). Using a practical spreading loss calculator, it was determined that in-air vessel noise would attenuate to ambient noise levels approximately 71 feet (22 meters) beyond the location of the outermost noise receptor (Crescent City RV Park, at approximately 2,000 feet (609 meters) from the closest extent of the proposed dredge area or 1,000 feet [305 meters] from the shoreline). Therefore, terrestrial noise generated from the vessel within the harbor will result in an Action Area within an approximately 2,100 feet (640 meters) radius from the location of the vessels. Because noise attenuates over a much greater distance over hard surfaces such as water, terrestrial noise is assumed to attenuate to background levels approximately 1,000 feet (305 meters) landward of the harbor.

Vessel noise generated along the transport route and at the disposal sites is anticipated to be at similar levels to that of the vessel in the harbor (70-84 dBA) although in-air noise levels at sea would be anticipated to be much lower. In-air noise along the transport route and at the open ocean disposal sites will vary based on wind speed and weather conditions, however, on average, 55 - 65 dBA can be expected along nearshore and offshore areas (WSDOT 2013). Using a practical spreading loss calculator, it was determined that in-air vessel noise would attenuate to ambient noise levels at sea approximately 1,400 feet (427 meters) beyond the vessel. Therefore, the marine portion of the Action Area impacted by in-air noise is approximately 1,400 feet surrounding the vessel during transport and while disposing at HOODS.

2.4.5 Underwater Noise

Underwater noise is expected to be generated from placement of material at the proposed dredged material disposal and placement sites. Underwater noise is more difficult to quantify due to multiple variables including, vessel type and dredge equipment, dredging methodology, and fluctuating ambient underwater noise within the dredged area (Crescent City Harbor), and if Option B is chosen, at HOODS. Because Crescent City Harbor is predominately surrounded by breakwater levees, vessel noise resulting from the dredging activities is expected to be relatively confined within Crescent City Harbor's 420 acres (0.49 square nautical miles).

The extent of the vessel noise at HOODS is conservatively estimated to extend 1 nautical mile in each direction underwater from the total acreage available at the placement sites until it attenuates to background levels. As a result, the total vessel noise buffer at HOODS extends 6.45 square nautical miles. Underwater vessel noise along the transport route is expected to attenuate similarly, extending 1 nautical mile in each direction from the vessel until vessel noise attenuates to ambient background ocean noise.

2.4.6 Visual Disturbance

Existing visual disturbance within Crescent City Harbor is high to moderate because the project area is an active marine commercial and recreational port. In addition, the City of Crescent City is immediately adjacent to the harbor. Existing visual disturbance within the transport route as well as at HOODS is low, though vessels do periodically occur within the transport route and disposal sites. It is conservatively estimated that visual effects would extend approximately 0.5 miles from the vessel in the open ocean locations.

3 Status and Presence of Listed Species and Designated Critical Habitat

3.1 Species under Jurisdiction of NMFS

3.1.1 Southern Oregon/Northern California Coast Coho

The Southern Oregon/Northern California Coast (SONCC) Evolutionarily Significant Unit (ESU) of coho salmon was listed as a threatened species under the ESA in 1997, a decision that was reaffirmed in 2005. The SONCC coho Salmon ESU includes all naturally spawned populations of coho salmon in coastal streams between Cape Blanco, Oregon, and Punta Gorda, California, as well as coho salmon produced by three hatchery programs. SONCC coho within the Action Area

are considered to be within the Central Coastal Basin Stratum, which includes the population within Elk Creek.

Elk Creek likely supported much larger runs of SONCC coho, but recent spawner surveys have found very low adult returns, with one study suggesting Elk Creek supports less than 50 adults (NMFS 2014). Southern Oregon Northern California Coast coho Salmon Recovery Plan (NMFS 2014) describes the Elk Creek population as dependent on strays from nearby populations to persist over time. The Elk Creek population is considered dependent because it does not have a high likelihood of sustaining itself over a 100-year time period in isolation and receives sufficient immigration to alter its dynamics and extinction risk (NMFS 2014). Although dependent populations are not viable on their own, they do increase connectivity through dispersal among independent populations and provide individuals for other populations, acting as a source of colonists in some cases (NMFS 2014). By exchanging spawners, the Elk Creek population interacts with other Central Coastal populations, such as the Smith River population, and plays an important role in the health and status of the ESU (NMFS 2014).

Though historical numbers of SONCC coho within Elk Creek were likely much higher, the relatively small geographic extent of the Elk Creek basin would limit both the historical numbers and recovery potential for this population (NMFS 2014). Portions of historical habitat available to coho salmon in Elk Creek have been lost to development and degradation, though large portions of the Elk Creek watershed remains suitable habitat. The available habitat for both spawning and rearing SONCC coho has been severely restricted and overall opportunity and capacity within the system is low under current conditions. According to the SONCC Recovery Plan (NMFS 2014), the Elk Creek population appears to be depressed in abundance and may consist of only a handful of spawning adults each year. A spawner survey in 1999 found one coho salmon carcass in Elk Creek (NMFS 2014). The SONCC Recovery Plan estimates that there are probably fewer than 50 adults that comprise the Elk Creek SONCC coho salmon population (Brown et al. 1994, Weitkamp et al. 1995, NMFS 2014).

The presence of juveniles in the basin suggests suitable incubating conditions in reaches where coho salmon successfully spawn (NMFS 2014). Previous data from the CA Department of Fish and Game (CDFG) surveys indicate low number of juveniles (around 30 per year) distributed throughout a small portion of the basin (CDFG 2004). Only a few age 1+ smolt size coho salmon have ever been found. This indicates rearing capacity for the system may be low, or that juveniles are leaving the system earlier than expected (NMFS 2014).

With the low number of spawning adults observed in the Elk Creek population and the relatively few smolt-size juveniles found, it is likely that the Elk Creek basin supports a small but potentially consistent population with presumably low overall productivity. As a dependent population, abundance and productivity is highly influenced by nearby populations, which contribute spawners as strays (NMFS 2014). Populations to the north (Smith River) and south (Klamath River) are both likely sources of strays to the Elk Creek population. Both these populations have been severely restricted, have low numbers of returning adults compared to

historical runs, and are at moderate to high risk of extinction (NMFS 2014). Key Limiting Stresses on the Elk Creek population include 'Degraded Riparian Forest Conditions' and 'Lack of Floodplain and Channel Structure'. Key Limiting Threats are identified as 'Channelization and Diking' and 'Urban/Residential/Industrial Development'. These stressors and threats are identified as key limiting factors to recovery for SONCC coho populations within Elk Creek.

The historical extent of estuarine area in Elk Creek which include the estuarine areas of Crescent City Harbor is unknown. Currently the estuarine area of Elk Creek is confined to less than six acres of tidal sand flat south of the Hwy 101 box culvert. Based on the natural drainage pattern and elevations in the area, much of the historical estuarine tidal area likely has been dredged and filled to accommodate the highway and commercial/industrial development. The reduction in the amount of estuarine habitat and the loss of natural estuarine functions have likely resulted in a loss of foraging and growth opportunities for SONCC juveniles as well as the loss of transitional migratory habitat for smolts.

SONCC coho may be present within the Harbor or marine portions of the Action Area at any time of year. Individuals may be present within the Action Area during adult migration to Elk Creek or smolt emigration from Elk Creek or other nearby natal streams, to estuarine rearing areas within the Harbor or beyond. Adults would be anticipated to occur in the Harbor between November and January. Smolts may be present within the Elk Creek estuary year round. Spawning does not occur within the Action Area (the Action Area does not extend upstream Elk Creek beyond the estuary) and therefore eggs, fry, or juveniles are not anticipated to occur within the project Action Area.

3.1.2 North American Green Sturgeon

Green Sturgeon are large, long-lived bottom-dwelling fish that spend most of their lives in nearshore ocean environments. In 2006, NMFS issued a Final Rule to list the Southern distinct population segment (DPS) of green sturgeon as threatened under the ESA (NMFS 2006). Early life-history stages of this species (< 4 years old) reside in fresh water, with adults returning to freshwater to spawn when they are more than 15 years of age. Green sturgeon range from Mexico to Alaska in marine waters, and forage in estuaries and bays ranging from San Francisco Bay to British Columbia.

Southern DPS green sturgeon typically spawn every three to four years. Spawning occurs primarily in the Sacramento River (NMFS 2015) approximately 375 miles south of Crescent City Harbor. Sub-adult and adult North American green sturgeon spend most of their life in the coastal marine environment. Tagging data indicate that green sturgeon typically occupy depths of 66-230 feet (20-70 m) while in marine habitats (NMFS 2015). Southern DPS green sturgeon are found in high concentrations in coastal bays and estuaries along the west coast of North America during the summer and autumn, particularly in Willapa Bay, Grays Harbor, and the Columbia River estuary. Recent data indicate that the majority of these fish are either immature or in the early stages of maturation (NMFS 2015). Occurrence of this species within the Action Area is expected to be sporadic, consisting of migrating adults and/or sub-adults.

3.1.3 Steller Sea Lion, Western DPS

In 1990, NMFS listed the Steller sea lion as threatened. In 1997, NMFS reclassified the species into two DPS (NMFS 1997). The Western DPS was reclassified as endangered. The Eastern DPS remained classified as threatened until NMFS proposed to delist the Eastern DPS. The largest member of the seal family, Steller sea lions forage in near shore and pelagic waters, often hauling out on rock islands as well as manmade jetty's, buoys and other floating docks or boat ramps. Steller sea lions are opportunistic predators that forage on a variety of marine species, and their diets vary seasonally. They are also capable of traveling long distances in a season and can dive to approximately 800 - 1,300 feet (244-396) in depth. They use land habitat as haul-out sites for periods of rest, molting, and as rookeries for mating and pupping during the breeding season. At sea, they are seen alone or in small groups, but may gather in large "rafts" at the surface near rookeries and haul outs. Crescent City Harbor is known to be a haul out location but is not documented as a breeding location for this species. This species may occur within the Harbor and nearshore areas year-round.

3.2 Species under Jurisdiction of USFWS

3.2.1 Marbled Murrelet

The marbled murrelet was listed under the ESA as threatened in 1992. This small diving seabird nests exclusively in large old-growth trees with large nesting platforms up to 50 miles inland from the coastline. The marbled murrelet depends solely on a diet of fish and other marine invertebrates, diving to forage for prey before returning to their forested nest sites. In California, this species has been documented up to 14 miles out at sea from the shoreline (USDA 1995), well within the range of the two open ocean disposal sites. Breeding birds forage together at sea as bonded pairs, and may make multiple trips each day to feed young in the nests resulting in hundreds of miles each day traversing to their at sea foraging grounds. There are two occurrences of designated critical habitat within coastal forested areas east of the Action Area; Jedediah Smith Redwood State Park (2-miles from the Harbor) and Del Norte Coast Redwoods State Park (3-miles from the Harbor). While no designated critical habitat for this species is within the Action Area, this species is expected to utilize the nearshore areas within the Action Area for foraging. Given the level of boating activity at the Harbor, this species is not expected to regularly utilize the Harbor itself.

3.2.2 Tidewater Goby

The Tidewater Goby is a small fish that strictly inhabits brackish coastal water habitats entirely within California, ranging from Tillas Slough (mouth of the Smith River, Del Norte County) near the Oregon border south to Agua Hedionda Lagoon (northern San Diego County). The tidewater goby is uniquely adapted to coastal lagoons and the uppermost brackish zone of larger estuaries, rarely occupying entirely marine or freshwater habitats. This species is typically found in water less than 3.3 feet (1 meter) deep and salinities of less than 12 parts per thousand (USFWS 2006). Principal threats to the tidewater goby include loss and modification of estuarine habitat, water diversions, predatory and competitive introduced fish species,

habitat channelization, and degraded water quality (USFWS 2006). The tidewater goby is documented to occur within the Elk Creek estuarine environments and is considered to be part of the North Coast Recovery Unit (Sub-Unit NC-1).

3.2.3 Western Lily

The Western lily is a large, perennially flowering plant, listed as endangered under the ESA in 1994. This species occurs in a narrow band of coastal wetland habitat from approximately Coos Bay, OR southward to Eureka, CA. The Western lily occurs in early successional bogs or coastal scrub on poorly drained soils, usually those underlain by an iron pan or poorly permeable clay layer (USFWS 1994). Populations are found at low elevations, from almost sea level to about 300 feet (100 meters) in elevation and from ocean-facing bluffs to about 4 miles (6 kilometers) inland. The largest documented population of the Western lily occurs within the low elevation wetland complex (Crescent City Marsh) just north of Highway 101, east of the Whaler Island Jetty, and currently numbers over one thousand flowering plants (USFWS 2011). This long and narrow wetland complex extends from Elk Creek southeastward upslope of South Beach to Cushing Creek, approximately 3.5 miles southeast of the Whaler Island Jetty.

Since 1987, several populations have been eliminated, while several new populations were discovered. Of the 25 populations known to exist in 1987, more than half of those contain fewer than 50 plants. About half the current populations are located on private land, the remainder scattered on county and state lands in both Oregon and California (CSU and CDFG, 2001).

4 Environmental Baseline

Multiple habitat communities are present within the proposed Action Area and support a diverse assemblage of biotic communities.

Crescent City Harbor and Environs

Crescent City is located within the Lake Earl and Jordan Creek watershed. Drainage from the city flows through Lake Earl and Jordan Creek, in addition to other minor drainages, before discharging to the Pacific Ocean. Other minor drainages include Elk Creek, the mouth of which is within the Crescent City Harbor (City of Crescent City 2001). Elk Creek contributes sediment deposition to Crescent City Harbor, although this is believed to be a relatively minor source of sediment (HydroPlan and Anchor QEA 2015). Although Elk Creek is considered to be a high quality fisheries stream, local drainages convey urban runoff which can adversely affect water quality.

Crescent City Harbor is an active working and recreational boating harbor with a history of at least 17 federal dredging events conducted in order to create and maintain the federal navigation channels. The aquatic habitats within Crescent City Harbor include freshwater riverine, estuarine, intertidal and nearshore marine environments. Similar to other harbors, construction of the jetties and breakwaters, as well as dredging activities, has altered sediment

flow regimes and removed benthic habitat, which has contributed to the alteration and degradation of shallow-water and nearshore environments.

The estuarine environment, the brackish mixing zone within the Harbor, can be broken into two main zones: the intertidal zone and the permanently inundated deeper waters. Estuaries, including intertidal areas, provide important habitat for numerous species, both aquatic and terrestrial. Estuaries also provide critical ecosystem services, including water filtration, protection and stabilization of shorelines, and storm surge buffering, as well as providing high value habitat for species breeding, rearing, feeding, and migration (Day, et. al. 1989). Prior to the introduction of the jetties, the shallow-water estuarine areas of what is now Crescent City Harbor were once more expansive and presumably more biologically productive.

Eelgrass is an aquatic plant of estuarine and nearshore environments that extends long rhizomes (roots) an average of 1.5 – 8 inches below the substrate from which the turions (stems) sprout with long green blades (leaves). Eelgrass forms extensive mats or "beds" in shallow water estuarine areas, provides important breeding, feeding, and rearing habitat for a number of marine, anadromous and terrestrial species. Eelgrass thrives in protected coastal waters with sandy or muddy bottoms where, undisturbed, it forms dense mats of vegetation and offers a unique and important habitat for resident and migratory species.

For out-migrating salmonid smolts, eelgrass provides important shelter and foraging habitat in the smolt to ocean lifecycle of salmonids as well as numerous other aquatic species. Eelgrass also provides cover and foraging grounds for juvenile fish and in some locations, serves as a spawning ground for species such as herring. In addition, some bird and other species feed almost exclusively on eelgrass.

Eelgrass can be adversely impacted by dredging, sedimentation, or indirectly by shading from over-water structures. Eelgrass beds were once abundant throughout shallow water estuarine and marine areas across the west coast, including within Crescent City Harbor. Patches of eelgrass remain within the shallow water areas of the Harbor, but due to previous dredging, eelgrass is unlikely to occur within the federal navigation channels. It is unknown how extensive the eelgrass communities once were in the Harbor, however, due to regular maintenance dredging and ongoing Harbor activities, it is assumed the Harbor (like many other developed ports, marinas, and harbors) has experienced a significant decline in biological productivity.

The intertidal zone is the transitional zone between upland and marine environments. Located in between sandy beaches and breakwaters and the low tide line, the intertidal zone is of high biological productivity and value, serving as breeding and feeding grounds for shorebirds, anadromous fish, marine fish, intertidal vertebrates and invertebrates, shorebirds and other seagoing birds. Both marine and terrestrial mammals (such as river otters) also forage in these productive areas.

Elk Creek is a freshwater tributary that discharges into Crescent City Harbor near the center of the Harbor's shoreline. The headwaters of Elk Creek originate in the Jedediah Smith Redwood State Park, a protected and relatively intact forested area east of Crescent City. The lower middle reaches of Elk Creek flow through a large forested and emergent wetland complex, part of the Crescent City Marsh. Elk Creek then passes under Highway 101 through a 500-feet long box culvert. Downstream of the culvert is a short stretch of the creek's estuarine environment, subject to daily tidal inundation. In Elk Creek, the greatest degree of habitat alteration from development has occurred in the lower valley. Urban, residential, and industrial development within the Elk Creek Valley has resulted in a major impact on aquatic habitat (NMFS 2014). Most of the coastal wetlands and estuarine rearing habitat that might have existed in the lower basin at one time has been dredged, channelized, and/or filled (NMFS 2014). However, Elk Creek still maintains native and anadromous fish, including SONCC coho salmon (NMFS 2014).

Sandy Beaches and Dunes

Sandy beach areas and vegetated dunes occur within the Project Area within Crescent City Harbor and to the southeast of Whaler Island along South Beach. Sandy beaches and associated vegetated dunes serve as important shoreline habitat to numerous terrestrial and intertidal species. Sand and well-drained soils are the defining factor of this habitat. Plant species in these exposed coastal environments include native and non-native grasses, herbaceous vegetation, and coastal shrub species. While some areas are disturbed by development and the entire length of South Beach is cutoff from higher ground by coastal roadways, these habitat communities provide important breeding and foraging areas for resident and migratory birds, invertebrates, and mammals. Vegetated dunes can also serve to buffer higher grounds from erosive wave forces including tsunami waves.

Wetlands

Three discharge culverts are located under U.S. 101 immediately southeast of the Whaler Island Jetty. These culverts, under jurisdiction of the California Department of Transportation (Caltrans), provide drainage from upstream wetland areas. They discharge runoff from the Crescent City Marsh under U.S. 101 onto South Beach, across the sands, and into the Pacific Ocean. Crescent City Marsh is a diverse wetland complex known as the Wildlife Area and is composed of approximately 600 acres of freshwater wetlands, uplands, and coastal forests (***Figure 4***). Crescent City Marsh is a low-elevation coastal wetland complex located just southeast of Crescent City Harbor along the landward side of Highway 101, extending from Elk Creek approximately 3.15 miles southward to a natural rock outcropping formation near Cushing Creek. Approximately half of this wetland complex is owned and managed by the California Department of Fish and Game while the remainder is in private holding. This diverse wetland complex supports the largest documented population of the federally endangered Western lily in the US.

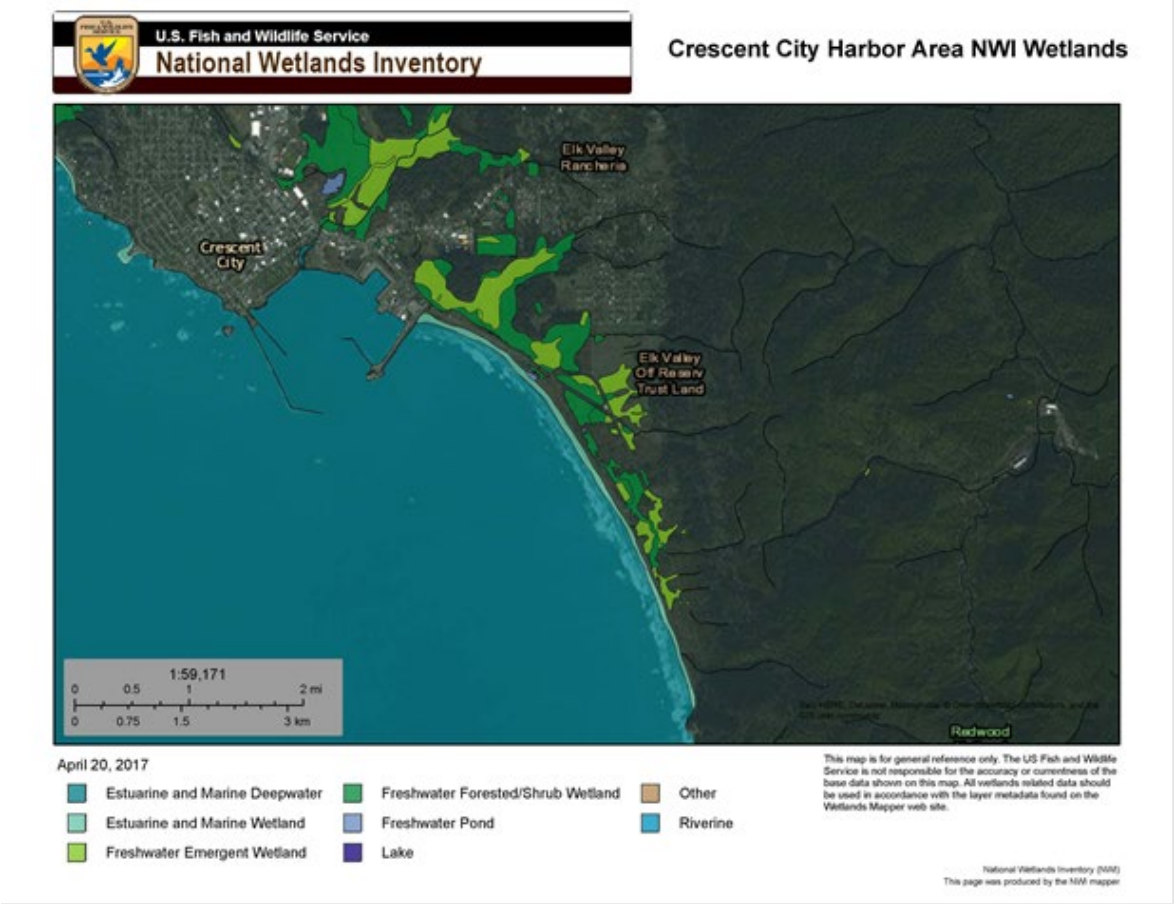

Figure 4. Wetlands in the vicinity of Crescent City Harbor

Whaler Island

Whaler Island is a natural nearshore rock formation that now makes up the southern tip of the artificial Whaler Island Jetty. The island is surrounded by estuarine and marine waters of Crescent City Harbor, and is subject to daily tidal and wave influences. The intertidal areas of the island likely support a variety of intertidal marine species, as well as serving as occasional forage grounds for seals and sea lions, shorebirds, and other seagoing birds. Its northern face (Harbor-side) is primarily composed of sparsely vegetated naturally occurring rock outcroppings with scrub-shrub and a few small conifer trees at the pinnacle of the rocks. The outcropping is artificially reinforced on the eastern, western, and northern ends. A roadway connects the island to the mainland. The jetty is protected with large rip-rap armoring on each side. The larger southern face of the island is relatively unaltered. The island is subject to winds and wave erosion. Though small in size, Whaler Island may be inhabited at various times of the year by nesting birds (migratory and resident), seals, and sea lions.

Humboldt Open Ocean Disposal Site (HOODS)

HOODS is an existing open-ocean sediment disposal site operating under the USEPA Region 9. The site is located 66 miles (57 nautical miles) south of Crescent City Harbor, approximately 3.5-4.5 miles (3 to 4 nautical miles) offshore from Eureka, CA in water depths of approximately 160-180 feet (49-55 meters). The entire area, for several miles offshore and several miles north-to-south around HOODS, is a gently sloping soft-bottom substrate without reef features or other hard-bottom outcrops (USEPA 2016a). The biological communities within HOODS are not as abundant or diverse as found in more shallow or deeper water habitats and may be the result of the fairly uniform sand bottom and/or the presence of prior placed dredged material (USEPA 2016a). The biological community within HOODS includes benthic macroinvertebrates, demersal (bottom-dwelling) fishes, polychaete, crustaceans, and mollusks. Since September 1990, HOODS has been used periodically for dredged material disposal, and in 1995 it was formally designated as an open ocean disposal site.

4.1 Crescent City Harbor – Hydrology

Crescent City is located within the Lake Earl, Jordan Creek, and Elk Creek watersheds. Drainage from the city flows through these waterbodies (with Elk Creek being only waterbody to flow into the Harbor itself) in addition to other minor drainages, before discharging to the Pacific Ocean. Although watershed conditions within the middle and upper reaches of Elk Creek are heavily forested and relatively intact, all drainages convey some urban runoff which can adversely affect water quality. The tides at Crescent City Harbor are mixed semidiurnal tides (two high and two low tides of different size every lunar day) with a great diurnal (one high and low tide per lunar day) range of 6.9 feet and a mean tide level elevation of 3.7 feet MLLW.

The wave climate offshore of Crescent City Harbor is typical of the Northern California coast, with severe storm waves generated from the northwest to the south. Based on 15 years of buoy data at a water depth of 150 feet (46 meters), typical winter waves average 9 feet (2.7 meters) in height and 12 seconds in period, while summer waves average 6 feet (1.8 meters) in height and 8 seconds in period. Winter storm waves can exceed 30 feet (9.1 meters) in height, with wave periods of up to 25 seconds (USACE 2006). The wave climate adjacent to Crescent City Harbor is milder than in the open ocean, with considerable attenuation of waves from most directions due to the surrounding breakwaters and levees. The exception involves waves arriving from the west-southwest to south-southwest, as a nearby shoal (***Figure 3***) often amplifies waves arriving from this direction by up to 30 percent of deep-water wave height (USACE 2006). The dynamics of the breakwaters and levees may contribute towards slower water circulation within the Harbor during very high or low tides or storm events.

4.2 Crescent City Harbor – Water Quality

Water quality factors of concern in Crescent City Harbor and in waters within or adjacent to placement sites include total suspended solids, turbidity, dissolved oxygen, nutrients, pH, salinity, and temperature. The Regional Water Quality Control Board (RWQCB) issues receiving

water limitations and monitoring requirements for water quality parameters during dredging to establish water quality parameters for the Project Area. For past dredging events, these were established through RWQCB Order R1-2000-59, which included a Monitoring and Reporting Program that established monitoring requirements for turbidity, settleable solids, and toxicity (***Appendix C***).

Limited water quality sampling, including modified elutriate testing (MET), was conducted in the Harbor for the 2009 Sampling and Analysis Report (USACE 2009). MET testing is valuable for determining the potential for decant water from the placement of dredged material to adversely impact receiving waters. All MET dissolved metals were reported at concentrations below the water quality objectives of the California Toxics Rule and the USEPA's Section 304(a) criteria for Priority Toxic Pollutants. MET elutriate bioassay results showed that none of the three channel samples exhibited toxicity to the mysid Americamysis bahia (small shrimp-like crustaceans) or were significantly different from the offshore reference site. Past water quality monitoring conducted by the USACE has not identified any exceedances of RWQCB water quality objectives. It is anticipated that the proposed action will have similar water quality impacts.

In the past, sediment characterization analyses have consistently confirmed that the sediment from the Crescent City Harbor federal channels is suitable for placement or disposal at the array of historical sites that have been used by USACE or the Crescent City Harbor District. However, sediment sampling and testing will be performed prior to dredging to ensure that material proposed for dredging is suitable for placement at the proposed placement/disposal sites.

The proposed action includes collecting and submitting representative samples of dredged sediments for physical, conventional, chemical, and biological testing based on applicable guidelines. Sediment samples will be collected from individual cores and composited to characterize dredge areas. Samples will be analyzed for physical and conventional parameters (grain size, total organic carbon, sulfides, and total solids); chemical parameters, including the suite of heavy metals and organic compounds tested in previous sampling events; and biological parameters, including water column toxicity and benthic bioassays. These analyses will be used to ensure that contaminated material impacts from dredging and placement of dredged material are avoided.

5 Effects of the Action

5.1 Direct Effects

Direct effects are the immediate effects of construction on the environment. Several elements of the project have the potential to directly affect listed species including: terrestrial noise, underwater noise, visual disturbance, turbidity, sedimentation, and contaminated sediments. Each of these potential effects created by project activities are discussed in detail below:

5.1.1 Terrestrial (In-Air) Noise

Project related terrestrial noise may result in temporary disturbances to listed wildlife species within the vicinity. Project related noise would be relatively continuous and not in bursts or impulsive (pile driving). Terrestrial-based noise is anticipated to result from operations of the vessel during dredging of the navigation channels, transport of material to the open ocean disposal sites, and from placement of material at Whaler Island.

Existing ambient noise levels vary greatly across the Project Area. Crescent City Harbor is an active marine harbor with existing moderate to high commercial and recreational vessel activity. As shown in ***Appendix B – Terrestrial Noise Analysis Calculations***, ambient baseline noise taken from multiple shore-based receptor sites was documented at levels between 67-81 decibels based on the A-weighted system[1] (dBA), which is considered a moderate to high noise range. As described in ***Section 2 Description of Action and Action Area***, noise generated by the dredge vessel within the Harbor is estimated to be 3 dBA above ambient noise levels, with construction noise levels anticipated at 70-84 dBA from the shoreline.

In-air noise along the transport route and at the open ocean disposal sites will vary based on wind speed and weather conditions. However, on average, 55 - 65 dBA can be expected along nearshore areas (WSDOT 2013). Vessel noise generated along the transport route and at the placement sites is anticipated to be at similar levels to that of the vessel in the Harbor (70-84 dBA). It can be assumed that the vessel would generate a similar in-air noise level range while in transport and at the HOODS disposal site.

5.1.2 Underwater Noise

Underwater noise generated by the dredge vessel and dredging activities may result in temporary disturbances to listed wildlife species within close vicinity of the vessel. Noise generated underwater from the dredge vessel and dredging activities is expected to occur during the entirety of the dredging operations (approximately 12 weeks) though noise would not be contiguous for the entirety of the project window as the dredge vessel would cease dredge operations while the barge transports material to and from the disposal sites.

Underwater noise levels generated by the dredge vessels are difficult to pinpoint due to several environmental variables including, vessel type and dredge equipment type, dredge methodology, fluctuating ambient underwater noise within the dredge area, and the open ocean placement areas. Underwater noise sampling within the Harbor or placement sites was not conducted as part of this assessment, however, an estimated range can be given based on previous analysis. Similar studies of soft-bottom dredge activities in marine harbors indicate dredge vessel noise to be less than 140 dB (Theobald et al., 2010) and may be less for soft-surface dredge operations as is the case for Crescent City Harbor. It should be noted that vessel

[1] A-weighted decibels are an expression of the relative loudness of sounds in air as perceived by the human ear. In the A-weighted system, decibel values of sounds at low frequencies are reduced, compared with unweighted decibels, in which no correction is made for audio frequency.

noise is contiguous and would not produce impact or burst noise as is associated with activities such as pile driving.

Within the Harbor, underwater noise generated from the vessel and dredge equipment is expected to be predominately contained within the bounds of the Harbor due to the breakwaters and jetties. The ambient underwater noise level in the Harbor is assumed to be moderate to high due to the existing vessel activity as well as other Harbor activities conducted year round. Therefore, the extent of underwater noise originating from the vessel would be expected to be less than the extent of underwater noise at the location of the transport route to HOODS.

5.1.3 Visual Disturbance

The presence of the dredge vessels within the Action Area may cause listed wildlife species to temporarily avoid or disperse from the area when vessels are present. Crescent City Harbor is an active marine Harbor, operating contiguously over the last 150 years with moderate to high large vessel traffic and other anthropogenic activities. Therefore, visual disturbance from presence of vessels within Crescent City Harbor is unlikely. The open ocean disposal sites and vessel transport routes are periodically utilized by other vessels, although their presence would be anticipated to be sporadic. Therefore, effects due to visual presence of the vessels may occur but would be expected to be temporary in nature.

5.1.4 Turbidity

Turbidity of waters surrounding the dredge and placement operations is likely to occur although it would be expected to be temporary in nature. Sediment is expected to become suspended within the water column during dredging of the navigation channel and placement at the dredged material placement and disposal sites and will likely result in turbid water surrounding the dredge equipment. Within Crescent City Harbor, the size, intensity, and duration of the anticipated turbidity plume will depend on particle size of the dredged material (larger sand particles will settle out faster than smaller silt particles), tide direction, and ambient turbidity levels at the time of dredging. The majority of the dredged material proposed for removal from the navigation channels is sand-sized particles proposed for placement via a pipeline at Whaler Island. Because Crescent City Harbor is predominately surrounded by breakwater levees, the anticipated turbidity plume resulting from the dredging activities is expected to be relatively contained within the Harbor. Turbidity as a result from placement at Whaler Island would be expected to be transported generally north or south along the shoreline depending on tidal direction and nearshore currents and would be expected to settle out of the water column or dissipate to ambient levels within 0.5 nautical miles of the Whaler Island placement area.

Similarly, the size, intensity, and duration of the turbidity plume at the open ocean disposal sites will depend on the size of the tides ambient turbidity levels at the time of the dredging event, as well as the quantity of material to be placed at each proposed dredged material placement site which has yet to be determined. Other factors include the height at which the

vessel will release material to the sea floor at HOODS (160-180 feet [49-55] depth range). The duration of turbid water resulting from placement of dredged material at HOODS is expected to be greater than that of Whaler Island, inasmuch as the particle size proposed for open ocean disposal is silt-sized. Turbid water resulting from disposal of dredged material at the open ocean disposal sites would be expected to return to background levels within 24 hours of completion of each disposal event.

5.1.5 Sedimentation

Some sedimentation within the Harbor is likely to occur during dredging as the dredge equipment removes sediment from the navigational channels and becomes suspended in the water column prior to resettling. The location, depth and duration of sedimentation depends on several environmental variables. As the majority of material dredged from the Harbor would either be placed on the disposal barge or pumped to the Whaler Island placement site, sedimentation is anticipated to be minimal within the Harbor and would result from suspended sediment (turbidity) resettling to the bottom. Areas of eelgrass are present within the shallow water areas of the Harbor, and could become temporarily covered in a fine layer of sediment for a short period of time (days or weeks) until tides and currents flush the area. However, it is not anticipated that eelgrass would be irreparably harmed by a fine layer of silt that does not prevent photosynthesis. No eelgrass occurs within the navigation channels as the channels have been periodically dredged for decades.

Significant sedimentation of the nearshore area at Whaler Island and the seafloor at HOODS is likely to occur immediately after disposal of the material. The sediment deposition at HOODS is likely to remain primarily within the boundary of the site limits due to EPA requirements to release material within specified quadrants or cells. Surveys conducted by USEPA indicate dredged material mounding within the bounds of the disposal site (USEPA 2016b). Benthic habitat and biological communities within the placement site could become temporarily or permanently covered in sediment permanently depending on the depth of material deposited at the disposal sites. Stationary marine benthic faunal species and/or communities may become permanently entombed by deeper layers of disposed sediment.

5.1.6 Water Quality and Contaminated Sediments

Past MET of Crescent City Harbor water found dissolved metals concentrations below the water quality criteria of the California Toxics Rule and the USEPA's Section 304(a) criteria for Priority Toxic Pollutants. MET elutriate bioassay results showed that none of the three channel samples exhibited toxicity to the mysid Americamysis bahia, or were significantly different from the offshore reference site. Past water quality monitoring conducted by the USACE has not identified any exceedances of RWQCB water quality objectives. There should not be a release of contaminants into the water column during dredging or disposal activities.

5.2 Indirect Effects

Indirect effects are defined as effects that are reasonably likely to occur later in time subsequent to project completion. The proposed project may result in the following indirect effects:

5.2.1 Beach Aggradation and Wetland Hydrology Alteration

Placement of up to 95,000 CY of sandy dredged material at Whaler Island may potentially result in beach aggradation (increased height or structure of the beach) along the adjacent South Beach. The potential for beach aggradation is not certain to occur and is dependent on several factors, including transport of sediment by tides, wave height, the structure or pitch of the nearshore shoreline, and storm events. It is expected that alteration of the beach structure or height may not necessarily occur immediately after construction, but may occur after multiple tidal cycles and/or after storm events. It would be reasonable to expect that the most likely location for beach aggradation would be near the Whaler Island placement area.

Beach aggradation at the northern edge of South Beach could potentially disrupt or impede outflow at one or more of the three culverts that drain Crescent City Marsh Wildlife Area under Highway 101. There is a great deal of uncertainty regarding the potential for indirect impacts to Western lily habitat resulting from placement of dredged material at Whaler Island. On a site visit to the area on 11 February 2015, it was observed that the outlets of the existing culverts were not obstructed and the levels of the beach sands at the time of the site visit did not appear to be impeding flow downstream of these culverts. Rather, accumulation of debris upstream of the culverts appeared to be impeding flow. Beach aggradation would not necessarily impede flow through the culverts if the flow was sufficient to maintain erosional channels across a higher beach elevation. A series of beach monitoring events are proposed in order to determine whether beach aggradation has occurred after the placement of the dredged material. In addition, mitigating measures are proposed in the event that aggradation which impedes downstream flow from the culverts occurs. Such measures are described in *Appendix A, The Crescent City Harbor Maintenance Dredging Western Lily Monitoring Plan*.

It is expected that material placed at Whaler Island would not impact the beach areas north of the Harbor, since material would be unlikely to traverse around the north jetty and any material would likely disperse seaward. Sandy depositional material would likely dissipate to background levels prior to coming ashore at the beach area between Battery Point Island and Preston Island. Anecdotal observations by residents indicate that the beach adjacent to Battery Island appears to be eroding.

5.3 Effects from Interdependent and Interrelated Actions

An interrelated activity is an action that is part of a larger action and depends on that larger action for its justification. An interdependent activity is an action that has no independent utility apart from the proposed action.

No known interrelated or interdependent actions are anticipated to occur. Commercial and recreational vessel activity to and from Crescent City Harbor is dependent upon maintenance of navigable depths within the federal navigation channels. The project proposes to dredge the existing navigation channels to their authorized depths. This action would allow for existing vessel traffic within Crescent City Harbor to continue, maintaining existing conditions within the Harbor.

5.4 Effects Determination for Listed Species and Designated Critical Habitat

5.4.1 Southern Oregon/Northern California Coastal coho Salmon

Direct effects to SONCC coho individuals within the Harbor at the time of dredging and placement of material at Whaler Island may include effects from water quality, turbidity, sedimentation of eelgrass rearing areas within the Harbor, the potential for resuspension of contaminants in the dredged sediment, and disturbance from underwater noise from vessel and dredge operations. Direct effects to SONCC coho individuals within the open-ocean disposal sites at the time of disposal activities at HOODS and may include effects from turbidity, the potential for resuspension of contaminants in the dredged sediment, and disturbance from underwater noise from vessel and disposal operations.

The project has not established a work window for the proposed work year so it is unknown if the project would occur during the window where retuning adults are present in the Harbor as they migrate towards Elk Creek (November-January). It is anticipated that smolts may be present in the Harbor year-round. Schools of adults and subadults (jacks) may be transient through HOODS, and the transport route year round.

Areas of eelgrass are present within the shallow water areas of the harbor and could become temporarily covered in a shallow layer of sediment for an unknown period of time until tides or currents flush through the area. This could temporarily disrupt smolts rearing in the estuary. The majority of the sediment dredged will be removed, however, sediments may settle out onto eelgrass beds from turbid water associated with dredging of the navigational channels.

Contaminant levels that exceed CA State water quality standards are not anticipated to be present within the dredged material above existing background levels. However, if present, contaminants within the dredged sediment could become resuspended within the water column. In accordance with the Sediment and Analysis Plan, sediment samples will be obtained prior to dredging to determine whether contaminants are present.

Underwater noise from the dredge or barge vessels could cause individuals to avoid or disperse from the area while dredging activities are occurring. Vessels would be expected to generate underwater noise levels at or below 140 dB, below the levels documented to cause harm or injury to fish (187 dB). Therefore, the vessels would not be expected to produce noise levels that would induce injury or harm, but would be expected to induce a behavioral response.

Turbidity associated with dredged material disposal may temporarily displace individuals present within the turbidity plume, increase susceptibility to predation, and cause individuals to avoid the area while the turbidity is present. Individuals present within the Harbor may avoid or be temporarily displaced from the area of the turbidity plume. Suspended solids in estuarine waters effect juvenile salmon and could reduce their ability to sight-feed on surface and near surface invertebrates (USACE 2008). Turbidity is expected to return to background levels within or under 24-hours after each dredging event over the course of the 12-week project window.

The open ocean disposal areas are in deeper water where adults and/or subadults would be expected to be migratory or transient while at sea. The disposal sites are not confined and are not utilized by smaller less mobile smolts and deeper marine waters are not used for rearing. It is likely that SONCC coho individuals within the vicinity of HOODS would avoid areas of high turbidity over the course of several disposal events, and would experience minor effects from turbidity.

5.4.2 North American Green Sturgeon

The North American green sturgeon may occur in the Harbor and/or marine portions of the Action Area during migration or foraging, as either adults or subadults. There is no documented spawning habitat within the Action Area for this species. Direct effects to the green sturgeon would be limited to water quality impacts from turbidity, sedimentation of forage areas, resuspension of contaminants in the dredged sediment, and disturbance from underwater noise from vessel and dredge operations. This benthic foraging species would likely avoid the shallow and heavy vessel traffic areas of the Harbor but may utilize the deeper navigational channels and outer harbor for foraging. Green Sturgeon may also occur within the vicinity of HOODS.

Turbidity associated with dredged material placement can temporarily interfere with the species' visual foraging, increase susceptibility to predation, and may temporarily interfere with migratory behavior. If this species is present within the vicinity of the navigational channels or proposed placement or disposal sites, any green sturgeon present may avoid or be temporarily displaced from the vicinity of the dredge equipment and turbidity. Placement of the dredged material will likely interfere with foraging in the area of sediment deposition. Effects to the green sturgeon from turbidity would be of limited duration, as would effects from sedimentation given the highly migratory nature of this species. Based on prior sampling and testing, contaminant levels that exceed CA State water quality standards are not expected to be present within the dredged material above existing background levels. Prior to the 2019 maintenance dredging episode, sediment sampling will be conducted. If contaminants are found within the dredged sediment, they could become resuspended within the water column during dredging.

5.4.3 Stellar Sea Lion

Steller sea lions are likely to be present within Crescent City Harbor and in nearshore areas, including the disposal sites and transport routes, at all times of the year. Due to the baseline

anthropogenic activity levels within Crescent City Harbor, Steller sea lions within Crescent City Harbor would likely be accustomed to moderate levels of vessel traffic and would likely avoid the dredge vessel or be temporarily displaced from the vicinity if they are within the area of the navigational channels.

Crescent City Harbor is known to be a haul out location of the Steller sea lion but is not documented as a breeding location for this species. Very young and less mobile pups are unlikely to be present within the Harbor. Similarly, individuals or groups out at sea within the vessel transport route or within vicinity of HOODS would also likely avoid the dredge vessel or be temporarily displaced from the vicinity. Given the highly mobile nature of this species, effects are expected to be minimal and limited to avoidance of the dredge and disposal areas and temporary displacement from the immediate vicinity of project actions.

5.4.4 Marbled Murrelet

There are two occurrences of designated critical habitat within the dense coastal forested areas just east of the Action Area, within Smith Redwood State Park (2-miles east of the Harbor) and within Del Norte Coast Redwoods State Park (3-miles southeast of the Harbor). While no designated critical habitat for the marbled murrelet is present within the Action Area, this species is expected to be present year round within nearshore areas of the Action Area while foraging in nearshore to offshore areas. Due to the baseline anthropogenic activity levels within Crescent City Harbor, the marbled murrelet would not be expected to forage within the Harbor, but is likely to occur within the vicinity of HOODS during forage trips.

Assuming dredging and disposal Option B is chosen, the haul barge will require several round trips to HOODS in order to dispose of material over the 12 week projected project timeline. The in-air decibel level generated by the vessel is estimated between 70-84 dBA and the underwater noise level is estimated at 140 dB sound exposure level (SEL)[2]. Marbled murrelets typically forage at sea in mated pairs. Individuals would likely avoid the area occupied by the vessel to a distance where their vocalization to their mates or other birds are not masked by vessel noise. Continuous noise of sufficient intensity in the frequency region of bird hearing can have a detrimental effect on the detection and discrimination of vocal signals by birds (Caltrans, 2007). Underwater noise generated by the dredge vessels may also affect diving marbled murrelets, however, dredge vessels are not anticipated to generate sound levels that would lead to injury (202 dB SEL). It is more likely that the vessel will produce underwater noise that would lead to behavioral effects, including flushing and avoidance of the immediate vicinity of the dredge vessel. It is expected that marbled murrelets periodically encounter other vessels at sea within their foraging areas and avoidance behaviors from vessels is likely common. Effects to the marbled murrelet would primarily involve avoidance of vessels, flushing of foraging pairs

[2] Sound exposure level (SEL) is a logarithmic measure of the sound exposure of a sound relative to a reference value.

or individuals from feeding grounds, and temporary masking of mated pair vocalizations within the Action Area surrounding the disposal sites and transport route.

5.4.5 Tidewater Goby

The tidewater goby may be present within the brackish waters of the Elk Creek estuary at any time of year. Tidewater goby may occur in these areas as either adults or juveniles. The brackish Elk Creek estuary is documented to support the tidewater goby. Direct effects to the tidewater goby would be limited to water quality impacts from turbidity, sedimentation of shallow water estuarine habitats, and disturbance from underwater noise from vessel and dredge operations. Turbidity associated with dredged material placement at Whaler Island may temporarily displace individuals from the area and/or increase susceptibility to predation. If tidewater goby are present within the vicinity of the Elk Creek estuary during project actions, any individuals present may avoid or be temporarily displaced from the vicinity. Effects to the tidewater goby from turbidity would be of limited duration.

Suspended sediments may settle out from the water column onto the Harbor bottom from turbid water associated with dredging of the navigational channels. Based on prior sediment sampling, contaminant levels that exceed CA State water quality standards are not anticipated to be present within the dredged material above existing background levels. Sediment sampling will be conducted prior to dredging and if contaminants are found, contaminants within the dredged sediment could become resuspended within the water column. Tidewater goby are limited to shallow brackish waters and would not occur in the marine portion of the Action Area.

5.4.6 Western Lily

The largest documented population of the Western lily occurs within the low elevation wetland complex adjacent to Highway 101 in the Crescent City Marsh Wildlife Area (over 1,000+ individuals have been documented). The placement of 93,000 cubic yards of sandy dredged material at Whaler Island could potentially result in beach aggradation (increased height or structure of the beach) at South Beach. Beach aggradation could potentially disrupt or impede outflow of at least two main culverts under Highway 101 that drain the Crescent City Marsh Wildlife Area. A USFWS 5-Year Review Summary and Evaluation report (USFWS 2009b) determined that decreased drainage from these culverts was inhibiting the growth of the lily within Crescent City Marsh. Inspection of the culverts on February 11, 2015 noted that debris had accumulated upstream of the culverts and was inhibiting flow through the culverts (HydroPlan and Anchor QEA 2015). It did not appear that beach sand was inhibiting flow through the culverts at the downstream end of the culverts at the time of survey. Caltrans is the responsible agency for maintaining culverts on state-owned and operated roadways.

The potential for beach aggradation from placement of dredged material at Whaler Island is dependent on several factors, including transport of sediment by tides, wave height, the structure or pitch of the nearshore shoreline, and storm events. Effects to plants would also depend on the time of year beach aggradation occurs, if in fact aggradation results from

placement of material at Whaler Island. If the culverts become blocked in winter when the plants are dormant, the duration of oversaturation may be better tolerated by dormant plants than if the plants become inundated during the warmer growing season.

The South Beach Aggradation Monitoring Plan (***Appendix A***) was prepared as a consequence of consultations with U.S. Fish and Wildlife (USFWS), California Coastal Commission (CCC), and California Division of Fish and Wildlife (CDFW) in February and March of 2019, regarding concerns over USACE placement of dredged material at Whaler Island. This plan outlines a monitoring approach, along five established transects, to determine whether placement of dredged material is impeding culvert flows either immediately during placement of dredged material or over a seasonal period. During the construction period, the contractor will be required to perform regular inspections of the culvert outlets and channels to determine if the accretion of sand is impeding flow.

The California Regional Water Quality Control Board (CRWQB) Monitoring and Reporting Program No. R1-2000-59 (Revised December 30, 2004) for Crescent City Harbor District maintenance dredging (USEPA 2017) requires the USACE to perform a survey of the beach elevations during minus tides (tides less than relative sea level). It is expected that alteration of the beach structure or height may not necessarily occur immediately after construction, but may occur after multiple tidal cycles and/or after storm events. It would be expected that the most measurable changes in beach elevation, if they should occur, would be greater at the northern end of South Beach closest to the Whaler Island placement area, where one of the culverts is located. A beach survey will be conducted prior to placement of dredged material at Whaler Island and during the following summer. Each survey will consist of cross sections of the beach at each culvert. Each cross section shall start at Highway 101 at the culvert outlet and extend along the centerline of the channel across the beach to open water. The first culvert is approximately 120 feet (37 meters) from the centerline of Anchor Way. The second and third culverts are located about 1,800 feet (549 meters) and 4,440 feet (1,353 meters), respectively, along Highway 101 from the first culvert.

Results of both of the beach surveys (prior to placement and post placement) will be provided to the Arcata Office of the USFWS. If comparison of the surveys indicates a significant accretion of sand has occurred at the culverts since the last dredging episode, USACE will coordinate with USFWS to determine additional mitigating measures and re-initiate consultation if appropriate.

6 Conclusions

6.1 Southern Oregon/Northern California Coastal coho Salmon

The project **may affect but is not likely to adversely** affect the SONCC coho salmon based on:

- The project may cause individuals within the dredged or placement areas to avoid the vicinity or be temporarily displaced from the vicinity of the action due to underwater vessel noise and turbidity;
- Dredging of the federal navigation channels may result in a temporary shallow layer of sedimentation on eelgrass beds within Crescent City Harbor where SONCC coho smolts may be rearing.

6.2 North American Green Sturgeon

The project **may affect but is not likely to adversely** affect the North American green sturgeon based on:

- The project may cause individuals within the dredged or placement areas to avoid the vicinity or be temporarily displaced from the vicinity of the action due to underwater vessel noise and turbidity;
- The placement of dredged material at HOODS may interfere with foraging habitat in the area of sediment mounding if the deposited sediment is deep enough to temporarily or permanently cover forage habitat.

6.3 Stellar Sea Lion

The project **may affect but is not likely to adversely affect** the Steller sea lion based on:

- Project activities within the harbor, transport route, and disposal sites may cause the Steller sea lion to avoid the area or become temporarily displaced from the vicinity.

6.4 Marbled Murrelet

The project **may affect but is not likely to adversely affect** the marbled murrelet based on:

- The presence of vessels within the transport route and or at HOODS may cause marbled murrelet individuals to avoid the vicinity of the vessel during foraging;
- Individuals or pairs foraging at sea may become temporarily displaced or flushed from feeding grounds;
- Communication between foraging pairs may become masked due to in-air and/or underwater vessel noise, resulting in disrupted foraging and communication between pairs.

6.5 Tidewater Goby

The project **may affect but is not likely to adversely affect** the tidewater goby based on:

- Turbidity from dredging activities may result in any tidewater goby present within the vicinity of the Elk Creek estuary to avoid the area or become temporarily displaced from the area.

6.6 Western Lily

The project **may affect but is not likely to adversely affect** the Western lily based on:

- Placement of 90,000 CY of sandy dredged material at Whaler Island may cause beach aggradation along South Beach that could potentially result in disruption or

impediment of the flow of one or more of the three culverts that drain the Crescent City Marsh Wildlife Area under Highway 101. While not anticipated, severe or prolonged impairment of drainage could result in over saturation in the area where a Western lily population is located. Depending on duration and timing (growing season vs dormancy) of any blockage resulting from beach aggradation, while unlikely to occur in amounts great enough to raise the beach elevation significantly, could in turn effectively drown plants if the culverts become blocked or the flow is impeded over a sufficient period of time.

- Beach elevation changes will be monitored during dredging and during the summer following placement in order to determine if beach levels have aggraded.
- Mitigating measures, such as excavating erosional pilot channels through beach sand, will be implemented if beach aggradation is found to be impeding flows from the outfall culverts. Therefore, the project is not likely to result in long-term hydrologic changes within the wetlands areas inhabited by the Western lily.

7 Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) includes a mandate that the National Marine Fisheries Service (NMFS) must identify Essential Fish Habitat (EFH) for federally managed marine fish. The Magnuson-Stevens Act also requires federal agencies to consult with NMFS on all activities (or proposed activities) that they authorize, fund, or undertake if the activities may adversely affect EFH. Adverse effects include the direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality or quantity of EFH. The Pacific Fisheries Management Council (PFMC) has designated EFH for Coastal Pelagic Species, Highly Migratory Species, Pacific Salmon, and Pacific Coast Groundfish (PFMC 1998, 1999, 2003, 2005). All of these fisheries have designated EFH that can be found in the Action Area of Crescent City Harbor, the transport route, and at HOODS. Accordingly, this analysis will address EFH for the four groups of EFH documented to occur within the Action Area: West Coast salmon, Pacific Coast groundfish, Pacific coastal pelagic species and Pacific highly migratory species.

The Pacific Salmon Fishery includes in its designation all streams, lakes, ponds, wetlands, and other water bodies currently or historically accessible to salmon in Washington, Oregon, Idaho, and California except above the impassable barriers identified by PFMC. The Pacific Salmon fishery includes Chinook, Coho, and pink salmon in its designation. All three are potentially present in the Action Area (PFMC 1999).

The Pacific Coast Groundfish Fishery includes 80-plus species over a large and ecologically diverse area. The overall extent of groundfish EFH for all managed species is identified as all waters and substrate within the following areas:

- Depths less than or equal to 3,500 m (1,914 fathoms) to mean higher high water level

(MHHW) or the upriver extent of saltwater intrusion, defined as upstream and landward to where ocean derived salts measure less than 0.5 ppt during the period of average annual low flow.
- Seamounts in depths greater than 3,500 m as mapped in the EFH assessment.
- Areas designated as Habitat Areas of Particular Concern (HAPCs) not already identified by the above criteria.

Crescent City Harbor, within the project area, is defined as both an Estuarine and Seagrass HAPC and may provide probable suitable habitat for one or more life stages of 15 groundfish species (PFMC 2008).

In determining EFH for the Coastal Pelagic Species (CPS) Fishery, the estuarine and marine habitat necessary to provide sufficient CPS production to support a maximum sustained yield (MSY) CPS fishery and a healthy ecosystem was considered. The east-west geographic boundary of EFH for each individual CPS finfish and market squid is defined to be all marine and estuarine waters from the shoreline along the coasts of California, Oregon, and Washington offshore to the limits of the exclusive economic zone (EEZ) and above the thermocline where sea surface temperatures range between 10°C to 26°C. The southern boundary of the geographic range of all CPS finfish is consistently south of the US-Mexico border, indicating a consistency in sea surface temperatures at below 26°C, the upper thermal tolerance of CPS finfish. Therefore, the southern extent of EFH for CPS finfish is the United States-Mexico maritime boundary. The northern EFH boundary is the position of the 10°C isotherm which varies both seasonally and annually. The CPS documented to occur within the Action Area are shown below in ***Table 4***.

Highly Migratory Species (HMS) include tunas, billfish, dorado, and sharks—species that range great distances during their lifetime, extending beyond national boundaries into international waters and among the EEZs of many nations in the Pacific. The HMS Fisheries Management Plan (NMFS 2005) describes species proposed for active management in detail. There are five tuna species, five shark species, striped marlin, swordfish, and dorado or dolphinfish. A much longer list of species, constituting all those that have been caught in HMS fisheries and not already under state or federal management, are not part of the management unit. The HMS documented to occur within the Action Area are shown below in ***Table 4***.

Table 3. Species with designated EFH found in the Marine and Estuarine waters of the Action Area

Groundfish Species	Coastal Pelagic Species	Highly Migratory Species	Pacific Salmon
Rex Sole	Jack Mackerel	Bigeye Thresher Shark North Pacific	Chinook Salmon
Yelloweye Rockfish	Pacific (Chub) Mackerel	Bluefin Tuna Pacific	Pink Salmon

Shortraker and Rougheye Rockfish	Pacific Sardine	Dolphinfish (Dorado or Mahi-mahi) Pacific	coho Salmon
Dusky Rockfish	Northern Anchovy Central Subpopulation	Pelagic Thresher Shark North Pacific	
Northern Rockfish	Northern Anchovy Northern Subpopulation	Swordfish North Pacific	
Thornyhead Rockfish	Market Squid		
Pacific Ocean Perch	Krill Thysanoessa Spinifera		
Walleye Pollock	Krill Euphausia Pacifica		
Pacific Cod	Other Krill Species		
Habitat Areas of Particular Concern (HAPC)			
Estuarine HAPC			
Seagrass HAPC			

7.1 Description of Proposed Action

A detailed description of the proposed Crescent City Harbor Federal Navigation Channel Maintenance Project is presented in the body of this BA in ***Section 2***, ***Description of the Action and Action Area***.

7.2 Effects of the Proposed Action

The proposed project has the potential to affect EFH for the fisheries identified in ***Table 4***. A detailed description of potential direct and indirect effects can be found in ***Section 5, Effects of the Action***. The following effects are summarized below and presented as they potentially impact EFH species:

7.2.1 Underwater Noise

Noise generated underwater from the dredge vessel and dredging activities is expected to occur during the entirety of the projected project (approximately 12 weeks). Dredging activities and vessel noise would be expected to be generated above ambient underwater noise levels within the harbor. Similar to the effects to SONCC coho and the North American green sturgeon, the project may cause all EFH species within the dredged or placement area to avoid the vicinity or be temporarily displaced from the vicinity of the action due to increased underwater vessel noise.

7.2.2 Turbidity

Sediment is expected to become suspended within the water column during dredging of the navigation channel and placement at the dredged material placement sites, and may result in turbid water surrounding the dredge equipment. Within Crescent City Harbor, the size, intensity, and duration of the turbidity plume will depend on particle size of the dredged material (larger sand particles will settle faster than smaller silt particles), tides, and ambient turbidity levels at the time of the dredge event. Similar to the dredge site, the size, intensity, and duration of the turbidity plume at the placement sites will depend on the sediment size, tides, ambient turbidity levels at the time of the dredge event, and the quantity of material to be placed at each proposed dredged material placement site. Similar to the effects to SONCC coho and the North American Green Sturgeon, the project may cause all EFH species within the dredged or placement area to avoid the vicinity of the dredged area and/or placement area or be temporarily displaced from the vicinity of the turbidity plume.

7.2.3 Sedimentation

Some sedimentation is likely to occur on the harbor bottom during dredging within close proximity to the navigation channels. No eelgrass is expected to occur within the navigation channels themselves as the channels have been dredged periodically for decades. Sedimentation of the seafloor at HOODS is likely to occur immediately after release of the material. The deposition of sediment is likely to remain primarily within the boundary of the site limits due to EPA requirements to release material within specific quadrants of the placement site boundary. Areas of eelgrass are present within the shallow water areas of the Harbor. These areas could become temporarily covered in a thin layer of sediment for an unknown period of time until tides or currents flush the area. The thin layer of sediment could temporarily disrupt Groundfish EFH species. The placement of dredged material at HOODS may interfere with foraging habitat for Groundfish EFH species in the area of sediment mounding if the placed sediment is deep enough to temporarily or permanently cover forage habitat.

7.2.4 Water Quality and Contaminated Sediments

All MET dissolved metals were reported at concentrations below the water quality objectives of the California Toxics Rule and the USEPA's Section 304(a) criteria for Priority Toxic Pollutants. MET elutriate bioassay results showed that none of the three channel samples exhibited toxicity to the mysid Americamysis bahia or were significantly different from the offshore reference site. Past water quality monitoring conducted by the USACE has not identified any exceedances of RWQCB water quality objectives. It is anticipated that the proposed action would not release contaminants through dredging actions or otherwise increase contaminants into the water column during dredging or disposal activities.

Contaminant levels that exceed CA State water quality standards are not expected within the dredged material above existing background levels. However, if contaminants are present within the dredged sediment, they could become resuspended within the water column.

7.3 Proposed Conservation Measures

A detailed description of the proposed Crescent City Harbor Federal Navigation Channel Maintenance Project BMPs, including avoidance and minimizations measures, is presented in the body of this BA in Description of Proposed Conservation Measures.

7.4 Conclusions by EFH

The proposed project **may adversely affect** EFH for the Pacific Salmon, Pacific Coast Groundfish, Coastal Pelagic Species, and Highly Migratory Species Fisheries. The direct adverse effects of the proposed project to EFH include: underwater noise disturbance; temporary degradation of water quality from turbidity caused by dredging of the navigation channels and placement of material at the proposed depositional sites; and temporary degradation of benthic habitat due to low sedimentation potential in the harbor and moderate to high sedimentation potential at the proposed dredge disposal sites. The majority of effects are temporary in nature, though sedimentation of benthic habitat at HOODS may result in longer term degradation of benthic habitat within the disposal area. The majority of potential effects to EFH are considered negligible. Sedimentation of benthic habitat within the seabed at HOODS may result in a loss of habitat in these areas, however, HOODS is designated as an open ocean disposal site and as such is periodically utilized for dredged material disposal. Benthic habitat within these areas would likely be periodically subject to deep layers of sedimentation which has probably changed the biological diversity and character of the sites. The overall cumulative effects to EFH is considered negligible.

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Appendix A

South Beach Aggradation Monitoring Plan

Crescent City Harbor
2019 Maintenance Dredging

SOUTH BEACH MONITORING PLAN

April 2019

U.S. Army Corps of Engineers
San Francisco District
Engineering and Technical Services Division
Planning Branch
Environmental Section B

Background

The San Francisco District, US Army Corps of Engineers (USACE) regularly dredges the Crescent City Harbor federal channels. During the next planned dredging episode sandy material is planned to be placed near Whaler Island. Questions have been raised regarding the movement of and potential impacts from the placement of sandy material near Whaler Island.

The specific nature of the potential impact is from sandy material blocking the existing culvert drainages from the Crescent City Marsh. The marsh is located on the opposite side of Highway 101 from the South Beach area. Placement of sandy material near Whaler Island is at the northern end of South Beach.

USACE's position is that placement of sand near Whaler Island does not impact the existing culverts draining the marsh. In order to verify this belief, USACE has agreed to monitor beach profiles after placement of sandy material near Whaler Island.

Proposed Beach Aggradation Monitoring

USACE will establish five transects across South Beach that begin at Highway 101 and end at the water's edge. USACE will monitor these locations for changes after dredging operations place material near Whaler Island. One transect will be located at each of the three culverts which drain onto South Beach. The remaining two transects shall be located between the culverts. These transects are shown on the attached figure.

Each transect shall be land surveyed at low tide and the data from each survey event will be evaluated to determine changes in the beach profiles over time. Surveys will be conducted before and after the dredging event. The survey from before the dredging event will serve as a baseline condition. Surveys after the placement of dredge material will be conducted quarterly for one year.

The northern and southern culverts have short channels leading to the beach. Transects will follow the center line of the channels as much as possible until the beach is reached. At that point, these transects will follow a straight line to the water's edge.

In addition to the above effort the culverts shall be inspected daily during the placement of dredge material. This inspection will consist of visual observations and photo documentation. These observations shall be conducted by the on-site contractor quality control (QC), and will be documented in the dredging project daily reports. The observations shall be made from the same location each day and shall include observing the culverts directly as well as the channels leading away from them to the beach.

If the daily observations indicate that there is a significant change in the culvert drainages, the contractor shall inform the USACE technical point of contact and the contract officer representative immediately. USACE shall coordinate with appropriate agencies as necessary and will determine what, if any, corrective actions are necessary.

At the conclusion of the monitoring effort a report shall be prepared to evaluate the observations and monitoring data and present conclusions.

TRANSECTS CONTROL POINTS

Point #	Easting	Northing
N-1	5,967,576	2,526,908
N-2	5,967,367	2,526,130
NC-1	5,968,404	2,526,325
NC-2	5,968,302	2,526,023
C-1	5,969,105	2,526,035
C-2	5,968,991	2,525,779
SC-1	5,970,184	2,525,352
SC-2	5,969,962	2,525,078
S-1	5,971,205	2,524,683
S-2	5,971,179	2,524,626
S-3	5,971,166	2,524,564
S-4	5,971,148	2,524,545
S-5	5,971,085	2,524,547
S-6	5,971,029	2,524,492
S-7	5,970,861	2,524,286

U.S. Fish and Wildlife Service Letter dated

November 2, 2009 (from Randy Brown to Larry Simon)

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Arcata Fish and Wildlife Office
1655 Heindon Road
Arcata, California, 95521
Phone: (707) 822-7201 FAX: (707) 822-8411

In Reply Refer To:
AFWO8-14-2009-3668
TAILS 81331-2010-TA-0004

NOV 0 2 2009

Mr. Larry Simon
Coastal Consistency Division
California Coastal Commission
45 Fremont Street, Suite 2000
San Francisco, California 94105-2219

Subject: Maintenance Dredging of Crescent City Harbor Marina Access Channel, Consistency Determination No. CD-060-09, Corps of Engineers, Del Norte County, California

The Arcata Fish and Wildlife Office (AFWO) would like to comment regarding maintenance dredging of the Crescent City Harbor Marina Access Channel proposed by the Army Corps of Engineers (ACOE). Beginning in January of 2009 the AFWO initiated communications with the San Francisco District of the ACOE regarding the dredging at Crescent City Harbor. We have expressed our concern to the ACOE that past placement of dredge spoils near South Beach, Crescent City, may have contributed to aggradation of the beach in the vicinity of the two culverts that pass under Highway 101. These culverts serve as the primary discharge outlet for Crescent City Marsh. It is our understanding that the California Department of Transportation has encountered problems maintaining free-flow through both culverts, due to the very low flow gradient onto the beach. We also understand that one of the culverts, located at the northern end of South Beach, is currently completely blocked by beach sediments and debris.

Crescent City Marsh supports greater than 70 percent of the entire reproductive population of the federally listed endangered western lily (*Lilium occidentale*). Maintenance of this population of the lily is critical to recovery of the species. Beginning in the late 1990's, our data

indicates the western lily population in the Crescent City Marsh declined by as much as 50 percent, and the lily was completely eliminated from portions of the marsh nearest to the culverts. Those declines appeared to coincide with unusually high water levels in the marsh that extended well into the summer.

We are requesting that prior to discharge of any further dredge material at the Whaler Island or South Beach disposal sites, an assessment be conducted of the potential direct, indirect, and cumulative effects of dredge spoil discharge on the aggradation of South Beach as far south as Enderts Beach Road. This assessment should also include the operation of the two Highway 101 culverts that drain onto this section of beach.

If the discharges are affecting South Beach, consultation under Section 7 of the Endangered Species Act, as amended (16 U.S.C. Section 1531 et seq.), for this project may be warranted. We believe the period during which discharge sediments could migrate onto the beach could extend well beyond the actual dredging period. Therefore, any beach monitoring designed to elucidate the effects of dredge disposal on beach aggradation should occur both during, and after, the dredging period.

If you have any questions regarding our interest in this project, please contact staff ecologist David Imper at (707) 882-7201.

Sincerely,

Randy A. Brown
Acting Field Supervisor

cc:
ACOE, San Francisco, CA (Attn: Mr. Laurie H. Suda, Chief Environmental Section B)
CDFG, Eureka (Attn: Mr. Michael Van Hattem/ Ms. Vicki Frey)
CCC, Eureka (Attn: Mr. Jim Baskin)

U.S. Fish and Wildlife Service Letter dated

December 21, 2010 (from Nancy Finley to Peter LaCivita)

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Arcata Fish and Wildlife Office
1655 Heindon Road
Arcata, California 95521
Phone: (707) 822-7201 FAX: (707) 822-8411

In Reply Refer To:
AFWO-11B0017-11TA0028

DEC 2 1 2010

Mr. Peter LaCivita, CESPN-ET-PB
Department of the Army
Corps of Engineers, San Francisco District
1455 Market Street, 15th Floor
San Francisco, California 94103

Subject: Maintenance Dredging of Crescent City Harbor, Del Norte County, California; Environmental Assessment dated November 12, 2010

Dear Mr. LaCivita:

We are submitting these comments in response to the environmental assessment (EA) for the FY2010-2011 maintenance dredging of Federal channels at Crescent City Harbor, dated November 12, 2010. Although it was unclear, the project description appeared to leave open the possibility for discharge of dredge tailings at the Whaler Island disposal site. We have commented in the past concerning the potential indirect impacts of disposal at Whaler Island on the federally endangered western lily (*Lilium occidentale*), of which the largest population range-wide occurs within Crescent City Marsh (marsh). There is growing evidence that sediments discharged at Whaler Island may be related to a rise in the beach profile on Crescent Beach, immediately adjacent to the discharge site, which has interfered with the ability to drain the marsh through two culverts located under U.S. Highway 101. We most recently submitted comments to your office, by letter in January 2010 (attached), in response to your assessment of the culvert drainage problems conducted on November 12, 2009.

The EA for this phase of dredging is incomplete with respect to the potential for significant impacts on the western lily. The action area should be defined to include the marsh, since there is evidence that both direct beach nourishment, and indirect beach nourishment as a result of any discharge of spoils at the groin at Whaler Island, both of which were discussed in the November 2010 EA, may impede the ability to drain the marsh.

TAKE PRIDE IN AMERICA

The assessment of impacts on the western lily should take into account the evidence showing a close relationship between the depth of water in the marsh, the efficiency of drainage at Highway 101, and mortality of the western lily.

For future consideration, we would be interested to accompany Army Corps of Engineers (Corps) staff in conducting a site review of the area in question, or discuss at length our issues concerning the drainage problem. We fully support any future investigation of disposal impacts, as requested by the Coastal Commission in their letter dated November 6, 2009, and are ready to assist in any way. As a reminder, under the Endangered Species Act, and its implementing regulations, the Corps should consult on the potential for impacts on the western lily resulting from any future placement of dredge disposal waste at Whaler Island.

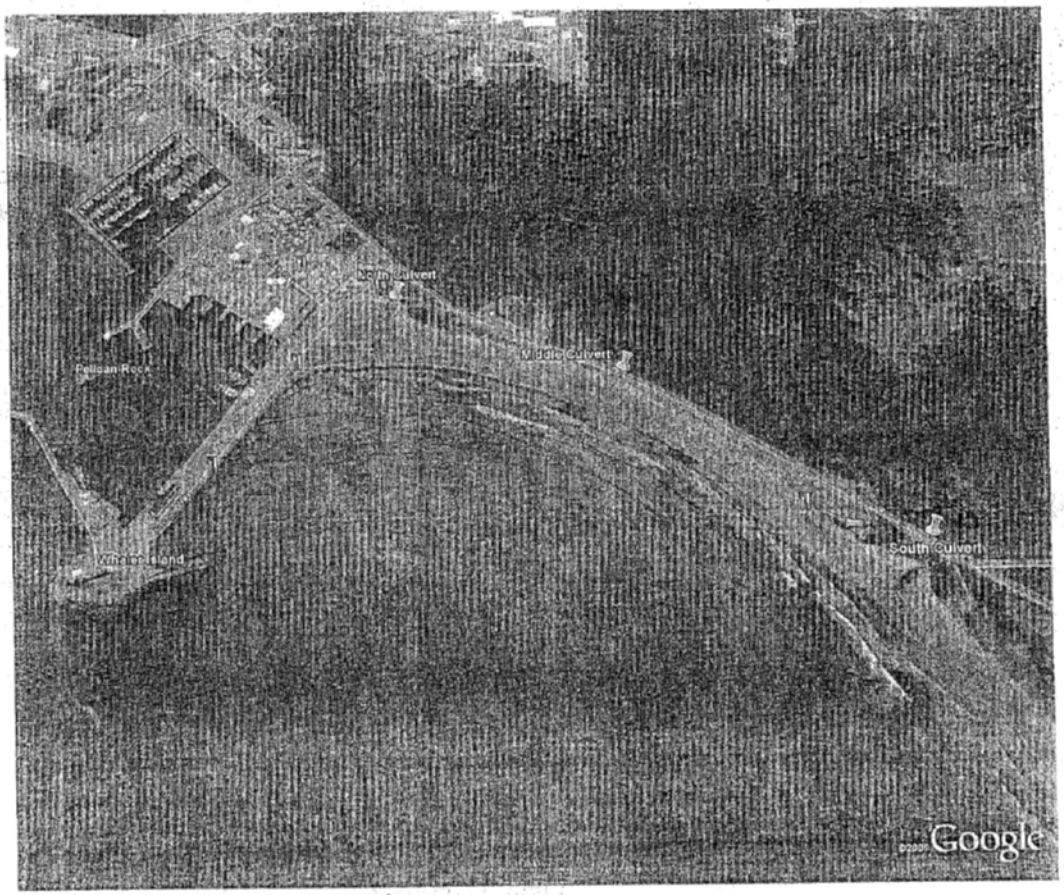
If you have any questions regarding our comments, please contact staff ecologist David Imper at (707) 822-7201.

Sincerely,

Nancy J. Finley
Field Supervisor

Attachment

cc:
California Department of Fish and Game, Eureka, California (Attn: Michael Van Hattem and Vicki Frey).
California Coastal Commission, Eureka (Attn: Jim Baskin).
California Coastal Commission, San Francisco (Attn: Larry Simon).
California Department of Transportation, Eureka (Attn: Sebastian Cohen).



It does not appear that sand is clogging the outlets. If the Whaler Island Site serves in part as an erosion control project, then the littoral zone is most likely dispersive and the sand does not stay there. Also, there are no sand dunes. Sand that is surplus to what the littoral drift would move north or south would accrete to the beach and form dunes. Engineering considerations aside, driftwood transported by storm surge appears to be the primary cause of culvert blockage. A final consideration is that there has been no disposal at Whaler Island since 1999. Dredged material from the harbor deepening in 2001 was placed at the Harbor District's upland site. Therefore, it is highly likely the navigation projects are not the problem.

I recommend coordination with the Harbor District, Coastal Commission, and the State to be assured that the disposal of Federal channel dredged material is consistent with Whaler Island Groin Project purposes.

Peter E. LaCivita
Regional Fishery Biologist
USAED San Francisco

U.S. Fish and Wildlife Service Letter dated

December 21, 2010 (from Randy Brown to Laurie Suda)

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Arcata Fish and Wildlife Office
1655 Heindon Road
Arcata, California, 95521
Phone: (707) 822-7201 FAX: (707) 822-8411

In Reply Refer To:
AFWO8-14-2009-3668
TAILS 81331-2010-TA-0004

DEC 21 2010

Mr. Laurie Suda, Chief Environmental Section B
Army Corps of Engineers, San Francisco District
1455 Market Street
San Francisco, California 94103-1398

Subject: Maintenance Dredging of Crescent City Harbor Marina Access Channel, Del Norte County, California

Dear Mr. Suda:

Thank you for your email transmittal of the review conducted by Peter LaCivita, concerning potential impacts of dredge disposal on Highway 101 drainage south of Crescent City, dated November 12, 2009. For future consideration, we would be interested to accompany Army Corps of Engineers staff in conducting a site review of the area in question, or discuss at length our issues concerning the drainage problem. I'd also like to clarify several points made in Mr. LaCivita's report. To help illustrate the drainage situation there, I have attached several Powerpoint slides presented by my staff ecologist, Dave Imper, at a recent Caltrans Technical Forum in Eureka. I also attached a copy of Mr. LaCivita's report.

We are not concerned with the northernmost culvert, located at 101MP25.26 (slide 1). That culvert has never been observed to be blocked, and drains an area of the Crescent City Marsh (Marsh) that appears to be hydraulically isolated from the southern portion of the Marsh where the flooding and federally endangered western lily (*Lilium occidentale*) occur. The flowline of this drain, both at the box culvert and at a concrete sill just above the beach, are several feet lower than the flowlines at the southern two culverts. The upper beach elevation also appears to be several feet lower here than at the southern two culverts.

TAKE PRIDE IN AMERICA

Regarding Mr. LaCivita's statement that the outlet of the culvert at 101MP24.92 ("middle culvert") is clear, Caltrans has advised us that they removed as much of the woody debris and sand from the outlet as they could last spring. Based on an inspection by Mr. Imper during the week of November 24, 2009, the primary effect of that clearing seems to have been to allow storm surges this winter to wash debris back under the highway into the inlet ditch. The elevation of the upper beach immediately surrounding the culvert outlet, as indicated in Mr. LaCivita's picture, remains close to the top of the culvert. The culvert provides no effective drainage of the Marsh, and we expect the outlet will completely block again soon. Slide 2 shows a series of oblique photos in the vicinity of the "middle" culvert, taken in 1972, 2002 and 2006. The historical photographs indicate the upper beach has accreted dramatically in the past several years. In addition, Mr. Imper personally recalls that in 1987, a rather tall bluff separated the road from the upper beach in that area.

The southern culvert at 101MP24.42 (slides 3 and 4) is the only culvert draining the majority of the approximately 1,500 acre watershed, and is only partially functioning. Based on the elevation profile measured two years ago, the flowline of the channel near the beach was nearly 3 feet above the lower culvert elevation at the outlet. The upper beach appears significantly accreted in the vicinity of the outlet channel.

As stated by Mr. LaCivita, disposal of dredge tailings at Whaler Island last occurred in 1999, at about the same time that flooding of the marsh in mid-summer became obvious. We do not know if there were dune accumulations at that time that might have signaled a surplus of material moving up onto the beach. However, there is the clear potential that the dredge disposal materials have influenced the beach profile, and therefore, the ability of the Marsh to drain.

Thank you for your interest in this project. We fully support any future investigation of disposal impacts, as requested by the Coastal Commission in their letter dated November 6, 2009, and are ready to assist in any way. Please be aware, under the Endangered Species Act, and its implementing regulations, the Corps should consult on the potential for impacts on the western lily resulting from any future placement of dredge disposal waste at Whaler Island.

If you have any questions regarding our interest in this project, please contact staff ecologist David Imper at (707) 822-7201.

Sincerely,

Randy Brown
Acting Field Supervisor

cc:
California Department of Fish and Game, Eureka, California (Attn: Michael Van Hattem and Vicki Frey).
California Coastal Commission, Eureka, California (Attn: Jim Baskin).
California Coastal Commission, San Francisco, California (Attn: Larry Simon).

Appendix B

Terrestrial Noise Analysis Calculations

Equation Used to Calculate Noise Level at Different Distance

$N_2 = N_1 + 20\log(D_1/D_2)$, where:

D_1 = original distance

N_1 = noise level at original distance

D_2 = new distance

N_2 = noise level at new distance

Table 1. Calculated Noise Level at New Distance

Source	Receptor at D2	D_1	N_1	D_2	N_2
Cutterhead Dredge noise	Harbor Office	50	90	200	78
	Chart Room Restaurant	50	90	1000	64
	U.S. Coast Guard Station	50	90	350	73
	Bayside RV Park	50	90	640	68

Equation Used to Calculate Combined Noise Level of Construction Equipment and Existing Ambient Noise at Sensitive Receptors

Ns = 10 log10 (10^[Na/10]+ 10^[N3/10], where:

N3 = noise level of existing ambient noise at the receptor

Na = attenuated noise level of construction equipment at sensitive receptor

Site	Noise Source/Receptor Analyzed	N_3 (average ambient noise estimate)	N_a (attenuated noise at sensitive receptor)	Combined Noise N_s	Difference btw ambient and new combined
	Harbor Office	78	78	81	3.0
	Chart Room Restaurant	64	64	67	3.0
	U.S. Coast Guard Station	74	74	77	3.0
	Bayside RV Parl	68	68	71	3.0

Noise Analysis Calculations

Equation Used to Calculate Combined Noise Level of Construction Equipment

$N_e = 10 \log_{10} (10^{[N_1/10]} + 10^{[N_2/10]})$, where:

N_e = combined noise level of construction equipment at 50 feet = 102 dBA

N_1 = noise level of vibratory pile driver at 50 feet = 96 dBA

N_2 = noise level of impact pile driver at 50 feet = 101 dBA

Equation Used to Calculate Attenuated Noise Level of Construction Equipment

$N_a = N_e - 6(Di/Do)$, where:

N_a = attenuated noise level of construction equipment

Di = distance of noise source to receptor

Do = reference distance = 50 feet

Equation Used to Calculate Combined Noise Level of Construction Equipment and

$N_s = 10 \log_{10} (10^{[Na/10]} + 10^{[N_3/10]}$, where:

N_3 = noise level of existing ambient noise at the receptor

Appendix C

California Regional Water Quality Control Board North Coast Region

Monitoring and Reporting Program No. R1-2000-59

for

Crescent City Harbor District Maintenance Dredging

California Regional Water Quality Control Board
North Coast Region

Monitoring and Reporting Program No. R1-2000-59
(Revised December 30, 2004)

for

Crescent City Harbor District
Maintenance Dredging

Del Norte County

The purpose of this monitoring program is to demonstrate that the requirements of Order No. R1-2000-59 are being met. The program calls for routine monitoring at regular intervals during and following dredging operations.

Dredging Records

Dredging activity shall be reported daily as "none" if the dredge is inactive, or "pond" if the dredge is placing spoil in the pond, or "beach" if the dredge is placing spoil at the Whaler Island disposal site.

Effluent Monitoring

Effluent grab samples shall be collected daily when the dredge spoil pond overflows. Samples shall be analyzed for turbidity (as NTU) and settleable solids (as mL/L). "Dry" shall be reported in place of sample results for each day of dredging not producing dredge spoil pond overflow.

Annually, on the first day of dredge spoil pond overflow or dredge discharge to the Whaler Island disposal site during a calendar year, a chronic toxicity bioassay shall be conducted using a sample of the discharge. During the first year, test organisms shall include topsmelt *Atherinops affinis*, red abalone *Haliotis rufescens*, and giant kelp *Macrocystis pyrifera*. The sensitivity of these three test organisms shall be determined during the first year of testing, and subsequent chronic toxicity bioassays shall use only the critical life stage of the most sensitive of the three organisms.

Receiving Water Monitoring

Receiving water samples shall be collected daily, within one hour of high tide, when the dredge spoil pond overflows or the dredge is placing spoil at the Whaler Island disposal site. These samples shall be analyzed for turbidity. One sample shall be taken near the ice house at the end of Citizens Dock Road, and the other shall be taken within 200 feet of the point of entrance of the discharge into the Ocean.

Annual Survey

An annual biological survey of the Whaler Island disposal site shall be conducted during the summer following use of the site for dredge disposal. Observation sites shall be established – one on the seaward side the groin extending southeasterly from Whaler Island, and the other on the opposite side of the groin. For each observation site the marine biologist conducting the survey shall quantify and report the density of colonization for each marine species observed.

A physical survey by a licensed land surveyor shall be made of the beach elevations within the groin during minus tides at approximately the same time as the biological survey. A map of the survey results shall be submitted with the monitoring report for the month of the survey.

Monitoring and Records

Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

The discharger shall calibrate and perform maintenance procedures in accordance with manufacturer's specifications on all monitoring instruments and equipment to ensure accurate measurements.

Records of monitoring information shall include:

1. The date, exact place, and time of sampling or measurements;
2. the individuals who performed the sampling or measurements;
3. the date(s) analyses were performed;
4. the individual(s) who performed the analyses;
5. the analytical techniques or methods used;
6. the results of such analyses;
7. the method detection limit; and
8. the practical quantitation level (PQL) or the limit of quantitation (LOQ).

Unless otherwise noted, all sampling and sample preservation shall be in accordance with the current edition of "Standard Methods for the Examination of Water and Wastewater" (American Public Health Association.)

All permit applications, reports, or information submitted to the Regional Water Board shall be signed by either a principal executive officer or ranking elected official of Crescent City Harbor District.

Any person signing a document under this monitoring and reporting program shall make the following certification:

"I certify under penalty of perjury that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

Reporting

Monitoring reports shall be submitted to the Regional Water Board for each month on or before the last day of the following month. Reports shall be submitted on a form similar to the attached example.

Ordered by: _____

Catherine E. Kuhlman
Executive Officer

December 30, 2004

ALW:js/123004_DredgingM&R

Appendix E

Crescent City Harbor Federal Navigation Channel- 2024 Maintenance Dredging Sampling and Analysis Report, June 2024.

CRESCENT CITY HARBOR FEDERAL NAVIGATION CHANNEL – 2024 MAINTENANCE DREDGING SAMPLING AND ANALYSIS REPORT

June 2024

Prepared for	Prepared by	Prepared by
U.S. Army Corps of Engineers 450 Golden Gate Ave, 4th Floor San Francisco, CA 94103-1398	**Pacific EcoRisk** 2250 Cordelia Road Fairfield, CA 94534	**DR Reed and Associates Inc.** 4207 SE Woodstock Blvd #484 Portland, Oregon 97206

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List of Acronyms

ASTM	American Society for Testing and Materials
Crescent City Harbor	Crescent City Harbor Federal Navigation Channel
COC	Chain-of-custody
DDT	dichlorodiphenyltrichloroethane
ER-L	Effect range-low
Eurofins	Eurofins Calscience
ft	foot
GPS	Global positioning system
HDPE	high-density polyethylene
HOODS	Humboldt Open Ocean Disposal Site
KEI	Kinnetic Environmental, Inc.
LC	lethal concentration (e.g., LC_{50})
MDL	method detection limit
MET	Modified Elutriate Test
mg/kg	milligram/kilogram
MLLW	Mean lower low water
MRL	method reporting limits
MS	Matrix Spike
MSD	Matrix Spike Duplicate
mWET	modified waste extraction test
ng/kg	nanogram per kilogram
O&M	Operations and Maintenance
OCI	organochlorine
OTM	Ocean Testing Manual
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PER	Pacific EcoRisk
QA/QC	quality assurance/quality control
RPD	Relative Percent Difference
SAP	Sampling and Analysis Plan
SEF	Sediment Evaluation Framework
SET	sediment elutriate test

List of Acronyms (continued)

SOP	Standard Operating Procedures
SPP	Suspended particulate phase
SUAD	Suitable for unconfined aquatic disposal
TEF	Toxicity equivalency factors
TEQ	Toxicity equivalency quotients
USACE	U.S. Army Corps of Engineers
USEPA	United Stated Environmental Protection Agency
WAAS	Wide Angle Augmentation System
WHO	World Health Organization
yd^3	Cubic yards

1. INTRODUCTION

The United States Army Corps of Engineers (USACE) San Francisco District is planning to dredge the Crescent City Harbor Federal Channel (Crescent City Harbor) as part of its O&M Dredging Program (Figures 1-1 through 1-3). In order to provide the physical and chemical characterization needed to obtain regulatory approval for this dredging, the USACE has contracted DR Reed and Associates Inc. (DR Reed) and Pacific EcoRisk (PER) to perform sediment characterization of Crescent City Harbor sediments as per regional and federal guidance. DR Reed and PER conducted sampling and analyses of these sediments in accordance with the *Crescent City Harbor Federal Navigation Channel 2024 Maintenance Dredging Sampling & Analysis Plan, Tier III Evaluation* (SAP [USACE 2023]),), *Master Sampling and Analysis Plan USACE SF-District O&M Dredging* (USACE 2021), Ocean Testing Manual (OTM [USEPA/USACE 1991]), Inland Testing Manual (ITM [USEPA/USACE 1998]).

This sampling and analyses covered agency requirements for placement of dredged material at Whaler Island or unconfined aquatic disposal at the Humboldt Open Ocean Disposal Site (HOODS).

1.1 Project Description

Crescent City Harbor is located on the Northern California coast, approximately 280 nautical miles north of San Francisco and about 17 miles south of the Oregon border (Figures 1-1 and 1-2). The harbor is located on the south edge of a broad marine terrace bordered on the south and west by the Pacific Ocean and on the north and east by densely forested coastal mountains. Crescent City Harbor is a shallow-draft critical harbor of refuge, supporting a Coast Guard search and rescue station, commercial and sport fishing, waterfront industry and recreational boating.

There are currently three federally constructed and maintained navigation channels at Crescent City Harbor (Figure 1-3). The Inner Harbor Basin Channel extends for 2,200 feet along the inside and around the tip of the inner breakwater, where it connects to the Entrance Channel, a 200-foot-wide channel that extends 2,200 feet to the outer breakwater, and lastly the Marina Access Channel is 140-210 feet wide and extends 1,200 feet from the Inner Harbor Basin Channel to the small boat basin.

The Entrance Channel has a project depth of -20.0 feet mean lower low water (MLLW) + 2.0 ft allowable over-depth while the interior channels, Inner Harbor Basin Channel and Marina Access Channel, have a project depth of -15.0 ft MLLW+ 2.0 ft allowable over-depth. The Entrance Channel was accordingly sampled and tested to a total depth of -22.0 ft MLLW and the Inner Harbor Basin and Marina Access Channels were sampled and tested to a total depth of -17.0 ft MLLW. In addition, “Z-layer” samples consisting of the top 6 inches of the post-dredged mudline project depth were collected at -22.5 ft MLLW for the Entrance Channel and to -17.5 ft MLLW for the Inner Harbor Basin and Marina Access Channels.

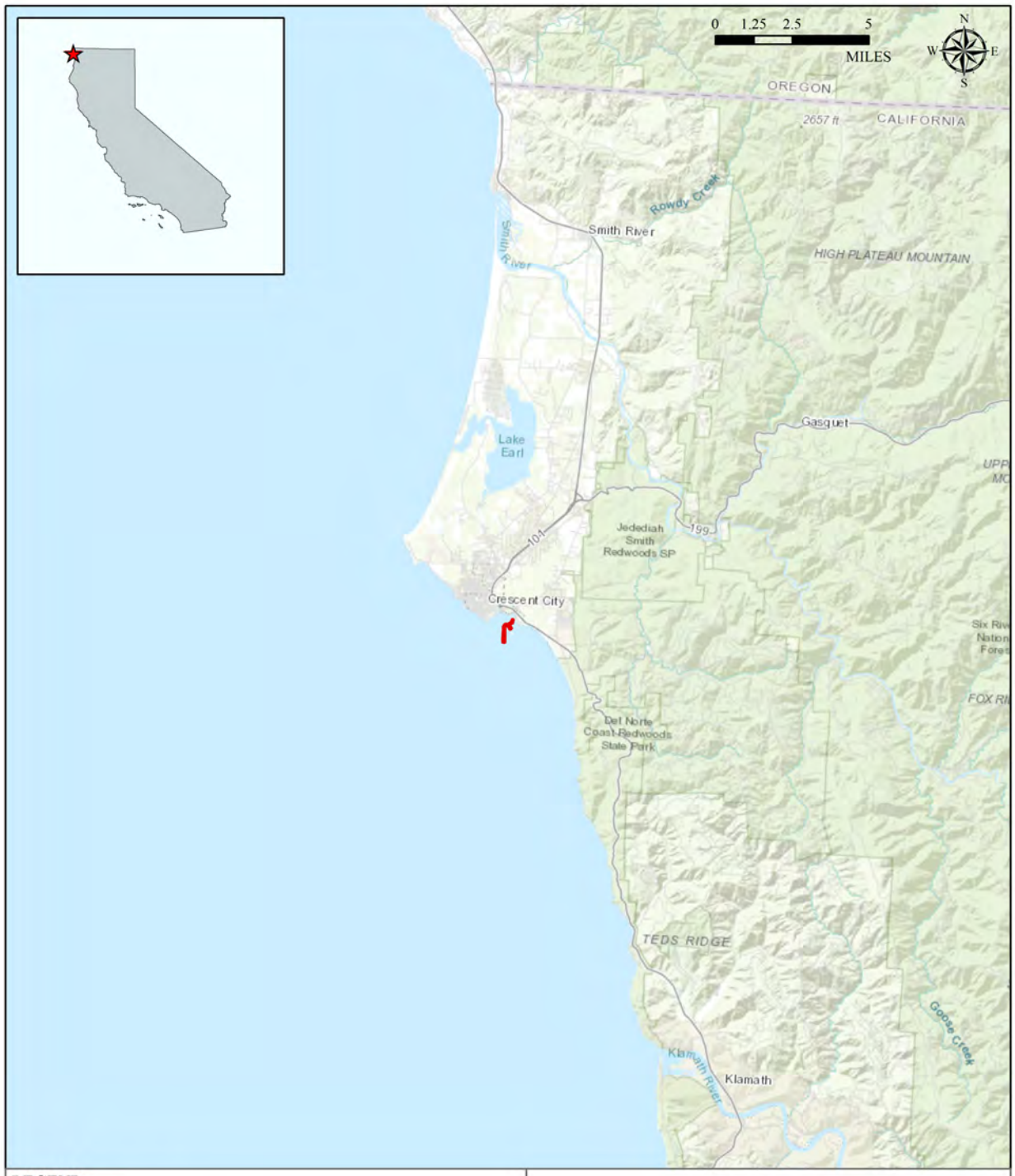


FIGURE 1-1.
LOCATION MAP:
CRESCENT CITY HARBOR

PACIFIC ECORISK ENVIRONMENTAL CONSULTING & TESTING

FIGURE 1-2.

VICINITY MAP:
CRESCENT CITY HARBOR

PACIFIC ECORISK ENVIRONMENTAL CONSULTING & TESTING

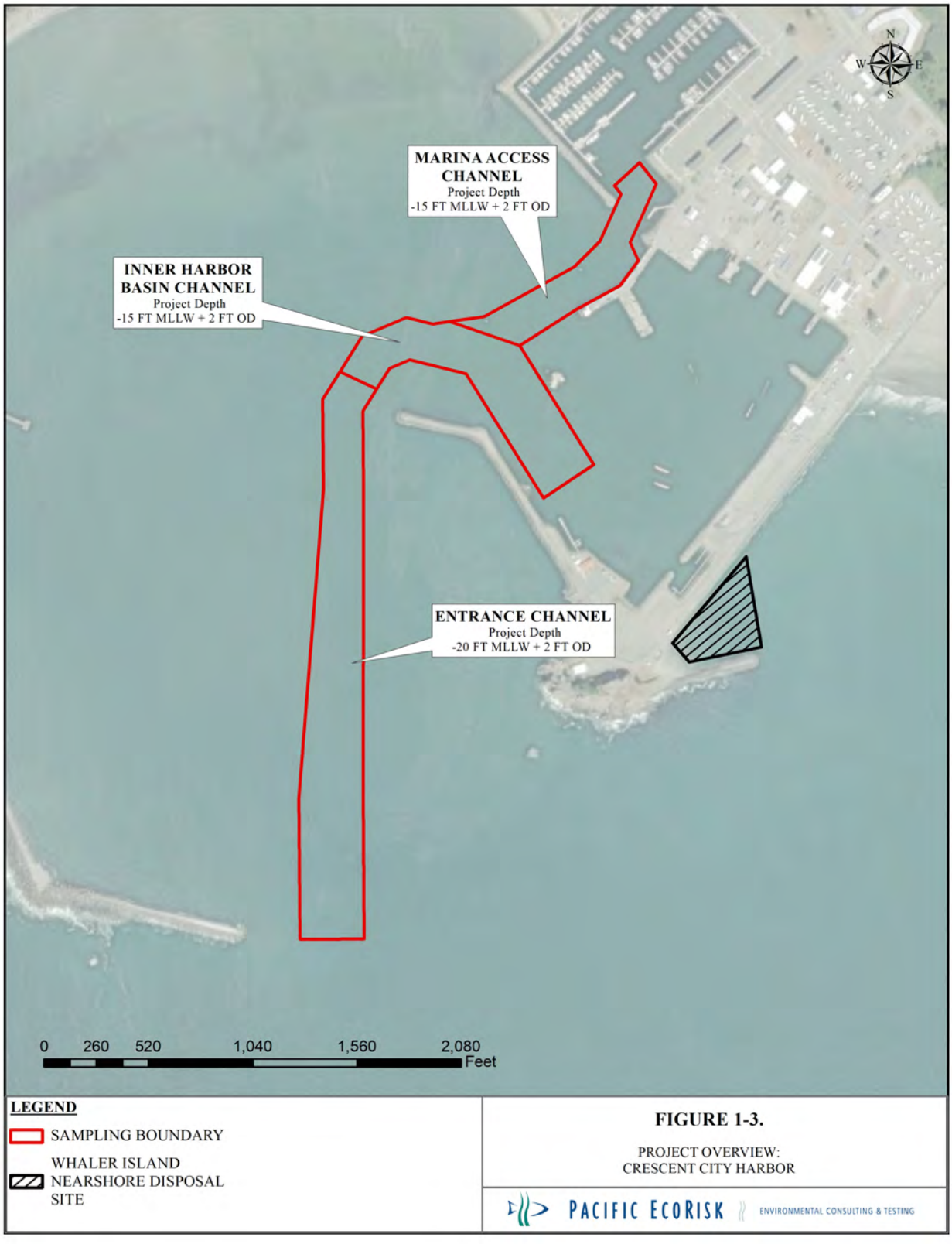


FIGURE 1-3.

PROJECT OVERVIEW:
CRESCENT CITY HARBOR

The current volume estimates based on the condition survey completed in January of 2024 are shown below in Table 1-1. The survey indicates that removing shoaled material to project depth would result in dredging 39,581 yd^3. In order to achieve project depth there is an allowable over-depth of two feet. The first foot of over-depth contains 37,526 yd^3. The second foot of over-depth also contains 37,526 yd^3 of material. This over-depth brings the total current dredge volume to 114,632 yd^3.

Table 1-1. Proposed Maintenance Dredging for Crescent City Harbor.

Sampling Area	Volume (yd^3) of Shoaled Material			Total Estimated Volume (yd^3)	Depth (ft MLLW)	Allowable Over-depth (ft)
	Project Depth	1st ft Overdepth	2nd ft Overdepth			
Entrance Channel	19,957	19,719	19,719	59,396	20	2
Inner Harbor Channel	4,685	11,112	11,112	26,909	15	2
Marina Access Channel	14,939	6,695	6,695	28,328	15	2
Total Volume =	**39,581**	**37,526**	**37,526**	**114,632**		

MLLW - Mean Lower Low Water yd^3- Cubic Yards ft - feet

1.2 Objectives of the Sediment Investigation

The objective of the current sampling and testing is to evaluate the proposed dredged material to determine whether any potential adverse impacts may occur during removal operations and/or placement at the permitted disposal site. The procedures for sediment sample collection, sample processing and preparation, physical and chemical analyses, and data analyses were presented in a previously approved SAP (USACE 2023) and approved Master SAP *"Master Sampling and Analysis Plan USACE SF-District O&M Dredging* (USACE 2021). The specific objectives of the SAP scope-of-work are as follows:

- Collect core samples from within the designated sampling areas following field protocol detailed in the SAP; and
- Conduct physical (e.g., grain size), limited chemical (ammonia, sulfides, and metals), and limited biological (MET toxicity testing) analyses on the "sandy" Entrance Channel; and physical, chemical, and biological analyses of the Inner Harbor Channel and Marina Access Channel sediments to determine suitability of the material for placement at Whaler Island or suitability for unconfined aquatic disposal (SUAD) at HOODS.

1.3 Organization of this Document

Sample collection and handling procedures are discussed in Sections 2 and 3 of this report. Results of physical and chemical analyses and biological toxicity testing are provided in Sections 4-6. Section 7 discusses quality control (QC) and Section 8 presents the conclusions regarding suitability of the material for placement at Whaler Island and/or HOODS.

2. FIELD SEDIMENT SAMPLE COLLECTION

2.1 Collection of Crescent City Harbor Federal Navigation Channel Sediment Cores

All sediments were collected in accordance with guidelines and procedures outlined in the SAP (USACE 2023). All field sampling activities were performed on March 19 and 20, 2024, under the direction of Mr. Jeffrey Cotsifas (of PER). Kinnetic Environmental, Inc. (KEI) provided the sampling vessel, on-board positioning system, and sampling equipment. PER provided a Field Scientist to assist in sediment core collection and collection of site water. Sediment cores were collected from 14 designated sites (Figures 2-1 through 2-3); Table 2-1 lists site identifiers, GPS coordinates, mudline elevations, and core penetration depths for all sites. Final site positions were determined with a global positioning system (GPS) that uses U.S. Government Wide Angle Augmentation System (WAAS) differential correction data to identify each sampling location.

Sediment was also collected from HOODS for use as a reference sediment in the bioassay testing.

2.1.1 Field Equipment Decontamination Procedure

The deck of the vessel was rinsed clean with site water between stations. All sampling equipment coming in contact with collected sediments was decontaminated between stations using the following procedures:

1. Rinse with site water and wash with scrub brush until free of sediment;
2. Wash with phosphate-free biodegradable soap solution; and
3. Rinse with site water taken from 3 ft. below the surface.

Any sampling equipment that could not be properly cleaned was not used for subsequent sampling activities.

2.1.2 On-Board Sample Processing and Labeling

All sediment cores were collected to the project depth plus over-depth, or until refusal was met, using an appropriate coring device. For each core, an additional 0.5 ft core section was collected from immediately below the 'project depth plus over-depth' and was designated the 'Z-layer'. The individual sediment cores were extruded on board the sampling vessel and the 'Z-layer' section of sediment was removed from each core and stored in a separate container; all core sections were placed into food-grade polyethylene bags. While aboard the vessel, samples were temporarily stored on ice (or frozen "blue ice") within insulated coolers until transport to the laboratory in Fairfield, CA, by PER staff.

2.2 Deviations from the Sampling and Analysis Plan

There were no unusual circumstances encountered during the fieldwork, and no major deviations from the SAP (USACE 2023). The proposed and actual station locations are presented in Figures 2-1 through 2-3. The Core Collection Forms are presented in Appendix A.

Table 2-1. Crescent City Harbor Sampling Station Locations and Core Depths Achieved.

SAMPLE ID	Sample Date	Latitude (decimal-deg)[A]	Longitude (decimal-deg)[A]	Mudline Elevation (ft MLLW)[B]	Core Penetration Depth Including	Total Core Depth (ft MLLW)
Entrance Channel						
CCH-2024-1-1	3/19/24	41.73762º	-124.18951º	-18.8	3.7	-22.5
CCH-2024-1-2	3/19/24	41.73976º	-124.18969º	-19.7	2.8	-22.5
CCH-2024-1-3	3/19/24	41.74143º	-124.18905º	-19.0	3.5	-22.5
CCH-2024-1-4	3/19/24	41.74226º	-124.18925º	-17.5	5.0	-22.5
CCH-2024-1-5	3/19/24	41.73967º	-124.18893º	-19.9	2.6	-22.5
CCH-2024-1-6	3/19/24	41.74089º	-124.18958º	-19.8	2.7	-22.5
Inner Harbor Channel						
CCH-2024-2-1	3/19/24	41.74428º	-124.18760º	-14.3	3.2	-17.5
CCH-2024-2-2	3/19/24	41.74389º	-124.18690º	-12.1	5.4	-17.5
CCH-2024-2-3	3/19/24	41.74334º	-124.18628º	-14.5	3.0	-17.5
CCH-2024-2-4	3/19/24	41.74309º	-124.18520º	-14.6	2.9	-17.5
Marina Access Channel						
CCH-2024-3-1	3/19/24	41.74485º	-124.18605º	-13.6	3.9	-17.5
CCH-2024-3-2	3/20/24	41.74543º	-124.18561º	-12.7	4.8	-17.5
CCH-2024-3-3	3/20/24	41.74582º	-124.18469º	-13.5	3.8	-17.3[C]
CCH-2024-3-4	3/19/24	41.74664º	-124.18430º	-14.1	3.2	-17.3[C]

NOTES:
A - State Plane Coordinate System, California Zone 3, NAD 83.
B - Mudline elevations were determined using a lead-line.
C – 0.3 ft Z-Layer collected due to refusal.

LEGEND

- PROPOSED SAMPLING POINTS
- ACTUAL SAMPLE LOCATIONS
- SAMPLING BOUNDARY
- WHALER ISLAND NEARSHORE DISPOSAL SITE

Entrance Channel (Project Depth at -20' MLLW + 2' OD)

Elevation
-18' and above
-18' to -19'
-19' to -20'
-20' to -21'
-21' to -22'
-22' to -23'
-23' and below

Inner Harbor Basin Channel (Project Depth at -15' MLLW + 2' OD)

Elevation
-13' and above
-13' to -14'
-14' to -15'
-15' to -16'
-16' to -17'
-17' to -18'
-18' and below

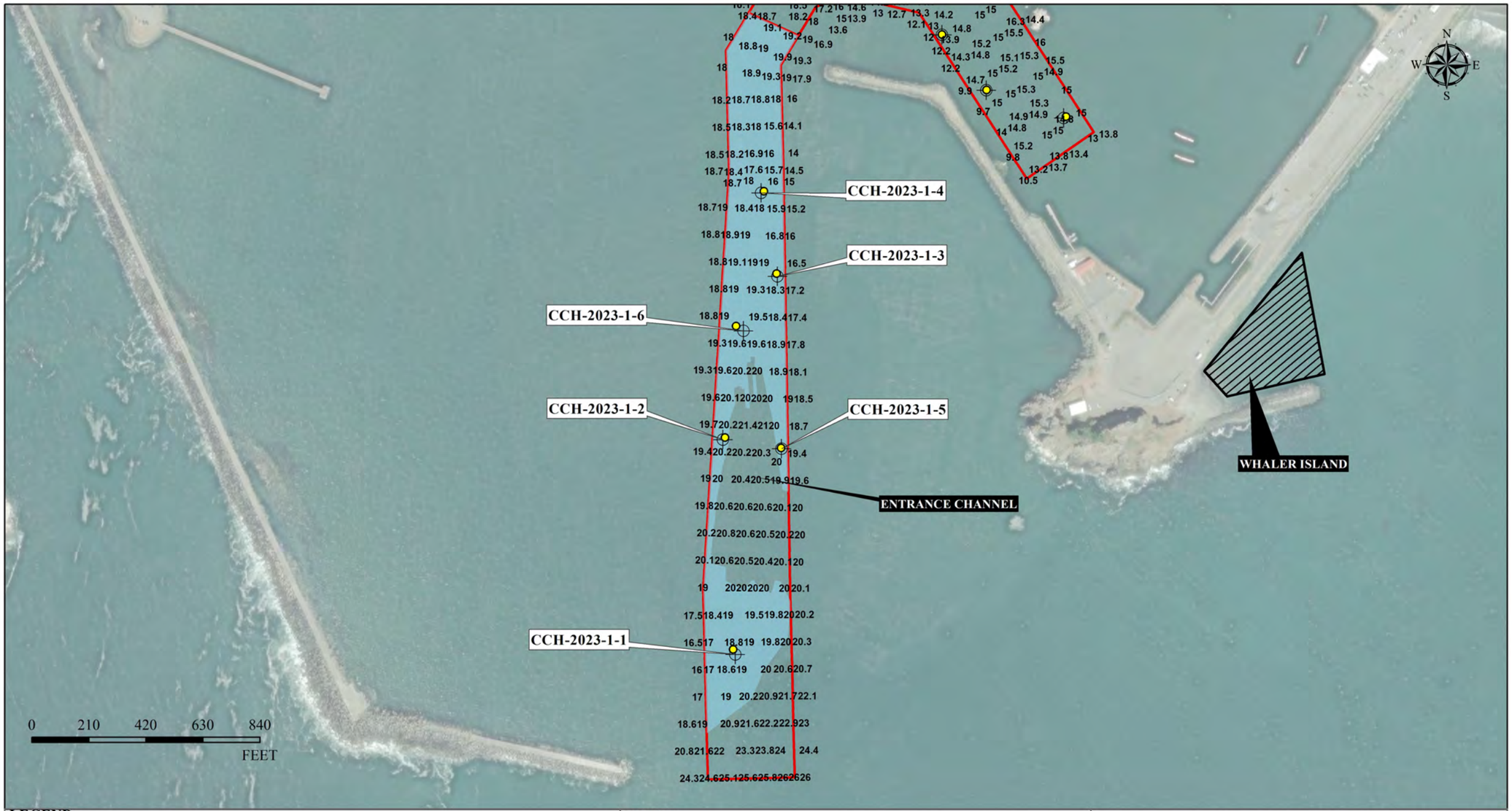
NOTES

1. SURVEY DATA COLLECTED ON JANUARY 29TH, 2023
2. HORIZONTAL DATUM/PROJECTION: NAD83 (2011), SPCS CALIFORNIA ZONE 01 - U.S. SURVEY FEET
3. VERTICAL DATUM: MLLW, U.S. SURVEY FEET.
4. THIS SURVEY REPRESENTS GENERAL CONDITIONS AT THE TIME OF THE SURVEY
5. MAP PREPARED BY PACIFIC ECORISK ON 4/30/2024

FIGURE 2-1

CRESCENT CITY HARBOR
PROPOSED AND ACTUAL SAMPLE LOCATIONS

PACIFIC ECORISK ENVIRONMENTAL CONSULTING & TESTING



LEGEND

- PROPOSED SAMPLING POINTS
- ACTUAL SAMPLE LOCATIONS
- ENTRANCE CHANNEL DREDGE FOOTPRINT — *Project Depth -20 FT MLLW + 2 FT OD*
- SAMPLING BOUNDARY
- WHALER ISLAND NEARSHORE DISPOSAL SITE

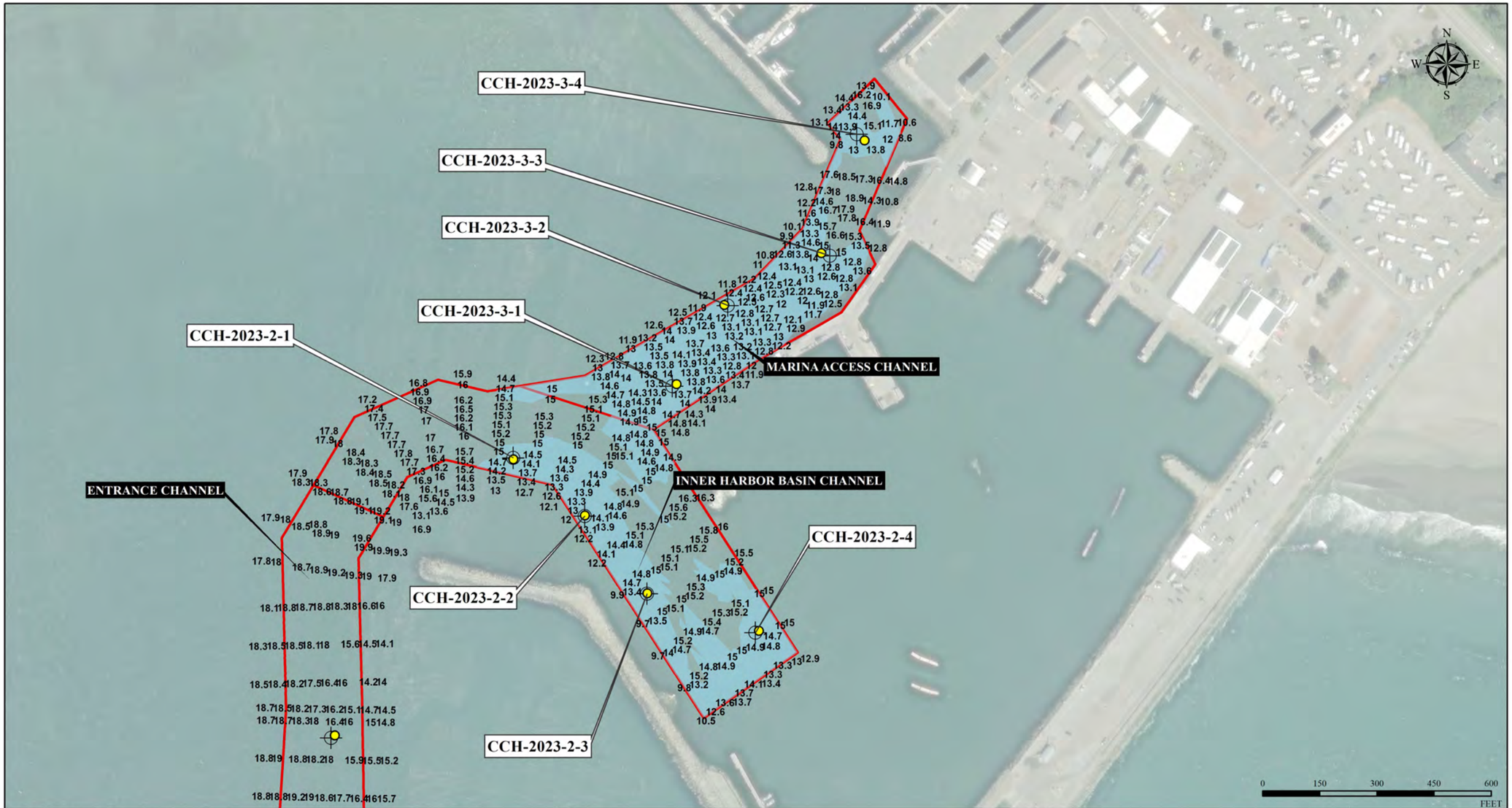
NOTES

1. SURVEY DATA COLLECTED ON JANUARY 29TH, 2023
2. HORIZONTAL DATUM/PROJECTION: NAD83 (2011), SPCS CALIFORNIA ZONE 01 - U.S. SURVEY FEET
3. VERTICAL DATUM: MLLW, U.S. SURVEY FEET.
4. THIS SURVEY REPRESENTS GENERAL CONDITIONS AT THE TIME OF THE SURVEY
5. MAP PREPARED BY PACIFIC ECORISK ON 5/21/2024

FIGURE 2-2

CRESCENT CITY HARBOR:
ENTRANCE CHANNEL
PROPOSED AND ACTUAL SAMPLE LOCATIONS

PACIFIC ECORISK — ENVIRONMENTAL CONSULTING & TESTING



LEGEND

- PROPOSED SAMPLING POINTS
- ACTUAL SAMPLE LOCATIONS
- INNER HARBOR & ACCESS CHANNEL DREDGE FOOTPRINT — *Project Depth -15 FT MLLW + 2 FT OD*
- SAMPLING BOUNDARY

NOTES

1. SURVEY DATA COLLECTED ON JANUARY 29TH, 2023
2. HORIZONTAL DATUM/PROJECTION: NAD83 (2011), SPCS CALIFORNIA ZONE 01 - U.S. SURVEY FEET
3. VERTICAL DATUM: MLLW, U.S. SURVEY FEET.
4. THIS SURVEY REPRESENTS GENERAL CONDITIONS AT THE TIME OF THE SURVEY
5. MAP PREPARED BY PACIFIC ECORISK ON 5/21/2024

FIGURE 2-3

CRESCENT CITY HARBOR
INNER HARBOR BASIN CHANNEL & MARINA ACCESS CHANNEL
PROPOSED AND ACTUAL SAMPLE LOCATIONS

PACIFIC ECORISK ENVIRONMENTAL CONSULTING & TESTING

3. SAMPLE PROCESSING

3.1 Homogenization and Compositing of Sediments

Each core was divided into project dredge depth sections (including overdredge) and Z-layer sections aboard the sampling vessel. Homogenization and compositing of individual sediment core sections was performed at the PER laboratory facility in Fairfield, CA. The project dredge depth section from each core was individually homogenized in a stainless-steel bowl or high-density polyethylene (HDPE) container. A 500-mL sub-sample of the resulting homogenized sediment was archived to allow for additional chemical analyses, if necessary; archived samples are being stored frozen at ≤-20˚C for up to one [1] year after sample collection.

Proportionate amounts of the homogenized sediment from the Entrance Channel project depth sediment core sections were composited and homogenized to form the "CCH-2024-1" composite sediment. The Inner Harbor Channel/ Marina Access Channel area project depth sediment core sections were similarly processed to form the "CCH-2024-2" and "CCH-2024-3" composite sediments, respectively. Sub-samples of the composited sediments were frozen for archival storage as described above. Samples of the composited project dredge depth sediments were submitted for chemical and conventional analyses.

The Z-layer samples were similarly processed, with each individual Z-layer core section being individually homogenized and archived. Representative amounts of the homogenized Z-layer sediment for each individual core for the Entrance Channel were composited to form a homogenized Z-layer composite sample designated "CCH-2024-1 Z-Layer". The Inner Harbor Channel/ Marina Access Channel area Z-layers samples were similarly processed to form the "CCH-2024-2 Z-Layer" and "CCH-2024-3 Z-Layer" composite sediments. The homogenized Z-layer composite and individual core samples were frozen for archival storage as described above.

3.2 Shipping of Sediment Samples to the Analytical Laboratories

Prior to shipping to the analytical laboratory, sample containers were wrapped in bubble wrap and securely packed inside a cooler with ice packs or crushed ice. A temperature blank was included in each cooler. The original signed chain-of-custody (COC) forms were placed inside the lid of each cooler and packaging tape was wrapped completely around each cooler. *This Side*

Up arrow labels and a *Glass-Handle with Care* label were attached on each side and to the top of each cooler, respectively. Each cooler was then sealed with custody seals on both the front and the back lid seams.

The sediment samples were shipped by overnight delivery. The sub-contracting analytical laboratories have been instructed to not dispose of any samples for this project unless notified by PER in writing.

3.2.1 Chain-of-Custody (COC) Protocol

COC procedures were followed for all samples throughout the collection, handling, and analyses activities. The Sampling and Analysis Project Manager, or a designee, was responsible for all sample tracking and COC procedures. This person was responsible for final sample inventory, maintenance of sample custody documentation, and completion of COC forms prior to transferring samples to the analytical laboratory. A COC form accompanied each cooler of samples to the respective analytical laboratories. Each custodian of the samples signed the COC form; copies of the COC forms are retained in the project file.

3.3 Deviations from the Sampling and Analysis Plan

No deviations from the SAP occurred for sample processing.

4. RESULTS OF LABORATORY ANALYSES

Sediment physical and chemical characteristics provide information about chemicals of concern present in the sediment and their potential bioavailability, and about non-chemical factors that could affect toxicity.

The Crescent City Harbor sediments collected from the Entrance Channel (CCH-2024-1) were submitted to Eurofins Calscience (Eurofins located in Tustin, CA) for conventional parameters (total solids, TOC, and grain size) and limited chemical analyses (trace metals, sulfides, and ammonia) as specified in the SAP (USACE 2023). The results of these analyses are presented below in Section 4.1 and Table 4-1. The full Data Reports submitted by Eurofins for these bulk sediment analyses are provided in Appendix B.

The Crescent City Harbor sediments collected from the Inner Harbor Channel, and Marina Access Channel areas were submitted to Eurofins for conventional parameters (total solids, TOC, and grain size) and chemical analyses including trace metals, polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), organochlorine (OCl) pesticides, butyltins (also referred to as organotins), chlorinated hydrocarbons, phthalates, phenols, dioxins/furans, and miscellaneous extractables as specified in the SAP (USACE 2023). The Inner Harbor Channel (CCH-2024-2) and the Marina Access Channel (CCH-2024-3) received further testing than the Entrance Channel (CCH-2024-1) because these areas were assumed to be silty, based on the 2018 testing results. However, all three composites had high sand content (>80% sand) for this sampling effort. The results of these analyses are presented below in Section 4.1 and Table 4-1. The full Data Reports submitted by Eurofins for these bulk sediment analyses are provided in Appendix B

A modified waste extraction test (mWET) was performed for the Crescent City Harbor composite samples from the Inner Harbor Channel and Marina Access Channel; the results of these mWET analyses are presented in Table 4-2 and Section 4-2. The full Data Report submitted by Eurofins for the mWET analyses is provided in Appendix C.

Modified Elutriate Test (MET) samples were prepared for the Crescent City Harbor composite samples from the Inner Harbor Channel and Marina Access Channel and were submitted to Eurofins for chemical analyses; the results of these MET analyses are presented in Table 4-3 and Section 4-3. The full Data Report submitted by Eurofins for the MET analyses is provided in Appendix D. The MET elutriates were also evaluated for toxicity; the results of those analyses are presented in Section 5.

The results of the physical and chemical analysis of the sediments were compared to:

- HOODS results;
- Marine sediment toxicity screening levels for chemicals of concern, Sediment Evaluation Framework for the Pacific Northwest (USACE 2018);
- Effects Range Low (ER-L) sediment quality objectives from Long et al. (1995); and
- Marine Water Quality Objectives for Toxic Pollutants for Surface Waters (USEPA, 2000).

Analytes whose reported concentrations exceeded these screening levels are presented in Table 4-4.

4.1 Results of Physical and Chemical Analysis of Crescent City Federal Navigation Channel Sediments

Each of the Entrance Channel (CCH-2024-1), Inner Harbor Channel (CCH-2024-2), and Marina Access Channel (CCH-2024-3) Area composite samples were analyzed for percent solids, TOC, grain size, total sulfides, ammonia, and metals; these results are presented in Table 4-1 and Sections 4.1.1 and 4.1.2. Additionally, the CCH-2024-2 and CCH-2024-3 Area composite samples were analyzed for butyltins, PCBs, organochlorine (OCl) pesticides, PAHs, chlorinated hydrocarbons, phthalate esters, phenols, miscellaneous extractables, and dioxins/furans; these results are presented in Table 4-1 and Sections 4.1.3 through 4.1.12.

4.1.1 Total Solids and Total Organic Carbon

Total solids in all cores ranged from 47.0 – 71.7%. The TOC concentrations ranged from 1.1 – 4.8%.

4.1.2 Grain Size

Particle size distribution in the CCH-2024-1 sample from the Entrance Channel area consisted of 8.62% fines (silt and clay), and total sand and gravel consisted of 91.4%. CCH-2024-2 (Inner Harbor Channel) and CCH-2024-3 (Marina Access Channel) areas consisted of 3.6 – 8.8% fines (silt and clay), and total sand and gravel consisted of 91 – 94.1%.

4.1.3 Metals

CCH-2024-1 – Nickel was measured above the Effect Range-Low (ER-L) and the HOODS reference site concentration. Cadmium, chromium, mercury, and molybdenum were measured above the HOODS reference site concentration, but below the ER-L concentration. All remaining metal analyte concentrations were below all screening criteria in the composite sample.

Table 4-1. Results of Chemical Analyses of Crescent City Harbor Sediments.

Analyte	CCH-2024-1	CCH-2024-2	CCH-2024-3	HOODS 2024	SEF[1]	ER-L[2]
Grain Size (%, dry wt)						
Gravel (>2.00 mm)	0	0.22	2.29	0	-	-
Sand (0.0625-2.00 mm)	91.38	90.97	94.06	57.55	-	-
Silt (0.0039-0.0625 mm)	7.78	7.89	3.12	39.82	-	-
Clay (< 0.0039 mm)	0.84	0.92	0.53	2.62	-	-
Percent fines (Silt+Clay)	8.62	8.81	3.65	42.44	-	-
% Solids	71.7	47.0	61.6	70.2	-	-
TOC (%)	1.09	4.77	3.74	0.720	-	-
Total Sulfides (mg/kg)	272[A]	937[A]	514[A]	10.2 J	-	-
Ammonia (mg/kg)	134 J	390 [A]	174[A]	152	-	-
Metals (mg/kg, dry wt)						
Antimony	<0.191	0.759 J[A]	<0.191	0.222 J	150	-
Arsenic	4.48	6.14[A]	4.95	5.13	57	8.2
Barium	19.2	45.4	26.1	110	-	-
Beryllium	<0.209	<0.316	<0.208	0.355 J	-	-
Cadmium	0.109 [A]	0.598[A]	0.376[A]	0.067	5.1	1.2
Chromium	78.2[A]	96.7[A,B]	87.0[A,B]	60.9	260	81
Cobalt	8.26	12.0[A]	9.44	11.0	-	-
Copper	9.26	30.9[A]	22.5[A]	20.6	390	34
Lead	2.89	6.85[A]	4.24	6.13	450	46.7
Mercury	0.0506 J[A]	0.0849 J[A]	0.0385 J[A]	<0.0313	0.41	0.15
Molybdenum	0.525 J [A]	3.81[A]	1.60[A]	0.501 J	-	-
Nickel	111[A,B]	130[A,B]	119[A,B]	79.5	-	20.9
Selenium	0.158 J	0.628[A]	0.144	0.198 J	-	-
Silver	0.028 J	0.114[A]	0.057 J	0.057 J	6.1	1.0
Thallium	<0.0901	0.412 J[A]	0.0949 J[A]	<0.0851	-	-
Vanadium	22.8	41.4[A]	29.0	37.6	-	-
Zinc	29.6	54.0	41.1	54.1	410	150
Butyltins (µg/kg, dry wt)						
Tetrabutyltin	-	<3.6	<2.3	<2.3	-	-
Tributyltin	-	<3.1	<2.0	<2.0	73[3]	-
Dibutyltin	-	<2.8	<1.8	<1.8	-	-
Monobutyltin	-	<1.2	<0.77	<0.76	-	-
∑ detected Butylins	-	**0**	**0**	**0**	-	-

Notes:
1 - Marine sediment toxicity screening levels for chemicals of concern, Sediment Evaluation Framework for the Pacific Northwest (USACE, 2018).
2 - Effects Range Low; NOAA Sediment Quality Guidelines (Long, et. al, 1995).
3 - SEF Bioaccumulation Trigger (USACE 2018)
J - Analyte detected below the method reporting limit (MRL) and the reported value is therefore an estimate.
All concentrations reported as being below the laboratory MDL are reported above as < the MDL.
A - Value exceeds HOODS reference site.
B - Value exceeds ER-L

Table 4-1 (*cont*). Results of Chemical Analyses of Crescent City Harbor Sediments.

Analyte	CCH-2024-2	CCH-2024-3	HOODS 2024	SEF[1]	ER-L[2]
PCBs (µg/kg, dry wt)					
PCB 005/008	<0.26	<0.17	<0.16	-	-
PCB 018	<0.21	<0.14	<0.13	-	-
PCB 028	<0.23	<0.15	<0.14	-	-
PCB 031	<0.20	<0.13	<0.13	-	-
PCB 033	<0.11	<0.069	<0.067	-	-
PCB 044	<0.27	<0.18	<0.17	-	-
PCB 049	<0.24	<0.16	<0.15	-	-
PCB 052	<0.18	<0.12	<0.11	-	-
PCB 056	<0.11	<0.069	<0.067	-	-
PCB 060	<0.29	<0.19	<0.18	-	-
PCB 066	<0.25	<0.16	<0.16	-	-
PCB 070	<0.21	<0.14	<0.13	-	-
PCB 074	<0.23	<0.15	<0.15	-	-
PCB 087	<0.28	<0.18	<0.18	-	-
PCB 095	<0.15	<0.097	<0.094	-	-
PCB 097	<0.31	<0.20	<0.20	-	-
PCB 099	<0.19	<0.13	<0.12	-	-
PCB 101	<0.24	<0.16	0.28	-	-
PCB 105	<0.24	<0.16	<0.15	-	-
PCB 110	<0.20	<0.13	<0.13	-	-
PCB 118	<0.18	<0.12	<0.11	-	-
PCB 128	<0.31	<0.20	<0.20	-	-
PCB 132/153	<0.54	<0.35	<0.34	-	-
PCB 138/158	<0.54	<0.36	<0.34	-	-
PCB 141	<0.15	<0.097	<0.094	-	-
PCB 149	<0.24	<0.16	<0.15	-	-
PCB 151	<0.21	<0.13	<0.13	-	-
PCB 156	<0.21	<0.14	<0.13	-	-
PCB 170	<0.23	<0.15	<0.15	-	-
PCB 174	<0.13	<0.084	<0.081	-	-
PCB 177	<0.21	<0.14	<0.13	-	-
PCB 180	<0.19	<0.12	0.45	-	-
PCB 183	<0.27	<0.18	<0.17	-	-
PCB 187	<0.20	<0.13	0.28	-	-
PCB 194	<0.25	<0.16	<0.16	-	-
PCB 195	<0.14	<0.092	<0.088	-	-
PCB 201	<0.31	<0.20	<0.20	-	-
PCB 203	<0.16	<0.10	<0.099	-	-
∑ detected PCBs	**0**	**0**	**1.01**	**130**	**22.7**

Notes:
1 - Marine sediment toxicity screening levels for chemicals of concern, Sediment Evaluation Framework for the Pacific Northwest (USACE, 2018).
2 - Effects Range Low; NOAA Sediment Quality Guidelines (Long, et. al, 1995).
All concentrations reported as being below the laboratory MDL are reported above as < the MDL.

Table 4-1 (*cont*). Results of Chemical Analyses of Crescent City Harbor Sediments.

Analyte	CCH-2024-2	CCH-2024-3	HOODS 2024	SEF[1]	ER-L[2]
Organochlorine Pesticides (µg/kg, dry wt)					
Aldrin	<0.82	<0.54	<0.52	9.5	-
alpha-BHC	<0.18	<0.12	<0.11	-	-
beta-BHC	<0.43	<0.28	<0.27	-	-
delta-BHC	<0.34	<0.22	<0.21	-	-
gamma-BHC (lindane)	<0.24	<0.16	<0.15	-	-
Total BHCs	**0**	**0**	**0**	**-**	**-**
Cis-nonachlor	<0.11	<0.070	<0.067	-	-
alpha-Chlordane	<0.23	<0.15	<0.14	-	-
gamma-Chlordane	<0.79	<0.52	<0.50	-	-
Chlordane	<1.6	<1.1	<1.0	2.8	-
Dieldrin	<0.15	<0.097	<0.094	1.9	-
Endosulfan I	<0.26	<0.17	<0.17	-	-
Endosulfan II	<0.51	<0.33	<0.32	-	-
Endosulfan sulfate	<0.24	<0.16	<0.15	-	-
Endrin	<0.43	<0.28	<0.27	-	-
Endrin aldehyde	<2.2	<1.4	<1.4	-	-
Endrin ketone	<0.43	<0.28	-	-	-
Heptachlor	<0.13	<0.088	<0.084	1.5	-
Heptachlor epoxide	<0.19	<0.13	<0.12	-	-
Methoxylchlor	<0.37	<0.24	<0.23	-	-
Toxaphene	<2.2	<1.5	<1.4	-	-
Trans-nonachlor	<0.25	<0.17	<0.16	-	-
2,4'-DDD	<0.14	<0.094	<0.091	-	-
2,4'-DDE	<2.3	<1.5	<1.5	-	-
2,4'-DDT	<0.21	<0.14	<0.13	-	-
4,4'-DDD	<1.1	<0.74	<0.71	16	-
4,4'-DDE	<0.61	39[A,B,C]	<0.38	9	2.2
4,4'-DDT	<0.69	<0.45	<0.44	12	-
∑ detected DDTs	**0**	**39[A,C]**	**0**	**50[3]**	**1.58**

Notes:
1 - Marine sediment toxicity screening levels for chemicals of concern, Sediment Evaluation Framework for the Pacific Northwest (USACE, 2018).
2 - Effects Range Low; NOAA Sediment Quality Guidelines (Long, et. al, 1995).
3 - DMMP User Manual (DMMP 2021) and SF-Bay (SFEI 2024) Bioaccumulation Trigger.
J - Analyte detected below the method reporting limit (MRL) and the reported value is therefore an estimate.
All concentrations reported as being below the laboratory MDL are reported above as < the MDL.
A - Value exceeds HOODS reference site.
B - Value exceeds SEF toxicity trigger.
C - Value exceeds ER-L

Table 4-1 (*cont*). Results of Chemical Analyses of Crescent City Harbor Sediments.

Analyte	CCH-2024-2	CCH-2024-3	HOODS 2024	SEF[1]	ER-L[2]
PAHs (µg/kg, dry wt)					
1-Methylnaphthalene (LPAH)	8.9 J	5.8 J	36 J	-	-
1-Methylphenanthrene (LPAH)	<3.3	<2.1	28 J	-	-
2,3,5-Trimethylnaphthalene (LPAH)	<2.9	<1.9	12 J	-	-
2,6-Dimethylnaphthalene (LPAH)	53[A]	21	45 J	-	-
2-Methylnaphthalene (LPAH)	13 J	9.7 J	57 J	670	70
Acenaphthene (LPAH)	<8.4	<5.5	<27	500	16
Acenaphthylene (LPAH)	<4.1	<2.7	<13	560	44
Anthracene (LPAH)	12 J	6.5 J	<14	960	85.3
Benzo(a)anthracene (HPAH)	15 J	7.8 J	<22	1,300	261
Benzo(a)pyrene (HPAH)	<10	<6.9	<33	1,600	430
Benzo(b)fluoranthene (HPAH)	<17	<11	<54	-	-
Benzo(e)pyrene (HPAH)	<14	<9.3	<45	-	-
Benzo(g,h,i)perylene (HPAH)	<11	<7.5	<36	670	-
Benzo(k)fluoranthene (HPAH)	6.3 J	<4.0	<19	3,200	-
Biphenyl (LPAH)	6.1 J	41 J[A]	16 J	-	-
Chrysene (HPAH)	17 J	9.3 J	<18	1,400	384
Dibenzo(a,h)anthracene (HPAH)	<17	<11	<55	230	63.4
Dibenzothiophene (LPAH)	<2.7	<1.8	<8.6	-	-
Fluoranthene (HPAH)	45[A]	31[A]	<18	1,700	600
Fluorene (LPAH)	11 J	6.7 J	<26	540	19
Indeno(1,2,3-c,d)pyrene (HPAH)	<14	<9.1	<44	600	-
Naphthalene (LPAH)	15 J	8.5 J	<31	2,100	160
Perylene (HPAH)	60[A]	9.9 J	33 J	-	-
Phenanthrene (LPAH)	32	19	59 J	1,500	240
Pyrene (HPAH)	40[A]	31[A]	19 J	2,600	665
∑ LPAHs	**151**	**118**	**253**	**5,200**	**552**
∑ HPAHs	**183[A]**	**89[A]**	**52**	**12,000**	**1,700**
∑ detected PAHs	**334[A]**	**207**	**305**	**-**	**4,022**

Notes:
1 - Marine sediment toxicity screening levels for chemicals of concern, Sediment Evaluation Framework for the Pacific Northwest (USACE, 2018).
2 - Effects Range Low; NOAA Sediment Quality Guidelines (Long, et. al, 1995).
J - Analyte detected below the method reporting limit (MRL) and the reported value is therefore an estimate.
All concentrations reported as being below the laboratory MDL are reported above as < the MDL.
A - Value exceeds HOODS reference site.

Table 4-1 (*cont*). Results of Chemical Analyses of Crescent City Harbor Sediments.

Analyte	CCH-2024-2	CCH-2024-3	HOODS 2024	SEF[1]	ER-L[2]
Chlorinated Hydrocarbons (µg/kg, dry wt)					
1,2,4-Trichlorobenzene	<4.5	<2.9	<14	31	-
1,2-Dichlorobenzene	<4.3	<2.9	<0.014	35	-
1,4-Dichlorobenzene	<9.3	<6.1	<0.030	110	-
Hexachlorobenzene	<11	<7.5	<0.036	22	-
Phthalate Esters (µg/kg, dry wt)					
Bis 2-ethylhexyl phthalate	<73	50 J[A]	<0.23	1,300	-
Butyl benzyl phthalate	<48	<32	<0.15	63	-
Diethyl phthalate	11 J[A]	<7.1	<0.034	200	-
Dimethyl phthalate	<6.6	<4.3	<0.021	71	-
Di-n-butyl phthalate,	100 J[A]	<69	<0.33	1,400	-
Di-n-octyl phthalate	<29	<19	<0.092	6,200	-
Phenols (µg/kg, dry wt)					
2,4-Dimethylphenol	<9.7	<6.4	<0.031	29	-
2-Methylphenol	<5.6	<3.7	<0.018	63	-
3/4-Methylphenol	210[A]	16 J[A]	<0.030	670	-
Pentachlorophenol	<230	<150	<0.074	400	-
Phenol	66[A]	14 J[A]	0.089	420	-
Total Phenols	<450	<300	0.089	-	-
Miscellaneous Extractables (µg/kg, dry wt)					
Benzoic acid	<500	<330	<1.6	650	-
Benzyl alcohol	<310	<210	<0.99	57	-
Dibenzofuran	9.4 J[A]	6.9 J[A]	<0.024	540	-
Hexachloro-1,3-butadiene	<8.7	<5.7	<0.028	11	-
Hexachloroethane	<5.4	<3.5	<0.017	-	-

Notes:
1 - Marine sediment toxicity screening levels for chemicals of concern, Sediment Evaluation Framework for the Pacific Northwest (USACE, 2018).
2 - Effects Range Low; NOAA Sediment Quality Guidelines (Long, et. al, 1995).
J - Analyte detected below the method reporting limit (MRL) and the reported value is therefore an estimate.
All concentrations reported as being below the laboratory MDL are reported above as < the MDL.
A - Value exceeds HOODS reference site.

Table 4-1 (*cont*). Results of Chemical Analyses of Crescent City Harbor Sediments.

Analyte	TEF	Sample ID				HOODS 2024		SEF[1]	ER-L[2]
		CCH-2024-2		CCH-2024-3					
Dioxins and Furans **(**ng/kg, dry wt)		**Conc.**	**TEQ**	**Conc.**	**TEQ**	**Conc.**	**TEQ**		
1,2,3,4,6,7,8-HpCDD	0.010	46	0.46	25	0.25	2.6 J	0.026	-	-
1,2,3,4,6,7,8-HpCDF	0.010	11	0.11	5.8 J	0.058	<0.31	0	-	-
1,2,3,4,7,8,9-HpCDF	0.10	0.75 J	0.0075	0.78 J	0.0078	<0.28	0	-	-
1,2,3,4,7,8-HxCDD	0.10	0.87 J	0.087	0.56 J	0.056	<0.50	0	-	-
1,2,3,6,7,8-HxCDD	0.010	2.7 J	0.27	1.5 J	0.15	<0.59	0	-	-
1,2,3,7,8,9-HxCDD	0.10	2.4 J	0.24	1.8 J	0.18	<0.52	0	-	-
1,2,3,4,7,8-HxCDF	0.10	0.49 J	0.049	1.1 J	0.11	<0.27	0	-	-
1,2,3,6,7,8-HxCDF	1.0	<0.27	0	0.58 J	0.058	<0.28	0	-	-
1,2,3,7,8,9-HxCDF	0.030	<0.26	0	0.44 J	0.044	<0.27	0	-	-
2,3,4,6,7,8-HxCDF	0.10	0.26 J	0.026	0.36 J	0.036	<0.26	0	-	-
OCDD	0.10	410	0.123	230	0.069	19	0.0057	-	-
OCDF	0.10	32	0.0096	14 J	0.0042	1.0 J	0.0003	-	-
1,2,3,7,8-PeCDD	0.30	<0.55	0	<0.37	0	<0.89	0	-	-
1,2,3,7,8-PeCDF	1.0	<0.27	0	<0.17	0	<0.26	0	-	-
2,3,4,7,8-PeCDF	0.10	<0.28	0	<0.19	0	0.99 J	0.297	-	-
2,3,7,8-TCDD	0.0003	<0.25	0	<0.16	0	<0.16	0	-	-
2,3,7,8-TCDF	0.0003	<0.14	0	<0.068	0	<0.53	0	-	-
∑ Dioxin/Furan (ng TEQ/kg, dry wt)	**NA**	**NA**	**1.38[A]**	**NA**	**1.02[A]**	**NA**	**0.329**	**-**	**-**

Notes:
1 - Marine sediment toxicity screening levels for chemicals of concern, Sediment Evaluation Framework for the Pacific Northwest (USACE, 2018).
2 - Effects Range Low; NOAA Sediment Quality Guidelines (Long, et. al, 1995).
J - Analyte detected below the method reporting limit (MRL) and the reported value is therefore an estimate.
All concentrations reported as being below the laboratory MDL are reported above as < the MDL.
A - Value exceeds HOODS reference site.

CCH-2024-2 – Chromium and nickel were measured above the ER-L. With the exception of barium, beryllium, and zinc, all metals were measured above the HOODS reference site concentration, but below available ER-L concentrations. All remaining metal analyte concentrations were below all screening criteria in the composite sample.

CCH-2024-3 – Chromium and nickel were measured above the ER-L and the HOODS reference site concentration. Cadmium, copper, mercury, molybdenum, and thallium were measured above the HOODS reference site concentration, but below available ER-L concentrations. All remaining metal analyte concentrations were below all screening criteria in the composite sample.

4.1.4 Butyltins

Total butyltins were reported below the method detection limit (MDL) in the CCH-2024-2 and CCH-2024-3 composite samples.

4.1.5 Polychlorinated Biphenyls (PCBs)

Total PCBs were reported below the MDL in the CCH-2024-2 and CCH-2024-3 composite samples.

4.1.6 Organochlorine Pesticides

The 4,4'-DDE (and total DDT) concentration was 39 µg/kg in the CCH-2024-3 sample, which was above the SEF toxicity trigger, ER-L, and HOODS reference site concentration, but below the SEF bioaccumulation trigger. The remaining OCl pesticides were below their respective MDLs.

4.1.7 Polycyclic Aromatic Hydrocarbons (PAH)

The total PAH concentration for the CCH-2024-2 sample was 334 µg/kg, which is above the HOODS reference site concentration but below remaining screening criteria. The total PAH concentration for the CCH-2024-3 sample was below all screening criteria.

4.1.8 Chlorinated Hydrocarbons

All chlorinated hydrocarbons analyte concentrations were below MDL in the CCH-2024-2 and CCH-2024-3 composite samples.

4.1.9 Phthalates

CCH-2024-2 – The diethyl phthalate concentration was 11 µg/kg and the di-n-butyl phthalate concentration was 100 µg/kg, both of which were above the HOODS reference site concentration, but below remaining screening criteria. All remaining phthalate analyte concentrations were below MDL.

CCH-2024-3 – The bis 2-ethylhexyl phthalate concentration was 50 µg/kg, which was above the HOODS reference site concentration, but below remaining screening criteria. All remaining phthalate analyte concentrations were below MDL.

4.1.10 Phenols

CCH-2024-2 – The 3/4-methylphenol concentration was 210 µg/kg and the phenol concentration was 66 µg/kg, both of which were above the HOODS reference site concentration, but below remaining screening criteria All remaining phenol analyte concentrations were below MDL.

CCH-2024-3 – The 3/4-methylphenol concentration was 16 µg/kg and the phenol concentration was 14 µg/kg, both of which were above the HOODS reference site concentration, but below remaining screening criteria. All remaining phenol analyte concentrations were below MDL.

4.1.11 Miscellaneous Extractables

CCH-2024-2 – The dibenzofuran concentration was 9.4 µg/kg, which was above the HOODS reference site concentration, but below remaining screening criteria. All remaining miscellaneous extractables analyte concentrations were below MDL.

CCH-2024-3 – The dibenzofuran concentration was 6.9 µg/kg, which was above the HOODS reference site concentration, but below remaining screening criteria. All remaining miscellaneous extractables analyte concentrations were below MDL.

4.1.12 Dioxins and Furans

Dioxins and furans concentrations were adjusted according to applicable World Health Organization (WHO) toxicity equivalency factors (TEFs) and are expressed as toxicity equivalency quotients (TEQs). Dioxins and furans TEQs in all composites ranged from 1.02 - 1.38 ng TEQ/kg. Dioxins and furans TEQs in the CCH-2024-2 and CCH-2024-3 samples were greater than the HOODS reference site TEQ of 0.329 ng TEQ/kg.

4.2 Results of Modified Waste Extraction Analysis of Crescent City Federal Navigation Channel Sediments

Crescent City Harbor Modified Waste Extraction Tests (mWET) extracts were evaluated to predict the concentrations of analytes that would be present in leachate following upland placement of dredged material; the results of these analyses are summarized in Table 4-2.

All Crescent City Harbor mWET elutriate samples analyte concentrations were below available Marine Water Quality Objectives for Toxic Pollutants for Surface Water.

4.3 Results of Modified Elutriate Test Analysis of Crescent City Federal Navigation Channel Sediments

The Crescent City Harbor MET elutriate analyses were evaluated to predict the concentrations of analytes that would be present in decant water discharged from a wetland beneficial reuse site following the upland placement of dredged material at a site such as Whaler Island; the results of these analyses are summarized in Table 4-3. All Crescent City Harbor MET elutriate samples analyte concentrations were below available Marine Water Quality Objectives for Toxic Pollutants for Surface Water.

Table 4-2. Results of mWET Elutriate Analyses of Crescent City Harbor Composite Sediments.

Analyte	CCH-2024-2	CCH-2024-3	Marine Water Quality Objectives for Toxic Pollutants for Surface Waters (µg/L)[1,2]	
			Criterion Continuous Concentration[3]	Criterion Maximum Concentration[4]
Total Suspended Solids (mg/L)			-	-
TOC (mg/L)	6.13	3.98	-	-
Total Sulfides (mg/L)	<0.0166	<0.0166	-	-
Ammonia (mg/L)	2.01	0.794	-	-
Metals (µg/L)				
Antimony	0.887	0.717	-	-
Arsenic	8.27	6.63	36[1]	69[1]
Barium	7.05	4.51	-	-
Beryllium	<0.290	<0.290	-	-
Cadmium	0.0250	0.0190 J	9.3[1]	42[5]
Chromium	0.953	0.651	50[1,5]	1100[1,5]
Cobalt	0.102	0.0930	-	-
Copper	2.27	2.67	3.1[1]	4.8[1]
Lead	0.258	0.227	8.1[1]	210[1]
Mercury	0.00477	0.00323	0.025[1]	2.1[1]
Molybdenum	36.2	29.7	-	-
Nickel	2.69	1.98	8.2[1]	7.4[1]
Selenium	<0.300	<0.300	5.0[6]	20[6]
Silver	<0.0780	<0.0780	-	-
Thallium	<0.0150	<0.0150	-	-
Vanadium	3.60	5.16	-	-
Zinc	2.07	1.87	-	-
Butyltins (µg/L)				
Tetrabutyltin	<0.0015	<0.0014	-	-
Tributyltin	<0.0011	<0.0011	-	-
Dibutyltin	0.033	0.053	-	-
Monobutyltin	1.2	1.5	-	-
∑ detected Butylins	**1.23**	**1.55**	**-**	**-**

Notes:
1 - California Toxics Rule Criteria, 40 CFR Part 131.38 (USEPA, 2000).
2 - Water quality objectives for metals criteria are expressed in terms of the dissolved fraction of the metal in the water column, unless otherwise noted.
3 - Criterion Continuous Concentration = the greatest concentration of a pollutant to which aquatic life can be exposed for an extended period (4-day average) without deleterious effects.
4 - Criterion Maximum Concentration = the greatest concentration of a pollutant to which aquatic life can be exposed for a short period of time (1-hour average) without deleterious effects.
5 -Water quality objective is for chromium VI; however, it may be met as total chromium.
6 - National Toxics Rule.
All concentrations reported as being below the laboratory MDL are reported above as < the MDL.

Table 4-2. Results of mWET Elutriate Analyses of Crescent City Harbor Sediments *(continued)*.

Analyte	CCH-2024-2	CCH-2024-3	Marine Water Quality Objectives for Toxic Pollutants for Surface Waters (µg/L)[1,2]	
			Criterion Continuous Concentration[3]	Criterion Maximum Concentration[4]
PCBs (µg/L, dry wt)				
PCB 005/008	<0.013	<0.0013	-	0.03[1]
PCB 018	<0.0010	<0.0010	-	0.03[1]
PCB 028	<0.0010	<0.0010	-	0.03[1]
PCB 031	<0.00042	<0.00042	-	0.03[1]
PCB 033	<0.00044	<0.00044	-	0.03[1]
PCB 044	<0.0015	<0.0015	-	0.03[1]
PCB 049	<0.00099	<0.00098	-	0.03[1]
PCB 052	<0.0011	<0.0011	-	0.03[1]
PCB 056	<0.0017	<0.0017	-	0.03[1]
PCB 060	<0.00056	<0.00055	-	0.03[1]
PCB 066	<0.0019	<0.0019	-	0.03[1]
PCB 070	<0.00095	<0.00094	-	0.03[1]
PCB 074	<0.0013	<0.0013	-	0.03[1]
PCB 087	<0.00096	<0.00095	-	0.03[1]
PCB 095	<0.00072	<0.00071	-	0.03[1]
PCB 097	<0.00071	<0.00071	-	0.03[1]
PCB 099	<0.00069	<0.00069	-	0.03[1]
PCB 101	<0.0015	<0.0014	-	0.03[1]
PCB 105	<0.00097	<0.00096	-	0.03[1]
PCB 110	<0.0013	<0.0013	-	0.03[1]
PCB 118	<0.0014	<0.0014	-	0.03[1]
PCB 128	<0.0028	<0.0028	-	0.03[1]
PCB 132/153	<0.0022	<0.0021	-	0.03[1]
PCB 138/158	<0.0027	<0.0027	-	0.03[1]
PCB 141	<0.0011	<0.0011	-	0.03[1]
PCB 149	<0.00072	<0.00072	-	0.03[1]
PCB 151	<0.0011	<0.0011	-	0.03[1]
PCB 156	<0.0011	<0.0011	-	0.03[1]
PCB 170	<0.00072	<0.00072	-	0.03[1]
∑ detected PCBs	**0**	**0**	**-**	**-**

Notes:
1 - California Toxics Rule Criteria, 40 CFR Part 131.38 (USEPA, 2000).
2 - Water quality objectives for metals criteria are expressed in terms of the dissolved fraction of the metal in the water column, unless otherwise noted.
3 - Criterion Continuous Concentration = the greatest concentration of a pollutant to which aquatic life can be exposed for an extended period (4-day average) without deleterious effects.
4 - Criterion Maximum Concentration = the greatest concentration of a pollutant to which aquatic life can be exposed for a short period of time (1-hour average) without deleterious effects.
All concentrations reported as being below the laboratory MDL are reported above as < the MDL.

Table 4-2. Results of mWET Elutriate Analyses of Crescent City Harbor Sediments *(continued)*.

Analyte	CCH-2024-2	CCH-2024-3	Marine Water Quality Objectives for Toxic Pollutants for Surface Waters (µg/L)[1,2]	
			Criterion Continuous Concentration[3]	Criterion Maximum Concentration[4]
Organochlorine Pesticides (µg/L)				
Aldrin	<0.018	<0.026	-	1.3[1]
alpha-BHC	<0.0072	<0.0072	-	-
beta-BHC	<0.024	<0.024	-	-
delta-BHC	<0.012	<0.012	-	-
gamma-BHC (lindane)	<0.0039	<0.0080	-	0.16[1]
Total BHCs	0	0	-	-
Cis-nonachlor	-	-	-	-
alpha-Chlordane	<0.0050	<0.0050	-	-
gamma-Chlordane	<0.052	<0.052	-	-
Chlordane	<0.15	<0.15	0.004[1]	0.09[1]
Dieldrin	<0.0079	<0.0079	0.0019[1]	0.71[1]
Endosulfan I	<0.0077	<0.0077	-	-
Endosulfan II	<0.025	<0.025	-	-
Endosulfan sulfate	<0.0082	<0.0082	-	-
Endrin	<0.014	<0.014	0.0023[1]	0.037[1]
Endrin aldehyde	<0.15	<0.15	-	-
Endrin ketone	<0.013	<0.013	-	-
Heptachlor	<0.0071	<0.0071	0.0036[1]	0.053[1]
Heptachlor epoxide	<0.024	<0.024	0.0036[1]	0.053[1]
Methoxylchlor	<0.022	<0.022	-	-
Toxaphene	<0.32	<0.32	0.0002[1]	0.2[1]
Trans-nonachlor	-	-	-	-
2,4'-DDD	-	-	-	-
2,4'-DDE	-	-	-	-
2,4'-DDT	-	-	-	-
4,4'-DDD	<0.026	<0.026	-	-
4,4'-DDE	<0.011	<0.011	-	-
4,4'-DDT	<0.0096	<0.0096	0.001[1]	0.13[1]
∑ detected DDTs	**0**	**0**	-	-

Notes:
1 - California Toxics Rule Criteria, 40 CFR Part 131.38 (USEPA, 2000).
2 - Water quality objectives for metals criteria are expressed in terms of the dissolved fraction of the metal in the water column, unless otherwise noted.
3 - Criterion Continuous Concentration = the greatest concentration of a pollutant to which aquatic life can be exposed for an extended period (4-day average) without deleterious effects.
4 - Criterion Maximum Concentration = the greatest concentration of a pollutant to which aquatic life can be exposed for a short period of time (1-hour average) without deleterious effects.
All concentrations reported as being below the laboratory MDL are reported above as < the MDL.

Table 4-2. Results of mWET Elutriate Analyses of Crescent City Harbor Sediments *(continued)*.

Analyte	CCH-2024-2	CCH-2024-3	Marine Water Quality Objectives for Toxic Pollutants for Surface Waters (µg/L)[1,2]	
			Criterion Continuous Concentration[3]	Criterion Maximum Concentration[4]
PAHs (µg/L)				
1-Methylnaphthalene (LPAH)	<1.6	<1.6	-	-
2,3,5-Trimethylnaphthalene (LPAH)	-	-	-	-
2,6-Dimethylnaphthalene (LPAH)	-	-	-	-
2-Methylnaphthalene (LPAH)	<1.4	<1.4	-	-
Acenaphthene (LPAH)	<1.6	<1.6	-	-
Acenaphthylene (LPAH)	<1.7	<1.7	-	-
Anthracene (LPAH)	<1.8	<1.8	-	-
Benzo(a)anthracene (HPAH)	<2.2	<2.2	-	-
Benzo(a)pyrene (HPAH)	<2.1	<2.1	-	-
Benzo(b)fluoranthene (HPAH)	<1.9	<1.9	-	-
Benzo(e)pyrene (HPAH)	-	-	-	-
Benzo(g,h,i)perylene (HPAH)	<2.0	<2.0	-	-
Benzo(k)fluoranthene (HPAH)	<2.1	<2.1	-	-
Biphenyl (LPAH)	-	-	-	-
Chrysene (HPAH)	<1.7	<1.7	-	-
Dibenzo(a,h)anthracene (HPAH)	<2.0	<1.9	-	-
Dibenzothiophene (LPAH)	-	-	-	-
Fluoranthene (HPAH)	<2.1	<2.1	-	-
Fluorene (LPAH)	<1.8	<1.8	-	-
Indeno(1,2,3-cd)pyrene (HPAH)	<1.7	<1.7	-	-
Naphthalene (LPAH)	<1.6	<1.6	-	-
Perylene (HPAH)	-	-	-	-
Phenanthrene (LPAH)	<1.9	<1.9	-	-
Pyrene (HPAH)	<2.1	<2.1	-	-
∑ LPAHs	**0**	**0**	**-**	**-**
∑ HPAHs	**0**	**0**	**-**	**-**
∑ detected PAHs	**0**	**0**	**-**	**15[5]**

Notes:
1 - California Toxics Rule Criteria, 40 CFR Part 131.38 (USEPA, 2000).
2 - Water quality objectives for metals criteria are expressed in terms of the dissolved fraction of the metal in the water column, unless otherwise noted.
3 - Criterion Continuous Concentration = the greatest concentration of a pollutant to which aquatic life can be exposed for an extended period (4-day average) without deleterious effects.
4 - Criterion Maximum Concentration = the greatest concentration of a pollutant to which aquatic life can be exposed for a short period of time (1-hour average) without deleterious effects.
5 - 24-hour average objective for total PAHs from the 1995 Basin Plan.
All concentrations reported as being below the laboratory MDL are reported above as < the MDL.

Table 4-2. Results of mWET Elutriate Analyses of Crescent City Harbor Sediments.

Analyte	CCH-2024-2	CCH-2024-3	Marine Water Quality Objectives for Toxic Pollutants for Surface Waters (µg/L)[1,2]	
			Criterion Continuous Concentration[3]	Criterion Maximum Concentration[4]
Chlorinated Hydrocarbons (µg/L)				
1,2,4-Trichlorobenzene	<1.6	<1.6	-	-
1,2-Dichlorobenzene	<1.7	<1.6	-	-
1,4-Dichlorobenzene	<1.6	<1.5	-	-
Hexachlorobenzene	<1.7	<1.7	-	-
Phthalate Esters (µg/L)				
Bis 2-ethylhexyl phthalate	<2.1	<2.1	-	-
Butyl benzyl phthalate	<3.6	<3.6	-	-
Diethyl phthalate	<1.8	<1.8	-	-
Dimethyl phthalate	<1.5	<1.5	-	-
Di-n-butyl phthalate,	<5.9	<5.9	-	-
Di-n-octyl phthalate	<5.2	<5.2	-	-
Phenols (µg/L)				
2,4-Dimethylphenol	<1.3	<1.3	-	-
3/4-Methylphenol	<2.7	<2.6	-	-
Pentachlorophenol	<8.3	<8.2	7.9[1]	13[1]
Phenol	<0.89	<0.89	-	-
Total Phenols	0	0	-	-
Miscellaneous Extractables (µg/L)				
Benzoic acid	<5.4	<5.4	-	-
Benzyl alcohol	<3.1	<3.1	-	-
Dibenzofuran	<1.5	<1.5	-	-
Hexachloro-1,3-butadiene	<1.7	<1.5	-	-
Hexachloroethane	<1.5	<1.5	-	-

Notes:
1 - California Toxics Rule Criteria, 40 CFR Part 131.38 (USEPA, 2000).
2 - Water quality objectives for metals criteria are expressed in terms of the dissolved fraction of the metal in the water column, unless otherwise noted.
3 - Criterion Continuous Concentration = the greatest concentration of a pollutant to which aquatic life can be exposed for an extended period (4-day average) without deleterious effects.
4 - Criterion Maximum Concentration = the greatest concentration of a pollutant to which aquatic life can be exposed for a short period of time (1-hour average) without deleterious effects.
All concentrations reported as being below the laboratory MDL are reported above as < the MDL.

Table 4-3. Results of Results of MET Elutriate Analyses of Crescent City Harbor Sediments.

Analyte	CCH-2024-2	CCH-2024-3	Marine Water Quality Objectives for Toxic Pollutants for Surface Waters (µg/L)[1,2]	
			Criterion Continuous Concentration[3]	Criterion Maximum Concentration[4]
Total Suspended Solids (mg/L)	39.8	6.3	-	-
DOC (mg/L)	6.44	1.20	-	-
Dissolved Sulfides (mg/L)	<0.0166	<0.0166	-	-
Ammonia (mg/L)	18.2	2.47	-	-
Metals (mg/L)				
Antimony	0.530	0.879	-	-
Arsenic	0.866	1.43	36[1]	69[1]
Barium	33.2	38.9	-	-
Beryllium	<0.290	<0.290	-	-
Cadmium	<0.0130	<0.0130	9.3[1]	42[5]
Chromium	0.307 J	0.401 J	50[1,5]	1100[1,5]
Cobalt	<0.0360	0.264	-	-
Copper	1.66	<0.430	3.1[1]	4.8[1]
Lead	<0.0230	<0.0230	8.1[1]	210[1]
Mercury, Total	0.00236	0.00108	0.025[1]	2.1[1]
Mercury, Dissolved	0.000369 J	0.000323 J	-	-
Molybdenum	7.37	34.6	-	-
Nickel	0.860	1.94	8.2[1]	7.4[1]
Selenium	<0.300	<0.300	5.0[6]	20[6]
Silver	<0.0780	0.0840 J	-	-
Thallium	0.0210 J	<0.0150	-	-
Vanadium	30.6	2.40	-	-
Zinc	5.74	1.44	-	-
Butyltins (µg/L)				
Tetrabutyltin	<1.4	<1.4	-	-
Tributyltin	<1.1	<1.1	-	-
Dibutyltin	<1.8	0.017	-	-
Monobutyltin	<4.7	0.780	-	-
∑ detected Butylins	**0**	**0.797**	**-**	**-**

Notes:
1 - California Toxics Rule Criteria, 40 CFR Part 131.38 (USEPA, 2000).
2 - Water quality objectives for metals criteria are expressed in terms of the dissolved fraction of the metal in the water column, unless otherwise noted.
3 - Criterion Continuous Concentration = the greatest concentration of a pollutant to which aquatic life can be exposed for an extended period (4-day average) without deleterious effects.
4 - Criterion Maximum Concentration = the greatest concentration of a pollutant to which aquatic life can be exposed for a short period of time (1-hour average) without deleterious effects.
5 -Water quality objectives is for chromium VI; however, it may be met as total chromium.
6 - National Toxics Rule.
All concentrations reported as being below the laboratory MDL are reported above as < the MDL.

Table 4-3. Results of MET Elutriate Analyses of Crescent City Harbor Sediments *(continued)*.

Analyte	CCH-2024-2	CCH-2024-3	Marine Water Quality Objectives for Toxic Pollutants for Surface Waters (µg/L)[1,2]	
			Criterion Continuous Concentration[3]	Criterion Maximum Concentration[4]
PCBs (µg/L, dry wt)				
PCB 005/008	<0.0013	<0.0013	-	0.03[1]
PCB 018	<0.0010	<0.0010	-	0.03[1]
PCB 028	<0.0010	<0.0010	-	0.03[1]
PCB 031	<0.00042	<0.00042	-	0.03[1]
PCB 033	<0.00044	<0.00044	-	0.03[1]
PCB 044	0.0033	<0.0015	-	0.03[1]
PCB 049	<0.00098	<0.00099	-	0.03[1]
PCB 052	<0.0011	<0.0011	-	0.03[1]
PCB 056	<0.0017	<0.0017	-	0.03[1]
PCB 060	<0.00055	<0.00056	-	0.03[1]
PCB 066	<0.0019	<0.0019	-	0.03[1]
PCB 070	<0.00094	<0.00095	-	0.03[1]
PCB 074	<0.0013	<0.0013	-	0.03[1]
PCB 087	<0.00095	<0.00096	-	0.03[1]
PCB 095	<0.00071	<0.00072	-	0.03[1]
PCB 097	<0.00071	<0.00071	-	0.03[1]
PCB 099	<0.00069	<0.00069	-	0.03[1]
PCB 101	<0.0014	<0.0015	-	0.03[1]
PCB 105	<0.00096	<0.00097	-	0.03[1]
PCB 110	<0.0013	<0.0013	-	0.03[1]
PCB 118	<0.0014	<0.0014	-	0.03[1]
PCB 128	<0.0028	<0.0028	-	0.03[1]
PCB 132/153	<0.0021	<0.0022	-	0.03[1]
PCB 138/158	<0.0027	<0.0027	-	0.03[1]
PCB 141	<0.0011	<0.0011	-	0.03[1]
PCB 149	<0.00072	<0.00072	-	0.03[1]
PCB 151	<0.0011	<0.0011	-	0.03[1]
PCB 156	<0.0011	<0.0011	-	0.03[1]
PCB 170	<0.00072	<0.00073	-	0.03[1]
∑ detected PCBs	**0.0033**	**0**	**-**	**-**

Notes:
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3 - Criterion Continuous Concentration = the greatest concentration of a pollutant to which aquatic life can be exposed for an extended period (4-day average) without deleterious effects.
4 - Criterion Maximum Concentration = the greatest concentration of a pollutant to which aquatic life can be exposed for a short period of time (1-hour average) without deleterious effects.
All concentrations reported as being below the laboratory MDL are reported above as < the MDL.

Table 4-3. Results of MET Elutriate Analyses of Crescent City Harbor Sediments *(continued)*.

Analyte	CCH-2024-2	CCH-2024-3	Marine Water Quality Objectives for Toxic Pollutants for Surface Waters (µg/L)[1,2]	
			Criterion Continuous Concentration[3]	Criterion Maximum Concentration[4]
Organochlorine Pesticides (µg/L)				
Aldrin	<0.018	<0.019	-	1.3[1]
alpha-BHC	<0.0072	<0.0073	-	-
beta-BHC	<0.024	<0.024	-	-
delta-BHC	<0.012	<0.012	-	-
gamma-BHC (lindane)	<0.0039	<0.0040	-	0.16[1]
Total BHCs	0	0	-	-
Cis-nonachlor	<0.0068	<0.0070	-	-
alpha-Chlordane	<0.0050	<0.0051	-	-
gamma-Chlordane	<0.052	<0.053	-	-
Chlordane	<0.15	<0.16	0.004[1]	0.09[1]
Dieldrin	<0.0079	<0.0081	0.0019[1]	0.71[1]
Endosulfan I	<0.0077	<0.0078	-	-
Endosulfan II	<0.025	<0.025	-	-
Endosulfan sulfate	<0.0082	<0.0082	-	-
Endrin	<0.014	<0.014	0.0023[1]	0.037[1]
Endrin aldehyde	<0.15	<0.15	-	-
Endrin ketone	<0.013	<0.013	-	-
Heptachlor	<0.0071	<0.0073	0.0036[1]	0.053[1]
Heptachlor epoxide	<0.024	<0.024	0.0036[1]	0.053[1]
Methoxylchlor	<0.022	<0.023	-	-
Toxaphene	<0.32	<0.33	0.0002[1]	0.2[1]
Trans-nonachlor	<0.0043	<0.0044	-	-
2,4'-DDD	<0.0051	<0.0052	-	-
2,4'-DDE	<0.13	<0.13	-	-
2,4'-DDT	<0.0081	<0.0082	-	-
4,4'-DDD	<0.026	<0.027	-	-
4,4'-DDE	<0.011	<0.011	-	-
4,4'-DDT	<0.0096	<0.0098	0.001[1]	0.13[1]
∑ detected DDTs	**0**	**0**	-	-

Notes:
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2 - Water quality objectives for metals criteria are expressed in terms of the dissolved fraction of the metal in the water column, unless otherwise noted.
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4 - Criterion Maximum Concentration = the greatest concentration of a pollutant to which aquatic life can be exposed for a short period of time (1-hour average) without deleterious effects.
All concentrations reported as being below the laboratory MDL are reported above as < the MDL.

Table 4-3. Results of MET Elutriate Analyses of Crescent City Harbor Sediments *(continued)*.

Analyte	CCH-2024-2	CCH-2024-3	Marine Water Quality Objectives for Toxic Pollutants for Surface Waters (µg/L)[1,2]	
			Criterion Continuous Concentration[3]	Criterion Maximum Concentration[4]
PAHs (µg/L)				
1-Methylnaphthalene (LPAH)	<0.10	<0.10	-	-
2,3,5-Trimethylnaphthalene (LPAH)	<0.029	<0.029	-	-
2,6-Dimethylnaphthalene (LPAH)	<0.0333	<0.033	-	-
2-Methylnaphthalene (LPAH)	<0.10	<0.10	-	-
Acenaphthene (LPAH)	<0.097	<0.097	-	-
Acenaphthylene (LPAH)	<0.13	<0.13	-	-
Anthracene (LPAH)	<0.083	<0.083	-	-
Benzo(a)anthracene (HPAH)	<0.12	<0.12	-	-
Benzo(a)pyrene (HPAH)	<0.15	<0.15	-	-
Benzo(b)fluoranthene (HPAH)	<0.11	<0.11	-	-
Benzo(e)pyrene (HPAH)	<0.050	<0.050	-	-
Benzo(g,h,i)perylene (HPAH)	<0.11	<0.11	-	-
Benzo(k)fluoranthene (HPAH)	<0.11	<0.11	-	-
Biphenyl (LPAH)	<0.038	<0.038	-	-
Chrysene (HPAH)	<0.11	<0.11	-	-
Dibenzo(a,h)anthracene (HPAH)	<0.16	<0.16	-	-
Dibenzothiophene (LPAH)	<0.051	<0.051	-	-
Fluoranthene (HPAH)	<0.099	<0.099	-	-
Fluorene (LPAH)	<0.093	<0.094	-	-
Indeno(1,2,3-cd)pyrene (HPAH)	<0.13	<0.13	-	-
Naphthalene (LPAH)	<0.11	<0.11	-	-
Perylene (HPAH)	<0.038	<0.038	-	-
Phenanthrene (LPAH)	<0.16	<0.16	-	-
Pyrene (HPAH)	<0.085	<0.085	-	-
∑ LPAHs	**0**	**0**	**-**	**-**
∑ HPAHs	**0**	**0**	**-**	**-**
∑ detected PAHs	**0**	**0**	**-**	**15[5]**

Notes:
1 - California Toxics Rule Criteria, 40 CFR Part 131.38 (USEPA, 2000).
2 - Water quality objectives for metals criteria are expressed in terms of the dissolved fraction of the metal in the water column, unless otherwise noted.
3 - Criterion Continuous Concentration = the greatest concentration of a pollutant to which aquatic life can be exposed for an extended period (4-day average) without deleterious effects.
4 - Criterion Maximum Concentration = the greatest concentration of a pollutant to which aquatic life can be exposed for a short period of time (1-hour average) without deleterious effects.
5 - 24-hour average objective for total PAHs from the 1995 Basin Plan.
All concentrations reported as being below the laboratory MDL are reported above as < the MDL.

Table 4-3. Results of MET Elutriate Analyses of Crescent City Harbor Sediments.

Analyte	CCH-2024-2	CCH-2024-3	Marine Water Quality Objectives for Toxic Pollutants for Surface Waters (µg/L)[1,2]	
			Criterion Continuous Concentration[3]	Criterion Maximum Concentration[4]
Chlorinated Hydrocarbons (µg/L)				
1,2,4-Trichlorobenzene	<0.13	<0.13	-	-
1,2-Dichlorobenzene	<0.11	<0.11	-	-
1,4-Dichlorobenzene	<0.14	<0.14	-	-
Hexachlorobenzene	<0.13	<0.13	-	-
Phthalate Esters (µg/L)				
Bis 2-ethylhexyl phthalate	<3.5	<3.5	-	-
Butyl benzyl phthalate	<0.66	<0.67	-	-
Diethyl phthalate	<0.18	<0.18	-	-
Dimethyl phthalate	<0.096	<0.096	-	-
Di-n-butyl phthalate,	<1.8	<1.8	-	-
Di-n-octyl phthalate	<0.53	<0.53	-	-
Phenols (µg/L)				
2,4-Dimethylphenol	<0.13	<0.13	-	-
3/4-Methylphenol	<0.20	<0.20	-	-
Pentachlorophenol	<0.83	<0.83	7.9[1]	13[1]
Phenol	<0.52	<0.52	-	-
Total Phenols	0	0	-	-
Miscellaneous Extractables (µg/L)				
Benzoic acid	<6.0	<6.0	-	-
Benzyl alcohol	<0.32	<0.32	-	-
Dibenzofuran	<0.096	<0.096	-	-
Hexachloro-1,3-butadiene	<0.15	<0.15	-	-
Hexachloroethane	<0.13	<0.13	-	-

Notes:
1 - California Toxics Rule Criteria, 40 CFR Part 131.38 (USEPA, 2000).
2 - Water quality objectives for metals criteria are expressed in terms of the dissolved fraction of the metal in the water column, unless otherwise noted.
3 - Criterion Continuous Concentration = the greatest concentration of a pollutant to which aquatic life can be exposed for an extended period (4-day average) without deleterious effects.
4 - Criterion Maximum Concentration = the greatest concentration of a pollutant to which aquatic life can be exposed for a short period of time (1-hour average) without deleterious effects.
All concentrations reported as being below the laboratory MDL are reported above as < the MDL.

Table 4-3. Results of MET Elutriate Analyses of Crescent City Harbor Sediments.

Analyte	TEF	Sample ID				Marine Water Quality Objectives for Toxic Pollutants for Surface Waters (ng/L)[1,2]	
		CCH-2024-2		CCH-2024-3		Criterion Continuous Concentration[3]	Criterion Maximum Concentration[4]
Dioxins and Furans (ng/L)		**Conc.**	**TEQ**	**Conc.**	**TEQ**		
1,2,3,4,6,7,8-HpCDD	0.010	0.028	0.00028	0.0061 J	0.000061	-	-
1,2,3,4,6,7,8-HpCDF	0.010	0.0052 J	0.000052	0.00070 J	0.000007	-	-
1,2,3,4,7,8-HxCDD	0.10	0.00049 J	0.000049	0.00026 J	0.000026	-	-
1,2,3,4,7,8-HxCDF	0.10	<0.00026	0	<0.000085	0	-	-
1,2,3,4,7,8,9-HpCDF	0.010	0.00041 J	0.0000041	<0.000034	0	-	-
1,2,3,6,7,8-HxCDD	0.10	0.0013 J	0.00013	0.00016 J	0.000016	-	-
1,2,3,6,7,8-HxCDF	0.10	<0.00027	0	<0.000088	0	-	-
1,2,3,7,8-PeCDD	1.0	0.00034 J	0.00034	<0.00010	0	-	-
1,2,3,7,8-PeCDF	0.030	<0.00013	0	<0.000052	0	-	-
1,2,3,7,8,9-HxCDD	0.10	0.0012 J	0.00012	0.00027 J	0.000027	-	-
1,2,3,7,8,9-HxCDF	0.10	<0.00030	0	0.00032 J	0.000032	-	-
2,3,4,6,7,8-HxCDF	0.10	<0.00023	0	<0.000076	0	-	-
2,3,4,7,8-PeCDF	0.30	<0.00010	0	<0.000039	0	-	-
2,3,7,8-TCDD	1.0	<0.00032	0	<0.000060	0	-	-
2,3,7,8-TCDF	0.10	<0.000082	0	<0.000046	0	-	-
OCDD	0.0003	0.25	0.000075	0.052 J	0.0000156	-	-
OCDF	0.0003	0.014 J	0.0000042	0.0028 J	0.00000084	-	-
∑ Dioxin/Furan TEQ (ng TEQ/L)	**NA**	**NA**	**0.0010543**	**NA**	**0.00018544**	**-**	**-**

Notes:
1 - California Toxics Rule Criteria, 40 CFR Part 131.38 (USEPA, 2000).
2 - Water quality objectives for metals criteria are expressed in terms of the dissolved fraction of the metal in the water column, unless otherwise noted.
3 - Criterion Continuous Concentration = the greatest concentration of a pollutant to which aquatic life can be exposed for an extended period (4-day average) without deleterious effects.
4 - Criterion Maximum Concentration = the greatest concentration of a pollutant to which aquatic life can be exposed for a short period of time (1-hour average) without deleterious effects.
All concentrations reported as being below the laboratory MDL are reported above as < the MDL.

Table 4-4. Sediment Analytes Measured Above HOODS Benchmark Data and Ecological Screening Levels.

Sample Area	Analytes Exceeding HOODS Concentrations	Analytes Exceeding SEF Sediment Toxicity Trigger	Analytes Exceeding ER-L	Marine Water Quality Objectives for Toxic Pollutants for Surface Waters (µg/L)[1,2]	
				Criterion Continuous Concentration[3]	Criterion Maximum Concentration[4]
CCH-2024-1	Sulfides, cadmium, chromium, mercury, molybdenum, & nickel	None	Nickel	None	None
CCH-2024-2	Sulfides, ammonia, antimony, arsenic, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, 2,6-dimethylnaphthalene, fluoranthene, perylene, pyrene, total HPAHs, total detected PAHs, diethyl phthalate, di-n-butyl phthalate, 3/4-methylphenol, phenol, dibenzofuran, & total dioxins/furans	None	Chromium & nickel	None	None
CCH-2024-3	Sulfides, ammonia, cadmium, chromium, copper, mercury, molybdenum, nickel, thallium, 4,4'-DDE, total DDTs, biphenyl, fluoranthene, pyrene, total HPAHs, bis 2-ethylhexyl phthalate, 3/4-methylphenol, phenol, dibenzofuran, & total dioxins/furans	4,4'-DDE[1]	Chromium, nickel, 4,4'-DDE, & total DDTs	None	None

1 – Value did not exceed DMMP User Manual (DMMP 2021) and SF-Bay (SFEI 2024) Bioaccumulation Trigger for total DDT.

5. RESULTS OF BIOLOGICAL TESTING

Up to eight different biological tests were performed for the Crescent City Harbor composite samples CCH-2024-1, CCH-2024-2, and CCH-2024-3:

1. A 10-day amphipod survival test with the amphipod *Leptocheirus plumulosus*,
2. A 10-day juvenile polychaete survival test with the polychaete *Neanthes arenaceodentata*, and
3. A 48-hr bivalve embryo survival & development test with the mussel *Mytilus galloprovincialis*.
4. A 96-hr mysid survival standard elutriate test with the mysid shrimp *Americamysis bahia*,
5. A 96-hr larval fish survival standard elutriate test with the estuarine fish *Menidia beryllina*,
6. A 96-hr modified (MET) elutriate mysid survival test with *Americamysis bahia,*
7. A 28-day bioaccumulation test with the clam *Macoma nasuta*, and
8. A 28-day bioaccumulation test with the polychaete *Nereis virens.*

All tests were performed following appropriate protocols as outlined in the SAP (USACE 2023). Test data and summaries of the statistical analyses for the bioassay results are provided in Appendices E-W. Summaries of test conditions and test acceptability criteria are provided in Appendix X.

5.1 Benthic (Solid-Phase Sediment) Toxicity Testing

Solid-phase bioassays were conducted with the amphipod *L. plumulosus* and the polychaete *N. arenaceodentata*. Positive and negative Control treatments were tested concurrently with the bioassays. The positive Control for both species consisted of a 96-hr waterborne reference toxicant test; the results of these tests were compared to PER's in-house reference toxicant test response databases to determine whether these test organisms were responding to toxic stress in a typical fashion. The negative Control (termed "Lab Control") for the *L. plumulosus* and *N. arenaceodentata* tests consisted of sediment collected from Paradise Cove located in Central San Francisco Bay. Toxicity testing with ammonia was also performed.

ITM/OTM guidance requires that site sediment results be compared with disposal site and/or reference site sediment results or a reference site database (if available) to determine the potential impact of whole sediment on benthic organisms at and beyond the boundaries of the disposal site (USEPA/USACE 1991 and 1998). As detailed in the ITM/OTM, comparative guidelines for acceptance were followed as listed below:

1. If survival is greater in the proposed dredged sediments than in reference site sediment(s) or the reference site sediment database, the proposed dredged sediments are ***not*** acutely toxic to benthic organisms.
2. If a reduction in the survival response between the site sediment and in the reference sediment (or the 'reference site database survival') is ≤20% for amphipods or ≤10% for polychaetes, the test sediments are ***not*** acutely toxic to benthic organisms.

3. If a reduction in the survival response between the site sediment and in the reference sediment (or the 'reference site database survival') is >20% for amphipods or >10% for polychaetes, then the respective survival responses must be statistically compared. If a statistically significant reduction in survival is observed for the site sediment, then the site sediment is considered to be acutely toxic to benthic organisms. Statistical analyses are not performed when reference site database values are used.

5.1.1 Sediment Porewater Characterization

Prior to the initiation of the sediment testing, the composited sediment samples were removed from refrigerated storage, and each was re-homogenized in large stainless-steel bowls. An aliquot of each re-homogenized composite sediment was then centrifuged at 2,500 g for 15 minutes; the resulting supernatant porewater was carefully collected and analyzed for ammonia and total sulfides (Table 5-1). A summary of the measured concentrations of total ammonia and total sulfides in the sediment porewaters, and summary tables of the total ammonia concentrations measured in the test overlying waters are presented in Appendix E.

Table 5-1. Sediment Porewater Initial Water Ammonia Levels.

Sample ID	pH	Total Ammonia (mg/L N)	Total Sulfide (mg/L)
HOODS	7.48	2.03	0.305
CCH-2024-2	7.79	8.96	0.671
CCH-2024-3	7.81	10.6	0.923

5.1.2 Effects of the Crescent City Harbor Sediments on *Leptocheirus plumulosus*

The results of these tests are summarized in Table 5-2. There was 98% survival in the Lab Control treatment. There was ≥91% survival in each of the Crescent City Harbor sediment samples. The differences in survival in the site sediments relative to the HOODS Reference Site survival response were <20%. The differences in survival in the site sediments relative to the control treatment were <20%. These test results indicate that the Crescent City Harbor sediments are ***not*** toxic to amphipods.

The test data and summary of statistical analyses for this testing are presented in Appendix F.

Table 5-2. *Leptocheirus plumulosus* survival in the Crescent City Harbor sediments.

Test Treatment	% Survival in Test Replicates					Mean % Survival
	Rep A	Rep B	Rep C	Rep D	Rep E	
Lab Control	100	100	95	100	95	98
HOODS	95	100	90	100	100	97
CCH-2024-2	100	100	95	100	100	99
CCH-2024-3	90	95	90	95	85	91

5.1.2.1 Reference Toxicant Toxicity to *Leptocheirus plumulosus* - The results of this test are summarized in Table 5-3. The LC_{50} for this test was consistent with PER's reference toxicant test database for this species, indicating that these test organisms were responding to toxic stress in a typical fashion.

The test data and summary of statistical analyses for this test are presented in Appendix G.

Table 5-3. Reference Toxicant Testing: Effects of KCl on *Leptocheirus plumulosus.*

KCl Treatment (g/L)	Mean % Survival
Lab Control	100
0.25	100
0.5	90
1	90
2	**0***
4	**0***
LC_{50} =	1.2 g/L KCl
Typical Response Range (mean ± 2 SD) =	0.67 – 1.7 g/L KCl

* The survival response at this treatment was significantly less than the Lab Control response at $p < 0.05$.

5.1.2.2 Ammonia Toxicity to *Leptocheirus plumulosus* - The results of this test are summarized in Table 5-4. There was ≥95% survival in the Lab Control treatment. The LC_{50s} were >120 mg/L NH_3.

The test data and summary of statistical analyses for this test are presented in Appendix H.

Table 5-4. Effects of Ammonia on *Leptocheirus plumulosus.*

NH_3-N Treatment (mg/L)	Mean % Survival
Lab Control	95
7.5	95
15	100
30	95
60	85
120	100
LC_{50} =	>120 mg/L NH_3-N

* The survival response at this treatment was significantly less than the Lab Control response at $p < 0.05$.

5.1.3 Effects of the Crescent City Harbor Sediments on *Neanthes arenaceodentata*

The results of these tests are summarized in Table 5-5. There was 100% survival in the Lab Control treatment, indicating an acceptable survival response by the test organisms. There was ≥98% survival in each of the Crescent City Harbor sediment samples. The differences in survival in the site sediments relative to the HOODS Reference Site survival response were <10%. The differences in survival in the site sediments relative to the control treatment were <10%. These test results indicate that the Crescent City Harbor sediments are ***not*** toxic to polychaetes.

The test data and summary of statistical analyses for these tests are presented in Appendix I.

Table 5-5. *Neanthes arenaceodentata* survival in the Crescent City Harbor sediments.

Test Treatment	% Survival in Test Replicates					Mean % Survival
	Rep A	Rep B	Rep C	Rep D	Rep E	
Lab Control	100	100	100	100	100	100
HOODS	100	100	100	100	100	100
CCH-2024-2	100	100	100	100	100	100
CCH-2024-3	100	90	100	100	100	98

5.1.3.1 Reference Toxicant Toxicity to *Neanthes arenaceodentata* - The results of this test are summarized in Table 5-6. The LC_{50} for this test was consistent with PER's reference toxicant test database for this species, indicating that these test organisms were responding to toxic stress in a typical fashion.

The test data and summary of statistical analyses for this test are presented in Appendix J.

Table 5-6. Reference Toxicant Testing: Effects of KCl on *Neanthes arenaceodentata.*

KCl Treatment (g/L)	Mean % Survival
Lab Control	100
0.5	100
1	100
2	**0***
3	**0***
4	**0***
LC_{50} =	1.4 g/L KCl
Typical Response Range (mean ± 2 SD) =	1.0 – 2.0 g/L KCl

* The response at this test treatment was significantly less than the Control treatment response at $p < 0.05$.

5.1.3.2 Ammonia Toxicity to *Neanthes arenaceodentata* - The results of this test are summarized in Table 5-7. There was 100% survival in the Lab Control treatments. The LC_{50}s were >240 mg/L NH_3.

The test data and summary of statistical analyses for this test are presented in Appendix K.

Table 5-7. Effects of Ammonia on *Neanthes arenaceodentata.*

NH_3-N Treatment (mg/L)	Mean % Survival
Lab Control	100
15	100
30	100
60	100
120	100
240	**70***
LC_{50} =	>240 mg/L NH_3-N

* The response at this test treatment was significantly less than the Control treatment response at $p < 0.05$.

5.2 Water Column (Standard Sediment Elutriate) Toxicity Testing

The 48-hr bivalve embryo survival and development toxicity test with *M. galloprovincialis* and 96-hr survival tests with *A. bahia* and *M. beryllina* were performed on standard sediment elutriates to assess the water column effects of dredged material disposal. A summary of these test results is presented in Table 5-8; detailed toxicity test results are presented in Sections 5.2.1-5.2.4. The test data and summary of statistical analyses for these tests are presented in Appendices L-Q. Elutriate mixing model calculations are presented in Appendix R.

Positive and negative Lab Control treatments were tested concurrently with the site sediment elutriates. The positive Lab Controls consisted of 'waterborne' reference toxicant tests; the results of these tests were compared to PER's reference toxicant test response databases to determine whether the test organisms were responding to toxic stress in a typical fashion. The negative Lab Control treatments (and dilution medium) consisted of 0.45 µm-filtered natural seawater (obtained from the UC Davis Granite Canyon Marine Laboratory, Carmel, CA), diluted to the test salinity of 30 ppt via addition of Type 1 lab water (reverse-osmosis de-ionized water). As an additional QA measure, the site water that was used to prepare the 100% elutriates was also tested.

The test results for the sediment composite elutriates were compared with the test organism responses at the negative Lab Control treatment to determine the potential impact of the proposed dredged materials on pelagic organisms at and beyond the boundaries of the disposal site (USEPA/USACE 1991 and 1998). The following criteria were used for suitability determinations:

1. If the survival response and/or normal embryo development response in the 100% sediment elutriate treatment is ≥ the Control (clean seawater) treatment response(s), the dredged material is ***not*** predicted to be acutely toxic to water column organisms.
2. If the reduction in survival response and/or normal embryo development response in the 100% sediment elutriate treatment relative to the Control treatment is ≤10%, there is no need for statistical analyses and no indication of water column toxicity attributable to the test sediments.
3. If the reduction in survival response and/or normal embryo development response in the 100% sediment elutriate treatment relative to the Control treatment is >10%, then the data must be evaluated statistically to determine the magnitude of toxicity. If there is >50% survival or normal embryo development in the 100% elutriate treatment, the LC_{50}/EC_{50} is assumed to be ≥100%. If there is <50% survival or normal embryo development in at least one of the elutriate treatments, then an LC_{50}/EC_{50} should be calculated and compared with existing acceptability standards.

In order for the dredged material to be determined suitable for disposal at HOODS, compliance with the narrative water quality standard must be met. Compliance with the narrative water quality standard is determined by evaluating whether the dredge material concentration (suspended particulate phase [SPP]), after mixing, would exceed 1% of the LC_{50} or EC_{50} value calculated from the sediment elutriate test (whichever is most conservative), outside of the mixing zone. Disposal site dilution models for the HOODS disposal areas were used to simulate the initial mixing concentration of the suspended particulate phase (SPP) during disposal. Mixing model results are presented in Table 5-8; mixing model calculations are presented in Appendix R.

Table 5-8. Results of the Crescent City Harbor Sediment Elutriate Toxicity Tests and Dilution Model Calculations.

Sampling Area	Test Species	Survival LC50	Development EC50	Lowest LC50 or EC50 x 0.01[A]	Predicted Suspended Particulate Phase	Pass?[B]
					HOODS	
CCH-2024-2	*M. galloprovincialis*	73% elutriate	71.6% elutriate	0.716	0.0002	**YES**
	A. bahia	>100% elutriate		-	-	
	M. beryllina	>100% elutriate		-	-	
CCH-2024-3	*M. galloprovincialis*	>100% elutriate	>100% elutriate	-	-	**YES**
	A. bahia	>100% elutriate		-	-	
	M. beryllina	>100% elutriate		-	-	

A – Considered the Limiting Permissible Concentration (LPC) for placement at HOODS.
B – If the suspended solid concentration is less than 1% of the lowest LC50 or EC50 value calculated from the sediment elutriate test, or if the lowest reported test LC50/EC50 is >100% elutriate, the sediment passes, and the narrative water quality standard is met.

5.2.1 Toxicity of the Crescent City Harbor Sediment Elutriates to *Mytilus galloprovincialis*

The results of this testing are summarized below in Tables 5-9 and 5-10. There was ≥93.9% survival and ≥98.4% normal development in the Lab Control treatments, indicating acceptable responses by the test organisms. The survival LC_{50} value for the CCH-2024-2 elutriate was 73%. The normal development EC_{50} value for the CCH-2024-2 elutriate was 71.6% elutriate. The survival LC_{50} and normal development EC_{50} value for the CCH-2024-3 elutriate were >100% elutriate.

The test data and summaries of statistical analyses for these tests are presented in Appendix L.

Table 5-9. Effects of CCH-2024-2 Sediment Elutriate on *Mytilus galloprovincialis.*

Elutriate Treatment	Mean % Survival	Mean % Normal Development
Lab Control	93.9	98.7
1%	89.2	**90.0***
10%	93.2	**93.6***
50%	86.8	**87.0***
100%	**0.0***	**0.0***
Site Water	86.3	89.8
Survival LC_{50} or Development EC_{50} =	73% elutriate	71.6% elutriate

* The response at this test treatment was significantly less than the Control treatment response at $p < 0.05$.

Table 5-10. Effects of CCH-2024-3 Sediment Elutriate on *Mytilus galloprovincialis.*

Elutriate Treatment	Mean % Survival	Mean % Normal Development
Lab Control	96.0	98.4
1%	94.2	98.0
10%	96.1	98.6
50%	97.3	98.6
100%	95.1	98.1
Site Water	86.3	89.8
Survival LC_{50} or Development EC_{50} =	>100% elutriate	>100% elutriate

5.2.1.1 Reference Toxicant Toxicity to *Mytilus galloprovincialis* Embryos - The results of this test are summarized in Table 5-11. The EC_{50} for this test were consistent with PER's reference toxicant test database for this species, indicating that these test organisms were responding to toxic stress in a typical fashion.

The test data and summary of statistical analyses for this test are presented in Appendix M.

Table 5-11. Reference Toxicant Testing: Effects of KCl on *Mytilus galloprovincialis.*

KCl Treatment (g/L)	Mean % Normal Embryo Development
Lab Control	98.4
0.5	99.1
1	99.4
2	**85.1***
3	**7.2***
4	**0.0***
EC_{50} =	2.46 g/L KCl
Typical Response Range (mean ± 2 SD)	1.82 – 2.84 g/L KCl

* The response at this test treatment was significantly less than the Control treatment response at $p < 0.05$.

5.2.2 Toxicity of the Crescent City Harbor Sediment Elutriates to *Americamysis bahia*
The results of these tests are summarized below in Tables 5-12 and 5-13. There was ≥98% survival in the Lab Control treatments, indicating acceptable survival responses by the test organisms. The survival LC_{50} values for the Crescent City Harbor sediments were all >100% elutriate.

The test data and summary of statistical analyses for these tests are presented in Appendix N.

Table 5-12. Effects of CCH-2024-2 Sediment Elutriate on *Americamysis bahia.*

Elutriate Treatment	Mean % Survival
Lab Control	100
1%	100
10%	100
50%	100
100%	98.0
Site Water	100
Survival LC_{50} =	>100% elutriate[a]

a - Due to the absence of significant impairment, the LC50 could not be calculated but can be determined by inspection to be >100% elutriate.

Table 5-13. Effects of CCH-2024-3 Sediment Elutriate on *Americamysis bahia.*

Elutriate Treatment	Mean % Survival
Lab Control	98.0
1%	98.0
10%	98.0
50%	100
100%	100
Site Water	100
Survival LC_{50} =	>100% elutriate[a]

a - Due to the absence of significant impairment, the LC50 could not be calculated but can be determined by inspection to be >100% elutriate.

5.2.2.1 Reference Toxicant Toxicity to *Americamysis bahia* - The results of this test are summarized in Table 5-14. The LC_{50} for this test are consistent with PER's reference toxicant test database for this species, indicating that these test organisms were responding to toxic stress in a typical fashion.

The test data and summary of statistical analyses for this test are presented in Appendix O.

Table 5-14. Reference Toxicant Testing: Effects of KCl on *Americamysis bahia*.

KCl Treatment (g/L)	Mean % Survival
Lab Control	100
0.125	100
0.25	100
0.5	90.0
1	**0.0***
2	**0.0***
LC_{50} =	0.66 g/L KCl
Typical Response Range (mean ± 2 SD) =	0.54 – 0.76 g/L KCl

* The response at this test treatment was significantly less than the Control treatment response at $p < 0.05$.

5.2.3 Toxicity of the Crescent City Harbor Sediment Elutriates to *Menidia beryllina*
The results of these tests are summarized in Tables 5-15 and 5-16. There was ≥92% survival in the Lab Control treatments, indicating acceptable survival responses by the test organisms. The survival LC_{50} values for the Crescent City Harbor sediments were all >100% elutriate.

The test data and summary of statistical analyses for these tests are presented in Appendix P.

Table 5-15. Effects of CCH-2024-2 Sediment Elutriate on *Menidia beryllina.*

Elutriate Treatment	Mean % Survival
Lab Control	98.0
1%	92.0
10%	95.8
50%	96.0
100%	90.0
Site Water	100
Survival LC_{50} =	>100% elutriate[a]

a - Due to the absence of significant impairment, the LC50 could not be calculated but can be determined by inspection to be >100% elutriate.

Table 5-16. Effects of CCH-2024-3 Sediment Elutriate on *Menidia beryllina.*

Elutriate Treatment	Mean % Survival
Lab Control	92.0
1%	92.0
10%	96.0
50%	98.0
100%	96.0
Site Water	100
Survival LC_{50} =	>100% elutriate

a - Due to the absence of significant impairment, the LC50 could not be calculated but can be determined by inspection to be >100% elutriate

5.2.3.1 Reference Toxicant Toxicity to *Menidia beryllina* - The results of this test are presented in Table 5-17. The LC_{50} for this test was consistent with PER's reference toxicant test database for this species, indicating that these test organisms were responding to toxic stress in a typical fashion.

The test data and summary of statistical analyses for this test are presented in Appendix Q.

Table 5-17. Reference Toxicant Testing: Effects of KCl on *Menidia beryllina.*

KCl Treatment (g/L)	Mean % Survival
Lab Control	100
0.125	100
0.25	90.0
0.5	95.0
1	100
2	**0.0***
LC_{50} =	1.3 g/L KCl
Typical Response Range (mean ± 2 SD) =	0.85 – 1.5 g/L KCl

* The response at this test treatment was significantly less than the Control treatment response at $p < 0.05$.

5.2.4 Toxicity Testing of Crescent City Harbor Modified Elutriates (MET) using *Americamysis bahia*

The results of the MET tests are summarized in Table 5-18. There was 98% survival at the Lab Control treatment, indicating acceptable survival responses by the test organisms. There was ≥96% survival in the Crescent City Harbor MET samples.

The test data and summary of statistical analyses for this testing are presented in Appendix S.

Table 5-18. Effects of Crescent City Harbor MET Elutriates on *Americamysis bahia.*

Test Treatments	Mean % Survival
Lab Control	98.0
Site Water	100
CCH-2024-1	96.0
CCH-2024-2	98.0
CCH-2024-3	94.0

5.2.4.1 Reference Toxicant Toxicity to *Americamysis bahia* - The results of this test are presented in Table 5-19. The LC_{50} for this test was consistent with PER's reference toxicant test database for this species, indicating that these test organisms were responding to toxic stress in a typical fashion.

The test data and summary of statistical analyses for this test are presented in Appendix T.

Table 5-19. Reference Toxicant Testing: Effects of KCl on *Americamysis bahia*.

KCl Treatment (g/L)	Mean % Survival
Lab Control	100
0.125	97.5
0.25	100
0.5	90.0
1	**0.0***
2	**0.0***
LC_{50} =	0.66 g/L KCl
Typical Response Range (mean ± 2 SD) =	0.51 – 0.77 g/L KCl

* The response at this test treatment was significantly less than the Control treatment response at $p < 0.05$.

5.3 Bioaccumulation Testing of the Crescent City Harbor Sediments

Sediment bioaccumulation testing was performed using the bivalve *M. nasuta* and the polychaete *N. virens*. Negative Lab Control treatments consisted of "clean" sediment collected from Paradise Cove in San Francisco Bay. The survival results for the bioaccumulation tests with *M. nasuta* and *N. virens* are presented in Tables 5-20 and 5-21, respectively.

5.3.1 Sediment Bioaccumulation Test Data for *Macoma nasuta*

The percentage of bivalves that survived in each of the test replicates is summarized in Table 5-20. The test data for this testing are presented in Appendix U.

5.3.2 Sediment Bioaccumulation Test Data for *Nereis virens*

The percentage of polychaetes that survived in each of the test replicates is summarized in Table 5-21. The test data for this testing are presented in Appendix V.

Table 5-20. Crescent City Harbor Sediment Bioaccumulation Testing with *Macoma nasuta.*

Test Treatment	Percent of Bivalves that Survived					Mean % Survival
	Rep A	Rep B	Rep C	Rep D	Rep E	
Lab Control	85	95	95	85	85	89
HOODS	95	100	100	90	100	97
CCH-2024-2	90	90	0[A]	95	95	92.5
CCH-2024-3	0 [A]	90	0 [A]	90	95	91.7

A - Aeration malfunction occurred during testing in this test replicate. Replicate removed from mean percent survival.

Table 5-21. Crescent City Harbor Sediment Bioaccumulation Testing with *Nereis virens*.

Test Treatment	Percent of Polychaetes that Survived					Mean % Survival
	Rep A	Rep B	Rep C	Rep D	Rep E	
Lab Control	70	100	100	80	100	90
HOODS	100	100	100	100	100	100
CCH-2024-2	100	90	90	90	100	94
CCH-2024-3	90	100	100	100	100	98

6. CHEMICAL ANALYSES OF BIVALVE AND POLYCHAETE TISSUES

Per USEPA/USACE coordination, the tissue samples from each of the Crescent City Harbor sediment bioaccumulation tests were analyzed for molybdenum or DDTs to support disposal at HOODS (Table 6-1). (note – the tissues from each test replicate were analyzed, and an Area mean was calculated from that replicate data).

Table 6-1. Tissue Analysis Performed to Support Disposal at HOODS.

Area	Area Sample ID	Tissue Analysis to Support Disposal at HOODS
Area 2	CCH-2024-2	Molybdenum
Area 3	CCH-2024-3	DDTs

Evaluation of bioaccumulation test data was consistent with ITM/OTM guidelines and DMMO guidance. To support disposal at HOODS, organism tissue contaminant concentrations were compared to the HOODS tissue contaminant concentrations.

6.1 Bioaccumulation Test Tissue Analytical Chemistry Results

The results of these analyses (performed by Eurofins) are summarized in Tables 6-2 and 6-3.

Macoma nasuta
The test initiation (T0) mean molybdenum tissue concentration was 0.422 mg/kg mg/kg. The Control mean tissue molybdenum concentration was 0.377 mg/kg. HOODS mean tissue molybdenum concentration was 0.378 mg/kg.

The test initiation (T0) mean tissue total DDT concentration was 0.56 µg/kg. The test Control mean tissue total DDT concentration was 0.26 µg/kg. HOODS mean tissue total DDT concentration was <MDL. The following molybdenum or total DDT tissue concentrations were measured in *Macoma nasuta* exposed to site sediments:

- The mean molybdenum concentration for Crescent City Harbor Area 2 *Macoma nasuta* was 0.377 mg/kg which is less that then the HOODS mean tissue molybdenum concentration ofs 0.378 mg/kg.
- The mean total DDT concentration for Crescent City Harbor Area 3 *Macoma nasuta* was <MDL.

Nereis virens
The test initiation (T0) mean molybdenum tissue concentration was 1.38 mg/kg mg/kg. The Control mean tissue molybdenum concentration was 0.215 mg/kg. HOODS mean tissue molybdenum concentration was 0.210 mg/kg.

Table 6-2. Results of the Chemical Analysis of *Macoma nasuta* Tissues for Crescent City Harbor Samples.

Analyte	HOODS						T0 (Sample collected at time of test initiation)						Lab Control					
	Rep A	Rep B	Rep C	Rep D	Rep E	**Mean**	Rep A	Rep B	Rep C	Rep D	Rep E	**Mean**	Rep A	Rep B	Rep C	Rep D	Rep E	**Mean**
Total lipids %							-	-	-	-	-	**1.15**						
Molybdenum (mg/kg, dry wt)	0.360 J	0.446 J	0.334 J	0.432 J	0.320 J	**0.378**	0.492 J	0.363 J	0.457 J	0.423 J	0.375 J	**0.422**	0.373 J	0.465 J	0.283 J	0.390 J	0.373 J	**0.377**
DDTs (µg/kg, dry wt)																		
2,4'-DDD	<0.063	<0.064	<0.064	<0.064	<0.064	**0**	<0.063	<0.064	<0.063	<0.064	<0.063	**0**	<0.064	<0.064	<0.064	<0.064	<0.064	**0**
2,4'-DDE	<1.0	<1.0	<1.0	<1.0	<1.0	**0**	<1.0	<1.0	<1.0	<1.0	<1.0	**0**	<1.0	<1.0	<1.0	<1.0	<1.0	**0**
2,4'-DDT	<0.091	<0.092	<0.092	<0.092	<0.092	**0**	<0.091	<0.092	<0.091	<0.092	<0.091	**0**	<0.092	<0.092	<0.092	<0.092	<0.092	**0**
4,4'-DDD	<0.49	<0.50	<0.50	<0.50	<0.50	**0**	1.2	<0.50	<0.49	<0.50	<0.49	**0.24**	<0.50	<0.50	<0.50	<0.50	<0.50	**0**
4,4'-DDE	<0.27	<0.27	<0.27	<0.27	<0.27	**0**	1.6	<0.27	<0.27	<0.27	<0.27	**0.32**	<0.27	0.73 J	0.55 J	<0.27	<0.27	**0.26 J**
4,4'-DDT	<0.30	<0.31	<0.31	<0.31	<0.31	**0**	<0.30	<0.31	<0.30	<0.31	<0.30	**0**	<0.31	<0.31	<0.31	<0.31	<0.31	**0**
∑ detected DDTs	**0**	**0**	**0**	**0**	**0**	**0**	**2.8**	**0**	**0**	**0**	**0**	**0.56**	**0**	**0.73 J**	**0.55 J**	**0**	**0**	**0.26 J**

Notes:
J – Analyte detected below the method reporting limit (MRL) and the reported value is therefore an estimate.
All concentrations reported as being below the laboratory MDL are reported above as < the MDL.

Table 6-2 *(continued).* Results of the Chemical Analysis of *Macoma nasuta* Tissues for Crescent City Harbor Samples.

Analyte	CCH-2024-2						CCH-2024-3					
	Rep A	Rep B	Rep C	Rep D	Rep E	**Mean**	Rep A	Rep B	Rep C	Rep D	Rep E	**Mean**
Molybdenum (mg/kg, dry wt)	0.390 J	0.327 J	-	0.351 J	0.358 J	**0.356**						
DDTs (µg/kg, dry wt)												
2,4'-DDD							-	<0.063	-	<0.063	<0.064	**0**
2,4'-DDE							-	<1.0	-	<1.0	<1.0	**0**
2,4'-DDT							-	<0.091	-	<0.091	<0.092	**0**
4,4'-DDD							-	<0.49	-	<0.49	<0.50	**0**
4,4'-DDE							-	<0.27	-	<0.27	<0.27	**0**
4,4'-DDT							-	<0.30	-	<0.30	<0.31	**0**
∑ detected DDTs							**-**	**0**	**-**	**0**	**0**	**0**

Notes:
J – Analyte detected below the method reporting limit (MRL) and the reported value is therefore an estimate.
All concentrations reported as being below the laboratory MDL are reported above as < the MDL.

Table 6-3. Results of the Chemical Analysis of *Nereis virens* Tissues for Crescent City Harbor Samples.

Analyte	HOODS						T0 (Sample collected at time of test initiation)						Lab Control					
	Rep A	Rep B	Rep C	Rep D	Rep E	**Mean**	Rep A	Rep B	Rep C	Rep D	Rep E	**Mean**	Rep A	Rep B	Rep C	Rep D	Rep E	**Mean**
Total lipids %							-	-	-	-	-	**1.38**						
Molybdenum (mg/kg, dry wt)	0.169 J	0.191 J	0.178 J	0.265 J	0.246 J	**0.210**	0.196 J	0.215 J	0.174 J	0.201 J	<0.373	**0.157**	0.215 J	0.166 J	0.187 J	0.273 J	0.236 J	**0.215**
DDTs (µg/kg, dry wt)																		
2,4'-DDD	<0.064	<0.062	<0.064	<0.064	<0.063	**0**	<0.063	<0.064	<0.063	<0.64	<0.063	**0**	<0.090	<0.063	<0.064	<0.063	<0.062	**0**
2,4'-DDE	<1.0	<1.0	<1.0	<1.0	<1.0	**0**	<1.0	<1.0	<1.0	<1.0	<1.0	**0**	<1.5	<1.0	<1.0	<1.0	<1.0	**0**
2,4'-DDT	<0.092	<0.089	<0.092	<0.092	<0.090	**0**	<0.091	<0.092	<0.091	<0.092	<0.091	**0**	<0.13	<0.091	<0.092	<0.090	<0.089	**0**
4,4'-DDD	<0.50	<0.49	<0.50	<0.50	<0.49	**0**	1.6	<0.50	<0.49	<0.50	<0.49	**0.32**	<0.70	<0.49	<0.50	<0.49	<0.49	**0**
4,4'-DDE	<0.27	<0.26	<0.27	<0.27	<0.26	**0**	2.1	<0.27	<0.27	<0.27	<0.27	**0.42**	<0.38	<0.27	<0.27	<0.26	<0.26	**0**
4,4'-DDT	<0.31	<0.30	<0.31	<0.31	<0.30	**0**	<0.30	<0.31	<0.30	<0.31	<0.30	**0**	<0.43	<0.30	<0.31	<0.30	<0.30	**0**
∑ detected DDTs	**0**	**0**	**0**	**0**	**0**	**0**	**3.6**	**0**	**0**	**0**	**0**	**0.72**	**0**	**0**	**0**	**0**	**0**	**0**

Notes:
J – Analyte detected below the method reporting limit (MRL) and the reported value is therefore an estimate.
All concentrations reported as being below the laboratory MDL are reported above as < the MDL.

Table 6-3 *(continued)*. Results of the Chemical Analysis of *Nereis virens* Tissues for Crescent City Harbor Samples.

Analyte	CCH-2024-2						CCH-2024-3					
	Rep A	Rep B	Rep C	Rep D	Rep E	**Mean**	Rep A	Rep B	Rep C	Rep D	Rep E	**Mean**
Molybdenum (mg/kg, dry wt)	0.202 J	0.173 J	0.223 J	0.306 J	0.259 J	**0.233**						
DDTs (µg/kg, dry wt)												
2,4'-DDD							<1.3	<0.063	<0.063	<0.063	<0.064	**0**
2,4'-DDE							<21	<1.0	<1.0	<1.0	<1.0	**0**
2,4'-DDT							<1.8	<0.091	<0.090	<0.091	<0.092	**0**
4,4'-DDD							<10	<0.49	<0.49	<0.49	<0.50	**0**
4,4'-DDE							<5.4	<0.27	<0.26	<0.27	<0.27	**0**
4,4'-DDT							<6.2	<0.30	<0.30	<0.30	<0.31	**0**
∑ detected DDTs							**0**	**0**	**0**	**0**	**0**	**0**

Notes:
J – Analyte detected below the method reporting limit (MRL) and the reported value is therefore an estimate.
All concentrations reported as being below the laboratory MDL are reported above as < the MDL.

The test initiation (T0) mean tissue total DDT concentration was 0.72 µg/kg. The test Control mean tissue total DDT concentration was <MDL. HOODS mean tissue total DDT concentration was <MDL. The following molybdenum and total DDT tissue concentrations were measured in *Nereis virens* exposed to site sediments:

- The mean molybdenum concentration for Crescent City Harbor Area 2 *Nereis virens* were 0.233 mg/kg. While this concentration was slightly greater than the HOODS mean tissue molybdenum concentration of 0.210 mg/kg, it was not statistically different.
- The mean total DDTs concentration for Crescent City Harbor Area 3 *Nereis virens* were <MDL.

The full Data Report for the *M. nasuta* and *N. virens* tissue analyses is presented in Appendix W.

6.2 Comparison of Tissue Concentrations to HOODS Reference Site Database

The *M. nasuta* and *N. virens* tissue molybdenum and total DDT concentrations were compared to the HOODS reference database. With the exception of Area 2 *Nereis viren* mean molybdenum tissue concentration, none of the mean measured tissue molybdenum or total DDT concentrations exceeded the HOODS reference site value. Although the Area 2 *Nereis virens* mean molybdenum tissue concentration was greater than the HOODS reference site concentration, it was not statistically significantly greater than the HOODS reference site concentration. Based on the overall results, no further evaluation was performed.

7. QUALITY CONTROL REVIEW

7.1 Conventional and Chemical Analytical Quality Control Summary

The QA/QC review entailed reviewing the contract lab Data Reports for sample integrity, correct methodology, and compliance with all appropriate quality Lab Control requirements. The overall data quality assessment found that all data were usable. Appendix B contains the sediment conventional and chemical analysis reports. Appendix C contains the Modified Waste Extraction Test (mWET) chemical analysis reports. Appendix D contains the Modified Elutriate Test chemical analysis reports. Appendix W contains the conventional and chemical analysis reports for the tissue samples. Each of these reports includes the contract laboratory QA/QC narrative.

A review summary of the analytical methods, the targeted reporting limits, and the achieved method reporting and detection limits are presented in Table 5-1.

7.1.1 Sediment Conventional and Chemical Analytical QA/QC Summary

Eurofins Calscience Report 570-178063-1

Butyltins – The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 570-426441 and analytical batch 570-426925 were outside control limits. Sample matrix interference was suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

The LCS and/or laboratory control sample duplicate (LCSD) for preparation batch 570-426441 and analytical batch 570-426925 were recovered outside control limits for dibutyltin and tributyltin. These analytes were biased high in the LCS and were not detected in the associated samples; therefore, the data were reported.

The LCS and/or LCSD for preparation batch 570-426731 and analytical batch 570-428293 were recovered outside control limits for dimethyl phthalate. These analytes were biased high in the LCS and were not detected in the associated samples; therefore, the data were reported.

OCl pesticides – The continuing calibration verification (CCV) associated with 570-428361 was recovered high and outside the control limits for 2,4'-DDT on one column. Results were confirmed on both columns and reported from the passing column. The associated samples were CCH-2024-2 (570-178063-2[MSD]), (LCS 570-426735/4-A) and (LCSD 570-426735/5-A).

The MS/MSD/sample duplicate (DUP) precision for preparation batch 570-426735 and analytical batch 570-428361 were outside control limits. Sample matrix interference and/or non-homogeneity was suspected because the associated LCS/LCSD precision were within acceptance limits.

The RPD of the LCS and LCSD for preparation batch 570-426735 and analytical batches 570-428560 and 570-428361 were recovered outside control limits for aldrin.

The MS/MSD/DUP precision for preparation batch 570-426735 and analytical batch 570-428560 were outside control limits. Sample matrix interference and/or non-homogeneity were suspected because the associated LCS/LCSD precision were within acceptance limits.

Metals – The method blank for preparation batch 570-426790 and analytical batch 570-427313 contained copper and vanadium above the MDL. This target analyte concentration was less than the RL in the method blank; therefore, re-extraction and/or re-analysis of samples was not performed.

The MS/MSD recoveries for preparation batches 570-426790, 570-427182, and 570-426601 and analytical batches 570-427313, 570-427586, and 570-426882 were outside control limits for one or more analytes. Sample matrix interference and/or non-homogeneity were suspected because the associated LCS recovery was within acceptance limits.

The sample and sample duplicate recoveries and precision for preparation batch 570-426790 and analytical batch 570-427313 were outside control limits. Sample matrix interference and/or non-homogeneity were suspected because the associated LCS/LCSD precision was within acceptance limits.

The method blank for preparation batch 570-427182 and analytical batch 570-427586 contained barium, copper, and antimony above the MDL. This target analyte concentration was less than the RL in the method blank; therefore, re-extraction and/or re-analysis of samples were not performed.

General Chemistry – The sulfide MS/MSD recovery for 570-178616-A-1-H and 570-178616-A-1-J MSD samples associated with preparation batch 570-426520 and analytical batch 570-426715 were outside control limits. The associated LCS recovery met acceptance criteria.

Eurofins Calscience Report 570-178063-3

Dioxins/Furans – The MS recoveries for preparation batch 320-752667 and analytical batch 320-755074 were outside control limits for one or more analytes. Sample matrix interference and/or non-homogeneity were suspected because the associated LCS recovery was within acceptance limits.

Eurofins Calscience Report 570-178065-1

Grain Size – The DUP precision for analytical batch 570-427029 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated LCS/LCSD precision were within acceptance limits.

Eurofins Calscience Report 570-178065-2

TOC and Percent Solids – The QC section indicated that the samples were out of hold time for analyses of TOC and percent solids. However, the samples were within the hold time (14 days until extraction for unfrozen samples, 6 months for frozen samples) listed in the USACE Master SAP (USACE 2021) for TOC and solids.

Eurofins Calscience Report 570-183022-1

Butyltins – The MS/MSD recoveries for preparation batch 570-438584 and analytical batch 570-438932 were outside control limits. Sample matrix interference was suspected because the associated LCS recovery was within acceptance limits.

The LCS and / or LCSD for preparation batch 570-438584 and analytical batch 570-438932 were recovered outside control limits for the 4-nitroaniline analyte. The analyte was biased high in the LCS and was not detected in the associated samples; therefore, the data were reported.

The RPD of the LCS and LCSD for preparation batch 570-438584 and analytical batch 570-439985 was recovered outside control limits for hexachlorocyclopentadiene.

The LCS and/or LCSD for preparation batch 570-438584 and analytical batch 570-439985 were recovered outside control limits for 4-nitroaniline and 2,4-dinitrophenol. These analytes were biased high in the LCS and were not detected in the associated samples; therefore, the data were reported.

PCBs – The method blank for preparation batch 570-438265 contained PCB-97 and PCB-174 above the RL. None of the samples associated with this method blank contained the target compound; therefore, re-extraction and/or re-analysis of samples were not performed.

OCl pesticides –
The RPD of the LCS and LCSD for preparation batch 570-438581 and analytical batch 570-438723 were recovered outside control limits for delta-BHC.

Metals – The method blank for preparation batch 570-438146 and analytical batch 570-438973 contained molybdenum were above the MDL. This target analyte concentration was less than the RL in the method blank; therefore, re-extraction and/or re-analysis of samples was not performed.

The MS/MSD recoveries for preparation batch 570-438146 and analytical batch 570-438973 were outside control limits for one or more analytes. Sample matrix interference and/or non-homogeneity were suspected because the associated LCS recovery was within acceptance limits.

The MS/MSD recoveries for preparation batch 570-438524 and analytical batch 570-438558 were outside control limits for one or more analytes. Sample matrix interference and/or non-homogeneity are suspected because the associated LCS recovery was within acceptance limits.

The HOODS (570-183022-1) sample was received outside of laboratory holding time, however, the samples were within the hold time (6 months extraction for unfrozen samples for all metals except mercury, 1 year for frozen samples for all metals except mercury and 28 days for mercury) listed in the USACE Master SAP (USACE 2021).

General Chemistry – The MSD recoveries for the (570-183319-A-1-E) and (570-183319-A-1-G MSD) samples associated with preparation batch 570-438568 and analytical batch 570-438704 were outside control limits. The associated LCS recovery met acceptance criteria.

The HOODS (570-183022-1) sample was received outside of laboratory holding time. However, the samples were within the hold time (14 days until extraction for unfrozen samples, 6 months for frozen samples) listed in the USACE Master SAP (USACE 2021) for TOC and solids.

Geotechnical – The DUP precision for analytical batch 570-438975 was outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated LCS/LCSD precision was within acceptance limits.

Eurofins Calscience Report 570-183022-3

Dioxins/Furans – The MB associated with 320-762310 has 2 peaks eluting within the non-2,3,7,8-PeCDD (Totals) window which are greater than the RL. The associated samples had the same peaks at similar levels. As non-2,3,7,8 dioxins and furans are estimates only, the data was reported with no further corrective action. Investigations are underway in the extraction laboratory to determine the source of this contamination for the HOODS (570-183022-1) sample.

7.1.2 Modified Waste Extraction Test (mWET) Chemical Analytical QA/QC Summary

Eurofins Calscience Report 570-178063--1

Metals – The MS/MSD recoveries for preparation batch 350-1904 and analytical batch 350-1961 were outside control limits for one or more analytes. Sample matrix interference and/or non-homogeneity were suspected because the associated LCS recovery was within acceptance limits.

7.1.3 Modified Elutriate Test (MET) Chemical Analytical QA/QC Summary

Eurofins Calscience Report 570-180369-1

Butyltins – The CCH-2024-2 MET (570-180369-1) sample formed emulsions during the extraction procedure. The emulsions were broken up using lots of sodium sulfate. The RPD of the LCS and LCSD for preparation batch 570-431328 and analytical batch 570-433824 were recovered outside control limits for tributyltin.

The LCS/LCSD for preparation batch 570-431984 and analytical batch 570-433443 were recovered outside control limits for benzoic acid. Benzoic acid had been identified as a poor performing analyte when analyzed using this method; therefore, re-extraction/re-analysis was not performed.

The RPD of the LCS and LCSD for preparation batch 570-431984 and analytical batch 570-433443 were recovered outside control limits for multiple analytes.

PCBs – PCB-5/8 was recovered outside control limits for the LCS associated with preparation batch 570-431878 and analytical batch 570-432499. The laboratory stated that this is not indicative of a systematic control problem because these were random marginal exceedances. Qualified results were reported.

OCl pesticides – The MS/MSD/DUP precision for preparation batch 570-431875 and analytical batch 570-433689 was outside control limits. Sample matrix interference and/or non-homogeneity were suspected because the associated LCS/LCSD precision was within acceptance limits.

The MS/MSD recoveries for preparation batch 570-431875 and analytical batch 570-433689 were outside control limits for one or more analytes. Sample matrix interference and/or non-homogeneity were suspected because the associated LCS recovery was within acceptance limits.

General Chemistry – The laboratory indicated that dissolved sulfide analysis is normally performed in the field and has a method-defined holding time of 15 minutes. The CCH-2024-2 MET (570-180369-1) and CCH-2024-3 MET (570-180369-2) samples exceeded the 15 minute hold time.

The CCH-2024-2 MET (570-180369-1) and CCH-2024-3 MET (570-180369-2) samples were analyzed outside of analytical holding time (24 hours after collection) for DOC.

The MS/MSD recoveries for preparation batch 570-433548 and analytical batch 570-434041 were outside control limits for one or more analytes for DOC. Sample matrix interference and/or non-homogeneity were suspected because the associated LCS recovery was within acceptance limits.

Eurofins Calscience Report 570-180369-2
No analytical or quality issues were noted.

7.1.4 Tissue Sample Analytical QA/QC Summary

Eurofins Calscience Report 570-184515-1
DDTs – Eurofins indicated that insufficient sample volume was available to perform a MS/MSD associated with preparation batch 570-446944.

The CCH-2024-3-A-Nereis-Day 28 sample was diluted due to the nature of the sample matrix (570-184515-21). Elevated RLs were provided.

The MS/MSD/DUP precision for preparation batch 570-447058 and analytical batch 570-450411 were outside control limits. Sample matrix interference and/or non-homogeneity were suspected because the associated LCS/LCSD precision were within acceptance limits.

The MS/MSD recoveries for preparation batch 570-447058 and analytical batch 570-450411 were outside control limits for one or more analytes. Sample matrix interference and/or non-homogeneity were suspected because the associated LCS recovery was within acceptance limits.

No additional analytical or quality issues were noted.

Table 7-1. Achieved Detection and Reporting Limits for Sediments.

Analyte	Units	Method Used	Targeted MRL	Achieved MDL	Achieved MRL
Metals					
Arsenic	mg/kg	EPA 6020	2	0.130 – 0.208	0.708 - 0.750
Cadmium	mg/kg	EPA 6020	0.3	0.020 – 0.039	0.046 – 0.088
Chromium	mg/kg	EPA 6020	5	0.142 – 0.236	1.42 - 2.27
Copper	mg/kg	EPA 6020	5	0.161 – 0.258	1.42 - 2.27
Lead	mg/kg	EPA 6020	5	0.0927 – 0.149	0.708 - 1.14
Mercury	mg/kg	EPA 7471A	0.02	0.0310 – 0.0515	0.117 - 0.195
Nickel	mg/kg	EPA 6020	5	0.135 – 0.216	1.42 - 2.27
Selenium	mg/kg	EPA 7742	0.1	0.097 – 0.186	0.194 – 0.373
Silver	mg/kg	EPA 6020	0.2	0.015 – 0.032	0.046 – 0.088
Zinc	mg/kg	EPA 6020	1	0.786 – 1.26	14.2 – 22.7
Pesticides					
Aldrin	µg/kg	EPA 8081B	2	0.52 – 0.82	1.5 - 2.2
a-*BHC*	µg/kg	EPA 8081B	2	0.11 – 0.18	1.5 - 2.2
b-BHC	µg/kg	EPA 8081B	2	0.27 – 0.43	1.5 - 2.2
d-BHC	µg/kg	EPA 8081B	2	0.21 – 0.34	1.5 - 2.2
g-BHC (Lindane)	µg/kg	EPA 8081B	2	0.15 - 0.24	1.5 - 2.2
Chlordane	µg/kg	EPA 8081B	20	1.0 - 1.6	7.4 - 11
2,4'-DDD	µg/kg	EPA 8081B	2	0.091 - 0.14	1.4 - 2.2
2,4'-DDE	µg/kg	EPA 8081B	2	1.5 - 2.3	1.4 - 4.5
2,4'-DDT	µg/kg	EPA 8081B	2	0.13 - 0.21	1.4 - 2.2
4,4'-DDD	µg/kg	EPA 8081B	2	0.71 - 1.1	1.4 - 2.2
4,4'-DDE	µg/kg	EPA 8081B	2	0.38 – 2.0	1.4 -7.4
4,4'-DDT	µg/kg	EPA 8081B	2	0.44 - 0.69	1.4 - 2.2
Total DDT	µg/kg	EPA 8081B	2	0.091 – 2.3	1.4 – 7.4
Dieldrin	µg/kg	EPA 8081B	2	0.094 -0.15	0.28 - 0.45
Endosulfan I	µg/kg	EPA 8081B	2	0.17 - 0.26	1.4 - 2.2
Endosulfan II	µg/kg	EPA 8081B	2	0.32 - 0.51	1.4 - 2.2
Endosulfan sulfate	µg/kg	EPA 8081B	2	0.15 - 0.24	1.4 - 2.2
Endrin	µg/kg	EPA 8081B	2	0.27 - 0.43	1.4 - 2.2
Endrin aldehyde	µg/kg	EPA 8081B	2	1.4 - 2.2	1.4 - 2.2
Heptachlor	µg/kg	EPA 8081B	2	0.084 - 0.13	1.4 - 2.2
Heptachlor epoxide	µg/kg	EPA 8081B	2	0.12 - 0.19	1.4 - 2.2
Toxaphene	µg/kg	EPA 8081B	20	1.4 - 2.2	7.1 - 11
Total Organotins	µg/kg	Krone 1989	10	0.76 – 3.6	4.2 – 6.7
Total PAHs	µg/kg	EPA 8270C	20	1.9 – 54	15 -71
Total PCBs	µg/kg	EPA 8270C	0.5	0.067 – 0.54	0.28 – 0.90
Dioxins/Furans	µg/kg	EPA 1613	2.0	0.000088 – 0.00089	0.0015 – 0.022
Grain Size	%	ASTM D4464	0.1	0.1	0.01
Total Solids	%	SM 2540B	0.1	0.1	0.1
Total Organic Carbon (TOC)	%	EPA 9060A	0.1	0.0902 – 0.451	0.800 – 2.00
Tissue Lipids (wet weight)	%	NOAA 1993	0.01	0.0990 – 0.100	0.0990 – 0.100

Table 7-2. Achieved Detection and Reporting Limits for Modified Elutriate and Modified Waste Extraction Test Analytes.

Analyte	Units	Method Used	Targeted MRL	Achieved MDL	Achieved MRL
Metals					
Arsenic	µg/L	EPA 1640	1	0.630	0.700
Cadmium	µg/L	EPA 1640	0.25	0.0130	0.0200
Chromium	µg/L	EPA 1640	1	0.110	0.500
Copper	µg/L	EPA 1640	1	0.430	0.500
Lead	µg/L	EPA 1640	0.25	0.0230	0.0500
Mercury	µg/L	EPA 1631E	0.005	0.0002	0.0005
Nickel	µg/L	EPA 1640	5	0.150	0.500
Selenium	µg/L	EPA 1640	0.5	0.300	0.700
Zinc	µg/L	EPA 1640	10	0.310	0.500

8. SUMMARY

The Crescent City Harbor Channel sediments were analyzed to evaluate suitability of the material to be dredged for placement Whaler Island Nearshore Disposal Site or the Humboldt Open Ocean Disposal Site (HOODS).

Whaler Island Nearshore Disposal Site
The sediments from the Entrance Channel Area (CCH-2024-1), Inner Harbor Channel Area (CCH-2024-2), and the Marina Access Channel Area (CCH-2024-3) were all >80% sand. Per the Whaler Island suitability decision flowchart (Figure 8-1) material from all Areas should be considered suitable for disposal at Whaler Island. However, it should be noted that 4,4'-DDE was measured in the CCH-2024-2 composite at 39 µg/kg which was above the SEF toxicity trigger of 9 µg/kg (USACE 2018) and the ER-L of 2.2 µg/kg. The following lines of evidence support placement of CCH-2024-2 at Whaler Island:

- In the SEF framework, exceeding a toxicity trigger requires toxicity testing to be performed on a sample. Toxicity tests performed on the CCH-2024-2 composite sediment indicated that the 4,4'-DDE concentrations in the sample were not biologically available to cause toxicity.
- The sediment total DDT concentration was below the SEF bioaccumulation trigger. Additionally, bioaccumulation testing was performed and indicated that the total DDT did not accumulate in bivalve or polychaete tissues.

Unconfined Aquatic Disposal at HOODS
For the CCH-2024-1, CCH-2024-2, and CCH-2024-3 sediments, one or more analyte concentrations were above HOODS reference sediment concentrations.

Benthic toxicity testing performed on the CCH-2024-2 and CCH-2024-3 sediments indicated that none of the measured compounds in these sediments were biologically available to cause toxicity in the 10-day sediment tests. In addition, the narrative WQO was met for the sediment elutriate tests performed.

Per USEPA/USACE coordination, the tissue samples from the sediment bioaccumulation tests for CCH-2024-2 were analyzed for molybdenum, and the tissue samples from CCH-2024-3 were analyzed for DDTs to support disposal at HOODS. The CCH-2024-2 tissue molybdenum concentrations were either less than or statistically the same as the HOODS reference site concentration, and CCH-2024-3 tissue total DDTs concentrations were less than the HOODS reference site concentration.

Based on these results, the CCH-2024-1, CCH-2024-2, and CCH-2024-3 sediments would be considered suitable for unconfined aquatic disposal (SUAD) at HOODS.

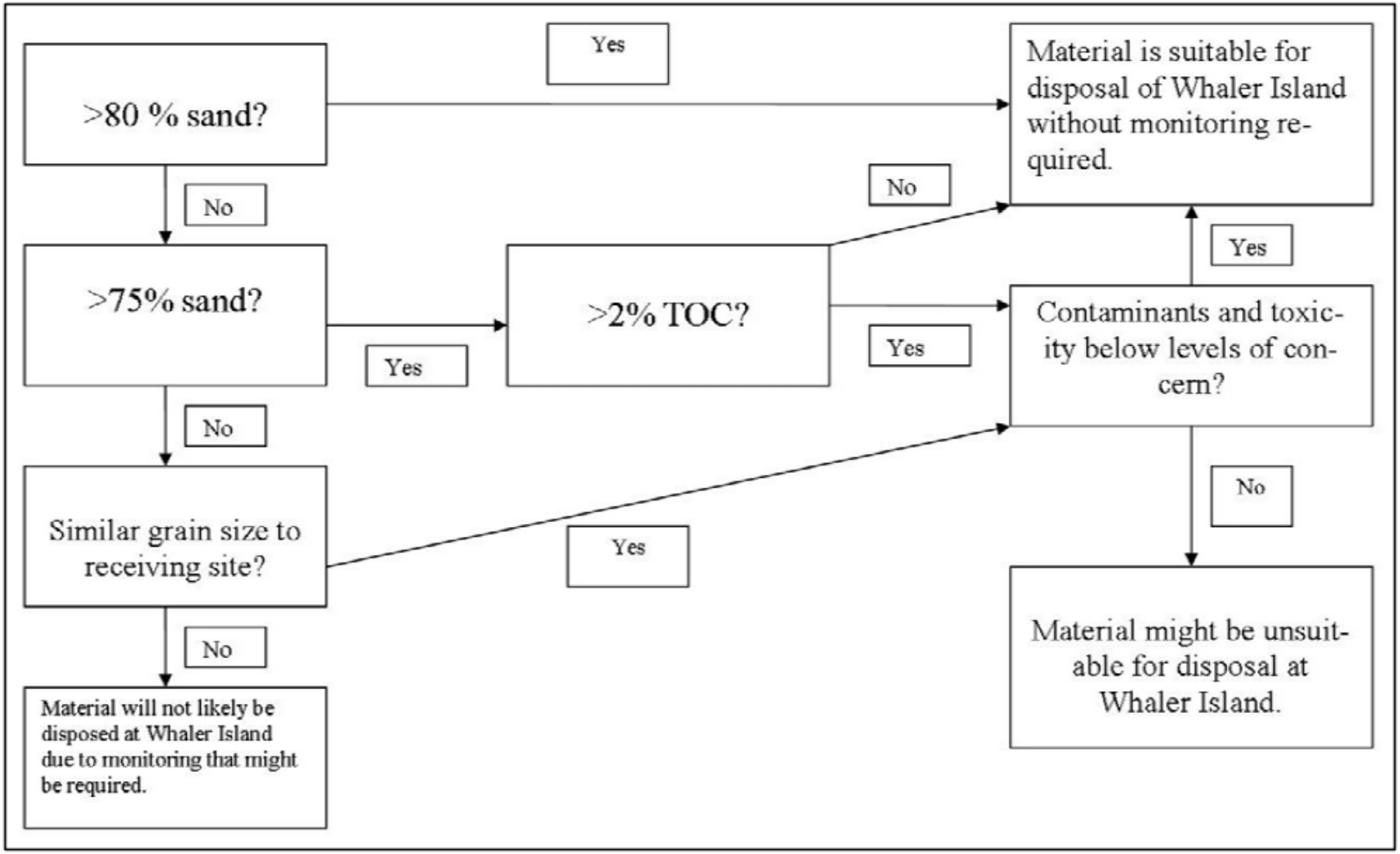

Figure 8-1 Whaler Island Suitability Decision Flowchart

9. REFERENCES

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Appendix F

Comments received on the Draft Environmental Assessment.

Commentor: Margarete Teicher, North Coast Regional Water Quality Control Board

Date Received: June 26, 2024 *Format Received: Email*

Comment 1 of 9: Placement Site

1. Whaler Island is not a feasible disposal site for the following reasons:
    a. It has not been designated as a disposal site by any of the permitting agencies.

    Whaler Island was first used in 1988 as a dredge material placement site and provides beach nourishment. It is regularly used by both the USACE and the Crescent City Harbor District. The North Coast Regional Water Quality Control Board Order No. R1-2000-59 specifically provides Whaler Island as an appropriate disposal location for the dredged material from the federal channels. Therefore, Whaler Island is a permitted disposal location by the North Coast Regional Water Quality Control Board.

    b. Section 4.1.1 (Waste Discharge Prohibitions) of the Northcoast Regional Water Quality Control Board's (Regional Water Board) Basin Plan prohibits point source waste discharges to Crescent City Harbor in accordance with the State Water Boards "Water Quality Control Policy for the Enclosed Bays and Estuaries of California". Chapter II.4 (Quality Requirements For Waste Discharges) of the Water Quality Control Policy for the Enclosed Bays and Estuaries of California states that "Dredge spoils to be disposed of in bay and estuarine waters must comply with federal criteria for determining the acceptability of dredge spoils to marine waters and must be certified by the State Board or Regional Boards as in compliance with the State Plans and Policies."

    No comment necessary.

    c. Placement of dredge material, without a complete sediment characterization to determine suitability, may not be protective of the following existing and potential Beneficial Uses, which have been adopted for Crescent City Harbor:
        i. FRSH: Freshwater Replenishment
        ii. NAV: Navigation
        iii. REC-1: Water Contact Recreation
        iv. REC-2: Non-Contract Water Recreation
        v. COMM: Commercial and Sport Fishing
        vi. WARM: Warm Freshwater Habitat
        vii. COLD: Cold Freshwater Habitat
        viii. WILD: Wildlife Habitat
        ix. RARE: Rare, Threatened, or Endangered Species
        x. MAR: Marine Habitat
        xi. MIGR: Migration of Aquatic Organisms
        xii. SHELL: Shellfish Harvesting
        xiii. AQUA: Aquaculture

    The sediments to be dredged have undergone physical, chemical, and biological testing to ensure suitability for the chosen placement site.

Comment 2 of 9: Placement Site

2. The Crescent City Dredge Pond is not a suitable disposal site as it is currently over capacity, and it is designated as a Crescent City Harbor District disposal site for its dredge material. The U.S. Army Corps of Engineers (USACE) would need to obtain approval by the Crescent City Harbor District for use of the Crescent City Dredge Pond if/when the pond has capacity for additional dredge material.
   We understand that the Crescent City Dredge Pond is not a feasible disposal option for the FY2024 effort, as the site has reached capacity; however, the site was important to include in our analysis in case it becomes available for future placements.

Comment 3 of 9: Beneficial Use

3. Beneficial reuse of dredge material consistent with the Northcoast Regional Water Board Sampling and Analysis Plan/Report Guidance, Beneficial Reuse of Dredge Material (attached), may be suitable. In addition, beneficial reuse of dredge material requires a permit from the Regional Water Board.
   The USACE disagrees and points out that the North Coast Regional Water Quality Board has not required a separate permission for Whaler Island in any of its past years and specifically names it as an appropriate disposal site, see response above. Further, the USACE has included the guidance from the North Coast Regional Water Quality Control Board, as necessary, within the Sampling & Analysis Results (SAR) from the sediment testing.

Comment 4 of 9: Scope of Analysis

4. Section 2 (Scope of Analysis). Explain why the EA is focused on direct and indirect impacts to the "human environment" only and not the entire environment within the footprint of the project.
   The focus on the "human environment" is in compliance with federal law. Section 101 of the National Environmental Protection Act (NEPA) sets forth a national policy "to use all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans." 42 U.S.C. 4331(a). Section 102 of NEPA establishes procedural requirements, applying that national policy to proposals for major Federal actions significantly affecting the quality of the **human environment** by requiring Federal agencies to prepare a detailed statement on: (1) the environmental impact of the proposed action; (2) any adverse effects that cannot be avoided; (3) alternatives to the proposed action; (4) the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity; and (5) any irreversible and irretrievable commitments of resources that would be involved in the proposed action. 42 U.S.C. 4332(2)(C).

Comment 5 of 9: Placement Site

5. Section 3.1.1 (Hydraulic (Cutterhead) Dredging: Explain why HOODS is a disposal alternative evaluated in the EA even though this section states "It is not feasible to transport of hydraulically dredged material to HOODS given the extensive distance to the site." Also, explain where has the

USACE previously disposed of dredged material from the Crescent City Harbor since 1956 when dredging activities were conducted using the cutterhead method.

A clarification has been added to *Section 3.1.1 of the Final Environmental Assessment for Crescent City Harbor Maintenance Dredging, Crescent City, Del Norte County, California, Fiscal Years 2024-2035:* It is not feasible to transport hydraulically dredged material via pipeline to HOODS given the extensive distance to the site; however, hydraulic dredge may still be used for the HOODS site by loading a dredge barge with material then transporting.

Comment 6 of 9: Beneficial Use

6. Section 3.1.5 (Proposed Action Sub-Alternative 3: Dredging and Disposal at the Crescent City Dredge Ponds):
    a. It should be noted that Regional Water Board staff issues permits for the beneficial reuse of dredge material. Regional Water Board staff typically does not deny a permit if the naturally occurring chemicals (e.g., arsenic) have concentration levels in the dredge material proposed for beneficial reuse that are similar to background.
    b. It should also be noted that the Crescent City Harbor District (HD) is currently coordinating with Regional Water Board staff to obtain beneficial reuse permits for some of the dredged material stockpiled in the dredge pond. It should also be noted that the CC HD and USACE can coordinate to remove all the stockpiled dredged sediment from the pond and dispose of it at the landfill. A permit from the Regional water Board for such a disposal at the landfill is not required.

    No comment necessary.

Comment 7 of 9: Permitting

7. Section 4.6.2 (Water Quality, Environmental Effect): The USACE should submit an application to obtain a 10-year permit for maintenance dredging of federal channels and beneficial reuse of dredged sediment at Whaler Island. It should be noted that that NCRWQCB Order No. R1-2000-59, referenced in this section of the EA, was issued to the Crescent City Harbor District for its maintenance dredging and disposal options. The USACE is not a named discharger or applicant on that permit. Therefore, the USACE would need to seek coverage under its own permit.

The USACE has used the 401 Certification *"Order No. R1-2000-59 Waste Discharge Requirements for Crescent City Harbor District Maintenance Dredging District Berthing Areas and Federal Channel",* also included in *Appendix A*, since 2000 as it specifically includes the Federal Navigation Channels. The USACE has received concurrence on the use of this certification from the NCRWQCB as recently as 2019.

Comment 8 of 9: Sediment Suitability

8. Section 4.6.2 (Water Quality, Environmental Effect) and Section 4.8 (Hazardous and Toxic Materials): The EA should be revised to state that some metals, DDT, and dioxin/furans were detected in sediments at some sampling locations during the 2024 sampling event. The Sampling and Analysis Report (SAR) that is being prepared by the USACE associated with this project should be consistent with the Northcoast Regional Water Board Sampling and Analysis Plan/Report Guidance, Beneficial Reuse of Dredge Material and clearly describe the extent of contamination of sediments to be dredge for the purpose of disposal or beneficial reuse.

A clarification has been added to *Section 4.6.2 of the Final Environmental Assessment for Crescent City Harbor Maintenance Dredging, Crescent City, Del Norte County, California, Fiscal Years 2024-2035:* In addition, in 2024 USACE conducted sampling and testing of the material to be dredged (as described in the Geology, Sediments, and Seismicity section below). These analyses found no contaminated sediments that would preclude placement at the proposed placement sites (USACE 2024). More information on the sediment sampling results can be accessed in ***Appendix E.*** Past characterizations similarly did not identify the presence of any contaminated materials that would preclude placement at the proposed placement sites (ADH 2009).

Comment 9 of 9: Scope of Analysis

9. Section 4.9.2 (Biological Resources, Environmental Effects). This section should clearly describe all potential impacts to biological resources as a result of the placement of dredge sediment at Whaler Island, including sediment characterization to ensure dredged material is suitable for placement at Whaler Island and will not have adverse impacts to the environment and human health. The only discussion of potential impacts resulting from placement at Whaler Island includes potential clogging of a culvert.
   More information on sediment characterization has been included in ***Appendix E.***

Commentor: Amanda Canepa, California Department of Fish and Wildlife

Date Received: June 25, 2024 *Format Received: Electronic Letter*

Comment 1 of 2: Eelgrass

1. Native eelgrass beds, Zostera marina, are recognized by state and federal statutes as both highly valuable and sensitive habitats. Eelgrass provides primary production and nutrients to the ecosystem along with spawning, foraging, and nursery habitat for fish and other species. Pursuant to the federal Magnuson-Stevens Fishery Conservation and Management Act, eelgrass is designated as Essential Fish Habitat for various federally managed fish species within the Pacific Coast Groundfish and Pacific Coast Salmon Fisheries Management Plans (FMP). Eelgrass is also considered a habitat area of particular concern for various species within the Pacific Coast Groundfish FMP. Eelgrass habitats are further protected under state and federal "no-net-loss" policies for wetland habitats. Additionally, the importance of eelgrass protection and restoration, as well as the ecological benefits of eelgrass, is identified in the California Public Resources Code (PRC Section 35630).

   The Department is concerned about potentially significant direct and indirect impacts to eelgrass habitat from the proposed Project. The Department mapped eelgrass in the Crescent City Harbor in June 2023 and noted expansion of eelgrass distribution compared to previous survey efforts, including expansion immediately adjacent to and potentially within the proposed dredge footprint. The Draft EA does not adequately describe potential impacts to eelgrass or propose mitigation. The Department recommends a comprehensive impact analysis and mitigation plan are provided in the Final EA, as outlined below.

Recommendations: The Department recommends the proposed Project avoid and minimize impacts to eelgrass and fully mitigate any remaining impacts. The Department makes the following recommendations for the Final EA:

- A comprehensive analysis of impacts to eelgrass habitat. The Department recommends USACE include maps and acreage of eelgrass habitat in the Project vicinity and fully analyze the impact to eelgrass habitat from direct and indirect activities associated with dredging and sediment placement.

  Thank you for providing your eelgrass survey data from June 2023. We have updated our plans and specs to include the new growth areas.

- A comprehensive eelgrass mitigation and monitoring plan. To ensure no net loss, the Department recommends the Final EA include avoidance and minimization measures as well as require the development of a comprehensive monitoring and mitigation plan, as defined in the California Eelgrass Mitigation Policy (CEMP) (NMFS 2014). This plan should include pre- and post-construction eelgrass surveys and mitigation for any impacts to eelgrass from Project activities. The Department recommends eelgrass mitigation, if needed, occur prior to Project construction to ensure success and minimize temporal loss.

  Pre-and-post eelgrass surveys are not necessary for the Proposed Action because any potential impacts would be mitigated.

  The primary impact to eelgrass from dredging would be the increase in sediment suspended in the water column, or turbidity plumes, which is expected to temporarily decrease eelgrass photosynthetic capability. With hydraulic dredging the equipment "vacuums" the sediments as it moves along the seafloor, which greatly reduces the amount of disturbed sediment in the water column. With this dredging method, turbidity plumes will primarily be limited to the placement site (Whaler Island), which is located outside of the Harbor and distanced from the eelgrass.

  From our review of dredging activities near eelgrass beds in Crescent City Harbor, including a 5-year monitoring survey that ended in 2018 and the CDFW survey from 2023, the eelgrass beds have grown significantly despite numerous dredging actions adjacent to the eelgrass, suggesting that impacts from dredging do not affect long-term eelgrass viability. Furthermore, extensive data from our SF Bay eelgrass monitoring over the past 15 years supports this conclusion despite SF Bay projects primarily utilizing the clamshell dredging method which is known to have short term minor impacts to water quality at dredge sites, and still no long-term impacts to the extent of eelgrass beds have been observed.

  The following minimization measures have been added to *Section 4.9.4 of the Final Environmental Assessment for Crescent City Harbor Maintenance Dredging, Crescent City, Del Norte County, California, Fiscal Years 2024-2035* to reduce the impact to eelgrass populations:

1. A buffer of 15-50 meters will be included, as practicable, to reduce shading impacts and to allow for greater circulation. This will also protect the eelgrass from potential boat maneuvering, grounding, or propeller damager.
2. Areas within the 15-meter eelgrass buffer will be dredged at night to avoid the photosynthetic period.
3. The hydraulic pipeline will be placed to avoid eelgrass when transporting sediments to the placement site.

- Consultation with respective agencies. The Department recommends that USACE consult with the appropriate permitting and resource agencies for review of all eelgrass mitigation and monitoring efforts.
  The USACE is in consultation with the National Marine Fisheries Service (NMFS) regarding project impact, specifically to Essential Fish Habitat (EFH) and eelgrass.

Comment 2 of 2: CES Listed & Commercially Important Species

The Department is concerned that dredging activities may result in potentially significant impacts to CESA- and ESA-listed species, SSC, and associated sensitive marine habitats (e.g., eelgrass, mudflats). Dredging causes an increase in suspended sediments, releases contaminants, and entrains benthic, epibenthic, and mid-water organisms (Nightingale and Simenstad 2001). Numerous studies have demonstrated entrainment of longfin smelt, salmonids, and other species of commercial and recreational importance from hydraulic dredging operations (Mari-Gold Environmental Consulting, Novo Aquatic Sciences and Applied Sciences 2011; Mari-Gold Environmental Consulting and Novo Aquatic Sciences 2015; Larson and Moehl 1990; McGraw and Armstrong 1990; Reine and Clarke 1998; USACE 2004; Simenstad 1990).

The Department is concerned that dredging operations may result in significant impacts to listed salmonids and sturgeon from entrainment, contaminated sediments, and increased turbidity which can result in gill injury, reduced foraging success, and increased predation (Nightingale and Simenstad 2001).

The Department is also concerned about entrainment of commercially and recreationally important species, including but not limited to Dungeness crab (Metacarcinus magister), California halibut (Paralichthys californicus), Pacific herring (Clupea pallasii), Northern anchovy (Engraulis mordax), and rockfishes (Sebastes spp.).

Recommendations: The Department recommends the Final EA include the following:

- Work Windows: Work windows are used to protect important life history stages of sensitive aquatic species. The Department recommends all Project activities, including dredging, occur from July 1 through October 15 to minimize impacts to migrating adult and out-migrating juvenile salmon. Currently, the Draft EA includes this work window for in-water placement but not for dredging.
  A correction has been made to *Section 3.1 of the Final Environmental Assessment for Crescent City Harbor Maintenance Dredging, Crescent City, Del Norte County, California, Fiscal Years 2024-2035* to clarify that all in-water work (including dredging and placement) will occur within the environmental work window of July 1 through October 15.
- Take coverage and mitigation for CESA-listed species: It is the Department's understanding that a biological assessment of the potential take of CESA-listed species has not been conducted for the

Project. Absent a biological assessment for CESA listed species and the proposed use of a hydraulic dredge potentially outside of the recommended work windows, the Department recommends USACE obtain an Incidental Take Permit (ITP) to address impacts of "take" pursuant to Fish and Game Code Sections 2080.1 or 2081(b) and California Code of Regulations Title 14 (14 CCR) § 783 et seq. The ITP application should include a complete project description, as well as other required elements per 14 CCR § 783.2. The project description should be sufficient to evaluate the effects of the Project on each species and will be used to evaluate and develop species-specific minimization and mitigation measures. As defined in CESA, all take of listed species must be mitigated in full and upfront. During the ITP development process, the Department recommends that National Marine Fisheries Service and U.S. Fish and Wildlife Service staff be included in discussions to assure that project mitigation measures are consistent with federal requirements.

A Biological Assessment (BA) for federally listed species associated with the project area was submitted to the USFWS in 2019, which can be accessed in *Appendix D*. Species considered in this BA were: Southern Oregon/Northern California Coast (SONCC) coho salmon, North American Green Sturgeon, Stellar Sea Lion, Marbled Murrelet, Tidewater Goby, and the Western Lily.

Please see *Section 2.3.3 Description of Proposed Conservation Measures* in the BA for avoidance, minimization, and conservation measures. These management strategies will broadly benefit CESA-listed and commercially important species as well.

- Entrainment monitoring: Since a hydraulic dredge is proposed, the Department recommends entrainment monitoring occur during active dredging events to better understand the impacts of hydraulic dredging on sensitive aquatic species. Without monitoring, it is difficult to determine if minimization measures are successful. In addition, monitoring can help pinpoint areas of the dredge cycle when fish are most vulnerable to entrainment and further refine measures that would minimize take. This data will also help estimate levels of take, and ensure avoidance, minimization, and mitigation measures are adequate to protect listed and vulnerable species.

  The USACE does not conduct entrainment monitoring for hydraulic dredging.

Commentor: Walt Deppe, California Coastal Commission

Date Received: June 14, 2024 *Format Received: Email*

Comment 1 of 1: Public Access

1. Please provide information about dredging pipeline route and potential impacts on public access/recreation (access to the boat launch and public access areas of Whaler Island during operations) and potential alternatives to avoid impacts.

   The following text has been added to *Section 4.3.2 of the Final Environmental Assessment for Crescent City Harbor Maintenance Dredging, Crescent City, Del Norte County, California, Fiscal Years 2024-2035:* The pipeline must cross Anchor Way Road, as shown in ***Figure 5***, to reach the placement site at Whaler Island. A ramp will be placed over the pipeline to maintain pedestrian and vehicular traffic.