PRIVACY ADVISORY

This Programmatic Environmental Assessment (PEA) is provided for public comment in accordance with the National Environmental Policy Act (NEPA), the President's Council on Environmental Quality (CEQ) NEPA Regulations (40 Code of Federal Regulations [CFR] Parts 1500-1508) and 32 CFR 989, Environmental Impact Analysis Process (EIAP).

The EIAP provides an opportunity for public input on Department of the Air Force (DAF) decision-making, allows the public to offer input on alternative ways for the DAF to accomplish what it is proposing, and solicits comments on the DAF's analysis of environmental effects.

Public commenting allows the DAF to make better, informed decisions. Letters or other written or oral comments provided may be published in the PEA. As required by law, comments provided will be addressed in the PEA and made available to the public. Providing personal information is voluntary. Any personal information provided will be used only to identify your desire to make a statement during the public comment portion of any public meetings or hearings or to fulfill requests for copies of the PEA or associated documents. Private addresses will be compiled to develop a mailing list for those requesting copies of the PEA; however, only the names of the individuals making comments and specific comments will be disclosed. Personal home addresses and phone numbers will not be published in the PEA.

Compliance with Section 508 of the Rehabilitation Act

To the extent possible, this document is compliant with Section 508 of the Rehabilitation Act. This allows assistive technology to be used to obtain the available information from the document. Due to the nature of graphics, figures, tables, and images occurring in the document, accessibility is limited to a descriptive title for each item.

Compliance with Revised CEQ Regulations

The DAF is aware of the November 12, 2024 decision in Marin Audubon Society v. Federal Aviation Administration, No. 23-1067 (D.C. Cir. Nov. 12, 2024). To the extent that a court may conclude that the CEQ regulations implementing NEPA are not judicially enforceable or binding on this agency action, the DAF has nonetheless elected to follow those regulations at 40 CFR Parts 1500–1508, in addition to the DAF's procedures/regulations implementing NEPA at 32 CFR 989, to meet the agency's obligations under NEPA, 42 U.S.C. §§ 4321 et seq.

This EA has been verified to be compliant with the 75-page limit, not including appendices, required by 40 CFR 1501.5(f). As defined by 40 CFR 1508.1(v) a "page" means 500 words and does not include maps, diagrams, tables, or other means of graphically displayed quantitative or geospatial data.

Draft

Programmatic Environmental Assessment for Harbor Activities

Vandenberg Space Force Base, California

Space Launch Delta 30, Installation Management Flight
1028 Iceland Avenue, Building 11146
Vandenberg Space Force Base, CA 93437

January 2025

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DRAFT FINDING OF NO SIGNIFICANT IMPACT/
DRAFT FINDING OF NO PRACTICABLE ALTERNATIVE

CEQ Unique Identification Number: PEAX-007-57-14Y-1737461380

HARBOR ACTIVITIES PROGRAM AT VANDENBERG SPACE FORCE BASE, CALIFORNIA

Pursuant to the provisions of the National Environmental Policy Act (NEPA), 42 United States Code (U.S.C.) 4321 to 4270d, implementing Council on Environmental Quality (CEQ) Regulations, 40 Code of Federal Regulations (CFR) 1500-1508[1], and 32 CFR Part 989, *Environmental Impact Analysis Process*, the Department of the Air Force (DAF) prepared the attached Programmatic Environmental Assessment (PEA) to assess the potential impacts associated with ongoing harbor activities at Vandenberg Space Force Base (Vandenberg SFB or Installation), in Santa Barbara County, California. This Finding of No Significant Impact (FONSI) and Finding of No Practicable Alternative (FONPA) hereby incorporates the entire PEA by reference.

PURPOSE AND NEED

The purpose of the Proposed Action is to conduct an updated evaluation of the harbor activities, that includes harbor dredging; vessel transit, loading and unloading; and general recreational activities for those personnel with authorized Installation access. In addition, the purpose of the Proposed Action is to gain insight into the combined use of current and potential future users of the harbor, and in particular vessel transit, loading, and unloading activities within the harbor by individual users. This insight would allow the DAF to determine the maximum threshold of harbor usage that can be achieved within the Santa Barbara County Air Pollution Control District (SBCAPCD) emission limitation rules. The need for the Proposed Action is for the DAF to have an updated understanding of the overall impacts from the harbor activities program, considering the current and potential future users of the harbor and that the previous NEPA analysis is over 20 years old.

PROPOSED ACTION

Alternative 1 includes continuation of the harbor activities program, which consists of three distinct components: 1) harbor dredging; 2) vessel transit, loading, and unloading; and 3) other general recreational activities for those personnel with authorized Installation access. The Proposed Action is defined as implementation of Alternative 1.

Harbor dredging, as defined in the 10-year Vandenberg Harbor Maintenance Dredge Plan (Dredge Plan), consists of maintenance dredging at the harbor to a minimum depth of -10 feet MLLW, plus a 2-foot overdredge allowance for a maximum depth of -12 feet mean lower low water (MLLW). The minimum depth would be necessary to accommodate vessel usage at the harbor throughout the 10-year Dredge Plan period. Dredging would occur in the same 3.5-acre subtidal dredge area as previous dredge activities. The need for dredging would be dictated by whether or not the equipment transport ships can safely moor in the harbor via bathymetric survey. Dredging would not occur during years when launch hardware would not be delivered. Based on

[1] The DAF is aware of the November 12, 2024 decision in Marin Audubon Society v. Federal Aviation Administration, No. 23-1067 (D.C. Cir. Nov. 12, 2024). To the extent that a court may conclude that the CEQ regulations implementing NEPA are not judicially enforceable or binding on this agency action, the DAF has nonetheless elected to follow those regulations at 40 CFR Parts 1500–1508, in addition to the DAF's procedures/regulations implementing NEPA at 32 CFR 989, to meet the agency's obligations under NEPA, 42 U.S.C. §§ 4321 et seq.

previous dredge activities and achieved production, dredging would occur over an approximately 3- to 5-week period, including mobilization and demobilization. Dredging frequency is expected to be approximately once per year, although on occasion additional dredging may be required, depending on vessel delivery schedule, sediment circulation patterns, the extent and intensity of winter storms, sediment loads of the longshore currents, and local conditions. Dredging operations in the harbor would be similar to previous events and include the use of a crane-mounted clamshell bucket operated from the dock and barge-mounted operations, as further described in Section 2.1.1 of the PEA.

The number of ships entering and exiting the harbor varies each year, depending on commercial launch activity. This programmatic analysis considered up to 200 harbor trips per year, based on known commercial launch activity and in consideration of potential future launch activity that would require harbor usage. This number may be lower in any given year depending on launch activity. Harbor trips may not exclusively be tied to launch activity, and not all launch activity requires harbor usage. Each launch could also require more than one harbor trip. The scope of this programmatic analysis considered ship transport within 24 nautical miles from the shore, consistent with the California Air Resources Board (CARB) definition for Regulated California Waters. It is assumed vessels would travel through federal waters prior to reaching Regulated California Waters within Santa Barbara County, before turning towards shore. Authorized ships would enter the harbor to offload CCBs, other equipment needed for space launch programs, or other general equipment or components as necessary. Tugboats may be utilized as necessary to provide safe access to the harbor, depending on harbor conditions and with permit authorization from SBCAPCD. Over the past 20 years the *Rocketship* has been the primary vessel to use the harbor; therefore, the PEA uses the details and operation of this ship as the representative vessel for harbor usage as described in Section 2.1.2 of the PEA. Refer to Section 2.1.2 of the PEA for additional information on how vessels would approach, enter, unload, and exit the harbor. All vessels utilizing the harbor would do so in accordance with all applicable SBCAPCD rules and regulations. Individual users of the harbor would be required to obtain all necessary authorizations, including any necessary approval under follow-on, site-specific NEPA, prior to entering the harbor. Further, follow-on site-specific NEPA would be required for any vessel transit activities that deviate from the scope of the programmatic analysis.

The harbor is occasionally used for general recreational activities that include fishing, boating, jet-skiing, and other general uses that mostly come from personnel with authorized Installation access. In addition, facilities adjacent to the harbor on the Installation are available for rent to host general events, such as weddings or picnics. These are ongoing activities that have largely occurred since the establishment of the harbor and are authorized as part of larger Installation land use and recreational plans and policies.

NO ACTION ALTERNATIVE

Under the No Action Alternative, Vandenberg SFB would not continue the harbor activities program. Re-dredging of the harbor would not occur. If the harbor is not re-dredged, the space launch programs at Vandenberg SFB would be jeopardized. Vessel transit, loading and unloading would also no longer continue within the harbor. Where possible, other launches may be redirected to Cape Canaveral Space Force Station, or payloads could be put on other launch vehicles at Vandenberg SFB or elsewhere. Impacts of these consequential actions were considered for the EELV program in previous NEPA analysis (USAF 1998). Redirection to other launch sites would be highly speculative. Payloads may also be redirected to other nearby harbors, such as the Port of Long Beach, and transported over land to Vandenberg SFB. If redirection is necessary, the need for additional NEPA analysis would be considered at such time. General recreation within the harbor would no longer continue. The No-Action Alternative is not

considered a reasonable alternative because it does not meet the purpose and need of the Proposed Action; however, it provides a measure of the baseline conditions against which the impacts of the Proposed Action can be compared.

SUMMARY OF FINDINGS

The DAF concludes that by implementing environmental protection measures (Section 2.4 of the PEA), no significant effects will result to the following resources as a result of the Proposed Action: air quality and climate; biological resources; geology and earth resources; Installation land use, recreation, and coastal resources; and public health and safety. In addition, the PEA concludes that the Proposed Action will not affect cultural resources, transportation, noise, visual resources, socioeconomics, environmental justice, public services and utilities, or groundwater.

PREFERRED ALTERNATIVE

Alternative 1 is the Preferred Alternative because it is the only alternative that fulfills the purpose and need for the Proposed Action.

NOTICE OF WETLAND OR FLOODPLAIN INVOLVEMENT

Pursuant to Executive Order (EO) 11990, *Protection of Wetlands,* EO 11988, *Floodplain Management*, EO 13690, *Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input*, and Air Force Manual 32-7003, *Environmental Conservation*, the DAF hereby provides notice of the potential impacts to wetland or floodplain as a result of the Proposed Action. The Proposed Action consists of harbor activities, which include ongoing dredging activities within a 100-year floodplain and Estuarine and Marine Deepwater wetlands, as defined by the National Wetland Inventory database.

The DAF concludes that there are no practicable alternatives outside of floodplains and wetlands for the Proposed Action. This is due to the fact that 1) harbor activities must be located on the water and 2) the harbor is a fixed location aboard Vandenberg SFB. Locating within floodplains wetlands therefore cannot be avoided, and there is no practicable alternative to the Proposed Action. Further, a No Action Alternative would risk unsafe navigation conditions and potential closure of the harbor should shoaling continue undeterred. The No Action Alternative would not meet the Purpose and Need for the Proposed Action as stated above. Two additional alternatives to dredging were considered but dismissed for reasons stated in the PEA; these alternatives would not avoid potential wetland or floodplain impacts. The Proposed Action would utilize only existing infrastructure (existing pier) and would not increase ground elevation anywhere within the harbor. As a result, no additional flood risk to the shoreline would result. The DAF would adhere to all conditions of the Clean Water Act Section 401 Water Quality Certification, Clean Water Act Section 404 permit, and Rivers and Harbors Act Section 10 permit, to minimize potential for adverse impacts to Waters of the U.S. and wetlands within the project area.

FINDING OF NO SIGNIFICANT IMPACT / FINDING OF NO PRACTICABLE ALTERNATIVE

Based on my review of the facts and analyses contained in the attached PEA, conducted under the provisions of NEPA, implementing CEQ Regulations, and 32 CFR Part 989, I conclude that the Proposed Action, with incorporation of required environmental protection measures, will not have a significant environmental impact on the human environment. Pursuant to EO 11990, EO 11988, EO 13690, Air Force Manual 32-7003, and the authority delegated by Secretary of the Air Force Order 791.1; and taking the above information into account, I find that there is no practicable alternative to this action and that the Proposed Action includes all practicable measures to minimize harm to wetland and floodplain environments. Therefore, further analysis in the form of an Environmental Impact Statement is not required and a FONSI/FONPA is appropriate. This

decision has been made after considering all submitted information, including a review of public and agency comments submitted during the 30-day public comment period, and considering a full range of practical alternatives that meet project requirements and are within the legal authority of the DAF. The signing of this FONSI/FONPA completes the environmental impact analysis process.

Col. Mark A. Shoemaker, USSF	Date
Commander	

Attachment: FINAL PROGRAMMATIC ENVIRONMENTAL ASSESSMENT FOR HARBOR ACTIVITIES, VANDENBERG SPACE FORCE BASE, CALIFORNIA (2025)

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Appendices

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List of Acronyms and Abbreviations

ACAM	Air Conformity Applicability Model
AFB	Air Force Base
BA	Biological Assessment
BMP	Best Management Practice
BO	Biological Opinion
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CARB	California Air Resources Board
CCB	Common Core Booster
CCC	California Coastal Commission
CCRWQCB	Central Coast Regional Water Quality Control Board
CDFW	California Department of Fish and Wildlife
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CGS	California Geological Survey
CH_4	methane
CNDDB	California Natural Diversity Database
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	Carbon dioxide equivalent
CWA	Clean Water Act
cy	cubic yard
CZMA	Coastal Zone Management Act
DAF	Department of the Air Force
dB	decibel
dBA	A-weighted decibel
DoD	Department of Defense
DPM	diesel particulate matter
EA	Environmental Assessment
EELV	Evolved Expendable Launch Vehicle
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EO	Executive Order
ER-L	effects range-low
ER-M	effects range-medium
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FMP	Fisheries Management Plan
GHG	greenhouse gas
GWP	global warming potential
HTA	Hazardous Materials Tracking Activity
IHA	Incidental Harassment Authorization
LOA	Letter of Authorization
MBTA	Migratory Bird Treaty Act
MLLW	mean lower low water
MMPA	Marine Mammal Protection Act
MSA	Magnuson-Stevens Fishery Conservation and Management Act
NAAQS	National Ambient Air Quality Standards

NASA	National Aeronautics and Space Administration
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
N_2O	nitrous oxide
NO_2	nitrogen dioxide
NO_x	oxides of nitrogen
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NWI	National Wetland Inventory
O_3	ozone
OSHA	Occupational Safety and Health Act
OSPR	Office of Spill Prevention and Response
Pb	lead
PEA	Programmatic Environmental Assessment
PERP	Portable Equipment Registration Program
$PM_{2.5}$	fine particulate matter
PM_{10}	respirable particulate matter
ppm	parts per million
POL	petroleum, oil, and lubricant
PSD	Prevention of Significant Deterioration
RHA	Rivers and Harbors Act
ROI	Region of Influence
SAP	Sampling and Analysis Plan
SAPR	Sampling and Analysis Plan Results
SBCAPCD	Santa Barbara County Air Pollution Control District
SCCAB	South Central Coast Air Basin
SC-DMMT	South Coast Dredge Materials and Management Team
SC-GHG	social cost of greenhouse gas
SFB	Space Force Base
SLC	Space Launch Complex
SLD	Space Launch Delta
SO_2	sulfur dioxide
SO_x	sulfur oxide
SR	State Route
SYBCI	Santa Ynez Band of Chumash Indians
TAC	toxic air contaminant
tpy	tons per year
ug/m^3	micrograms per cubic meter
U.S.	United States
USACE	United States Army Corps of Engineers
U.S.C.	United States Code
USCG	United States Coast Guard
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USSF	United States Space Force
VOC	volatile organic compound
WQC	Water Quality Certification

Chapter 1. Purpose and Need for the Proposed Action

This Programmatic Environmental Assessment (PEA) evaluates the potential environmental impacts associated with ongoing harbor activities at Vandenberg Space Force Base (SFB), formerly Vandenberg Air Force Base (AFB), in Santa Barbara County, California (throughout this PEA, Vandenberg SFB will be used for all references to the Installation, including for historical references). Harbor activities are defined as a range of actions that include harbor dredging; vessel transit, loading, and unloading; and other general recreational activities. Harbor activities were last assessed in the 2001 *Final USAF Environmental Assessment for Harbor Activities Associated with the Delta IV Program at Vandenberg Air Force Base.* The United States Department of the Air Force (DAF) obtained a 10-year Standard Individual Permit from the United States Army Corps of Engineers (USACE) in January 2023; this permit renews the previously issued permit, covering requirements under Section 404 of the Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act (RHA), and allows for ongoing maintenance dredging activities within the harbor through January 2033. In addition, a 10-year Vandenberg Harbor Maintenance Dredge Plan (Dredge Plan) has been developed and implemented in support of the Standard Individual Permit. The 10-year Dredge Plan is an update to the 2017 Plan. The DAF is also conducting a programmatic environmental analysis of vessel transit, loading, and unloading within the harbor, conducted by various launch program operations at Vandenberg SFB in order to fully understand the range of potential environmental impacts associated with this use of the harbor. Launch providers are authorized by the Space Launch Delta (SLD) 30 Commander to utilize the harbor for loading and off-loading of space launch-related and other equipment. The programmatic analysis will provide insight into the number of vessels Vandenberg SFB may authorize to use the harbor while remaining in compliance with Santa Barbara County Air Pollution Control District (SBCAPCD) regulations. Finally, the analysis will also consider the periodic recreational activities that occasionally occur within the harbor.

The National Environmental Policy Act (NEPA); Council on Environmental Quality (CEQ) regulations implementing NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508) updated July 1, 2024; and the DAF's supplemental NEPA regulations (32 CFR Part 989) require lead agencies to evaluate the potential impacts of federal actions on the surrounding environment. Overall, this PEA considers the potential impacts associated with ongoing harbor activities (also referred to as the "harbor activities program" throughout this PEA) based on current and future harbor users and provides the DAF meaningful insight in long-term agency planning and decision making related to use of the harbor. Specific users of the harbor conducting vessel transit, loading, and unloading would be required to conduct follow-on site-specific environmental analysis tiering from this document.

1.1 Background

The primary mission of Vandenberg SFB is to support national space and missile launch operations. Vandenberg SFB supports West Coast launch activities for the DAF, United States Space Force (USSF), Department of Defense (DoD), Missile Defense Agency, National Aeronautics and Space Administration (NASA), foreign nations, and various commercial launch companies. At Vandenberg SFB, SLD 30 is the organization responsible for space and missile launch activities on the U.S. West Coast. Satellites destined for polar or near-polar orbit are launched from Vandenberg SFB.

The harbor at Vandenberg SFB was historically utilized to support United States Coast Guard (USCG) lifesaving operations but was modified and expanded in 1983 to support the Space

Shuttle program. The harbor was utilized for the transport of fuel tanks and other equipment for the Space Shuttle program until 1989, when the program was terminated at Vandenberg SFB. In April 1998, the DAF completed a Final Environmental Impact Statement (EIS) for the development, deployment, and operation of the Evolved Expendable Launch Vehicle (EELV) program at Vandenberg SFB (USAF 1998), which briefly considered dredging activities in the harbor to facilitate transport of Common Core Boosters (CCBs). Transport of larger, solid rocket motors was subsequently evaluated in a March 2000 Supplemental EIS by the DAF (USAF 2000). A July 2001 EA was prepared to consider in greater detail overall harbor activities, including dredging activities and use of a temporary sediment storage area; modification of the dock to include a ramp and reconfigure the lighting; refurbishment of docking dolphins; construction and use of a turnaround area for vessels; and use of the harbor for transporting EELV-related hardware (ENSR 2001). Dredging activities were initially conducted in the harbor in October 2001 to provide marine vessel access to the harbor's dock for the EELV program.

As an integral facet of the EELV and other space programs, CCBs are transported to Vandenberg SFB via ship. Historically, this occurred via a specifically designed ship, the *Delta Mariner*. The *Delta Mariner* was rechristened as the *Rocketship* in 2018. The *Rocketship* has an absolute minimum draft of approximately 8 feet and a working minimum draft of approximately 9 feet. The 7-acre harbor must be maintained at an adequate depth to accommodate similarly sized ships. The harbor is the only existing facility along Vandenberg SFB's coast that could be used for off-loading CCBs for transport to the Space Launch Complexes (SLCs). For some CCBs, constructing them near the SLCs is infeasible given the massive size of the manufacturing facilities required for such an operation. The CCBs are also too large to be feasibly transported from other harbors that could accommodate a large vessel, such as the *Rocketship*, or other similar ships. Because of the large size of the CCBs when mounted on a transport vehicle (approximately the size of a wide-body airplane fuselage), transportation by truck or rail presents major logistical challenges and safety issues. If dredging is not maintained as needed, several DoD, NASA, and commercial space launch programs at Vandenberg SFB could be in jeopardy.

Because the harbor is located along a very dynamic section of the California coast, sand movement causes sediments to accumulate in the harbor as soon as dredging is complete. The sedimentation rate in the harbor is highly variable. Therefore, the harbor needs to be re-dredged to a working depth of approximately -10 feet mean lower low water (MLLW) plus a 2-foot overdredge as necessary to accommodate vessel usage and facilitate the mission of Vandenberg SFB. The Dredge Plan (see Appendix C) was prepared to support the USACE permit SPSL-2022-00504-TS, issued in January 2023. The Dredge Plan has been updated generally every 5 years since 2003 to support permit renewal and to submit to the California Coastal Commission (CCC) Negative Determination.

The overall dredge volume required between dredge events can vary greatly depending on conditions within the harbor, as demonstrated in Table 1-1. The harbor has been dredged nine times since 2001. Dredging in March 2017 was curtailed due to inclement weather but was completed in November 2017.

Table 1-1. Summary of Dredging Activities

Year	Month(s)	Dredged Volume (cubic yards)[1]
2001	October	16,000
2002	December	1,500
2009	July-August	2,655
2011	July-August	5,055

Table 1-1. Summary of Dredging Activities

Year	Month(s)	Dredged Volume (cubic yards)[1]
2014	August-September	4,229
2017	March	250
2017	November	263
2020	March	69.5
2021	July-August	58.5

Notes:
a. Dredge volumes fluctuate because the harbor is highly dynamic with variations in currents in wave patterns, which drives variations in the amount necessary to dredge, as informed by bathymetric surveys.

In addition to the EELV program, several new and in-development space launch programs have indicated interest and/or have a pending requirement for using the harbor, which may result in the need for more frequent dredging and new ships requesting use of the harbor. At present, this primarily includes various commercial clients. Individual users request use of the harbor through an internal scheduling and planning process, and evaluate their launch activities, to include harbor usage, discretely as it pertains to their proposed action. Launch providers are then authorized by the SLD 30 Commander to utilize the harbor for loading and off-loading of space launch-related and other equipment. Vandenberg SFB does not currently have insight into the maximum allowable number of ships that could be authorized to use the harbor while remaining in compliance with SBCAPCD regulations. The current process includes individual providers and users seeking approval directly through the SBCAPCD and conducting their own individual NEPA analyses, which can result in inconsistencies in approach to overall harbor management.

Other general vessel transit, loading, and unloading associated with activities other than space launch programs is also possible within the harbor. In addition, the harbor is also occasionally used by individuals with access to Vandenberg SFB for various recreational activities such as fishing, boating, jet-skiing, and other general use. Facilities adjacent to the harbor are available for rent to host general events, such as weddings or picnics.

1.1.1 Project Location

Vandenberg SFB is located on the south-central coast of California, approximately 55 miles northwest of Santa Barbara (Figure 1-1). Vandenberg SFB covers approximately 99,572 acres in western Santa Barbara County. The Santa Ynez River and State Route (SR) 246 divide Vandenberg SFB into two distinct areas: North Vandenberg SFB and South Vandenberg SFB. The harbor is located on South Vandenberg SFB, approximately 10 miles northeast of Point Conception and 3 miles southeast of Point Arguello (Figure 1-1). Land access to the harbor is through the Vandenberg SFB South Gate entrance via SR 246, then over DAF-controlled secondary roadways, including Arguello Boulevard, Bear Creek Road, and Coast Road.

1.2 Purpose of the Proposed Action

The purpose of the Proposed Action is to conduct an updated evaluation of the harbor activities, that includes harbor dredging; vessel transit, loading and unloading; and general recreational activities.

In addition, the purpose of the Proposed Action is to gain insight into the combined use of current and potential future users of the harbor, and in particular vessel transit, loading, and unloading activities within the harbor by individual users. This insight would allow the DAF to determine the maximum threshold of harbor usage that can be achieved within the SBCAPCD emission limitation rules.

Figure 1-1. Regional Map

1.3 Need for the Proposed Action

The need for the Proposed Action is for the DAF to have an updated understanding of the overall impacts from the harbor activities program, considering the current and potential future users of the harbor and that the previous NEPA analysis is over 20 years old. Further, the Proposed Action is needed for the DAF to understand the number of vessels that may be authorized to use the harbor while remaining in compliance with SBCAPCD regulations.

1.4 Interagency and Intergovernmental Coordination and Consultation

1.4.1 State Historic Preservation Officer

The Proposed Action is a federal undertaking subject to compliance with Section 106 of the National Historic Preservation Act (NHPA). The undertaking would be conducted within a sub-tidal embayment that was excavated from native rock in 1984 to provide access for delivery of essential equipment to Vandenberg SFB. The entirety of the project area is a previously built environment of modern age. Dredging is considered periodic maintenance, is limited to removing recently deposited sediment within the same footprint of the previously constructed dock area, and has no potential to affect paleontological or cultural resources. All other harbor activities (i.e., vessel transit, loading, and unloading; and other general recreational activities) have no potential to affect paleontological or cultural resources. As a result of the Proposed Action, no new facilities are anticipated to be constructed within the harbor to facilitate vessel transit, loading, or unloading activities. Therefore, no consultation is required with the State Historic Preservation Officer for Section 106 of the NHPA.

1.4.2 Tribal Consultation

Vandenberg SFB encompasses the traditional territory of the Santa Ynez Band of Chumash Indians (SYBCI). As no consultation was required with the State Historic Preservation Officer for Section 106 of the NHPA, no tribal consultation with federally recognized Native American tribes is required. Vandenberg SFB's Tribal Liaison and Cultural Resources Managers are in constant contact with the SYBCI Cultural Department and Elders Council. Dredging activities have no potential to affect Native American sacred sites. SYBCI tribal members use the harbor for recreational activities such as fishing, a reserved right of the SYBCI at Vandenberg SFB.

1.4.3 California Coastal Commission

Where federal projects occur adjacent/near the state coastal zone (i.e., coastal waters, to include the lands lying in and submerged thereunder, as well as adjacent shore lands) as defined in Section 304(1) of the Coastal Zone Management Act (CZMA) and as described in a state's federally approved Coastal Management Program, and where such projects may affect coastal uses or resources, they are subject to federal consistency review. In 2001, the CCC concurred with consistency determination CD-035-01 for harbor dredging at Vandenberg SFB, and in 2002 the Commission's Executive Director concurred with negative determination ND-082-02 for harbor maintenance dredging at Vandenberg SFB. The Executive Director concurred with negative determinations ND-096-03, ND-048-08, and ND-0012-014 for 5-year harbor maintenance dredging programs in December 2003, September 2008, and May 2014, respectively. The DAF submitted a Negative Determination letter to the CCC on July 6, 2022, indicating that implementation of the 10-year Dredge Plan would not adversely affect coastal resources. The DAF concluded that harbor dredging does not require a consistency determination. The CCC concurred with the DAF's determination in a letter dated August 17, 2022 (refer to Appendix B-1 for details). Refer to Sections 3.4 and 4.4, Land Use, Recreation,

and Coastal Zone Resources, of this PEA for additional information on federal coastal zone consistency.

Consistency review related to vessel transit, loading, and unloading within the harbor by space launch programs, if required pursuant to CZMA and its implementing regulations upon review of the site-specific activity, would be completed and evidence of the coordination would be incorporated into site-specific NEPA analyses by individual harbor users, as applicable.

1.4.4 U.S. Fish and Wildlife Service

In August 2001, the U.S. Fish and Wildlife Service (USFWS) issued a Biological Opinion (BO) for the EELV Program (1-8-99-F27), including harbor dredging and maintenance (USFWS 2001). The BO specified monitoring requirements and mitigation measures to be implemented during dredging activities (see Section 2.4.1, Environmental Protection Measures – Biological Resources). In a letter dated October 25, 2002, the USFWS stated that the proposed increase in dredging frequency (to annually or semiannually) did not require reinitiating formal consultation. There have been no updates to the harbor-related BO since the 2002 letter was issued; however, dredging and related harbor activities were incorporated to a sufficient degree in the DAF's 2011 Programmatic BO, as well as 2015 and 2018 re-initiations (2018 re-initiation is 8-8-13-F49R). Additional measures are being incorporated into a new Basewide Programmatic BO expected in 2025. Several minimization measures will be included in the Programmatic BO in regard to management and monitoring of the threatened southern sea otter (*Enhydra lutris nereis*). See Section 2.4.1, Environmental Protection Measures – Biological Resources, for additional information on measures that would be employed related to protected species as part of the Proposed Action.

1.4.5 National Marine Fisheries Service

Dredging activities were previously incorporated into the Vandenberg SFB Letter of Authorization (LOA) from the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) that also supported launch and flight operations. Due to lack of documented disturbance to pinnipeds (seals and sea lions), the DAF determined in April 2019 that there was very low potential for Level B harassment of marine mammals and harbor dredging is no longer formally included in the LOA (NMFS 2019).

The DAF has determined that all other harbor activities (i.e., vessel transit, loading, and unloading; and other general recreational activities) have a very low potential to result in effects on marine mammals or sea turtles (see Section 4.2, Biological Resources). All harbor activities would be subject to applicable permit requirements and environmental protection measures (see Section 2.4.1, Environmental Protection Measures – Biological Resources). Consideration of any potential effects by vessel transit, loading, and unloading from space launch programs would be conducted for site-specific NEPA analyses as needed by individual harbor users.

Essential Fish Habitat

The DAF previously consulted with the NMFS regarding potential effects to Essential Fish Habitat (EFH) due to activities within the harbor dating back to 2001, at that time as part of the 2001 *Final USAF EA for Harbor Activities Associated with the Delta IV Program at Vandenberg Air Force Base* (ENSR 2001). Coordination with NMFS has continued, as activities occurring within the harbor have also continued. In 2001, NMFS indicated that the proposed action, which included ongoing activities within the harbor, would adversely affect EFH for at least 18 federally managed fish species within the Coastal Pelagics and Pacific Groundfish Fisheries Management Plans (FMPs). It was also determined that activity within the harbor would occur in kelp canopy designated as a habitat area of particular concern for various federally managed

fish species within the Pacific Groundfish FMP and EFH prey species foraging on infaunal and bottom-dwelling organisms. Surveys were conducted in support of the 2001 EFH consultation, and at that time, no eelgrass (*Zostera* spp.) or Caulerpa (*Caulerpa* sp.) were observed.

Subsequent to that consultation, and pursuant to Section 305(b)(4)(A) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) and in order to mitigate for lost habitat, a Kelp Mitigation Plan (ENSR 2002) was implemented and completed in 2009 to minimize temporal losses associated with the 2001 kelp habitat impact. Approximately 150 tons of boulders were placed in the harbor to provide substrate for kelp recruitment. Surveys conducted in March 2010 indicated that there were 1.05 acres of kelp canopy in the project area, which is 0.34 acre more than found in the pre-project survey; therefore, in 2010, consistent with the Kelp Mitigation Plan, the NMFS stated that no further mitigation was required. Ground-based visual observations of kelp conducted in the mitigation area in 2021 indicated that the colony was flourishing.

Surveys were conducted in 2020 and 2021, in accordance with the California Eelgrass Mitigation Policy, and eelgrass was observed in both surveys. However, no mitigation was required, and Caulerpa was not observed. An EFH Assessment for Abbreviated Consultation was completed on August 10, 2022, and the NMFS stated in a September 2, 2022 email that there are no additional EFH Conservation Recommendations (see Appendix B-2). The revised dredge permit No. SPL-2022-00504-TS includes requirements related to eelgrass and Caulerpa (See Section 2.4.1, Environmental Protection Measures – Biological Resources). In accordance with the Eelgrass Monitoring Plan, pre- and post-dredge surveys and Status and Trends monitoring during non-dredge years are to be conducted. If survey monitoring results indicate impacts to eelgrass and/or the presence of Caulerpa, the DAF would coordinate further with NMFS.

Environmental protection measures associated with dredging activities would also limit the potential for impacts to EFH from vessel transit, loading, and unloading. Other general recreational activities are not expected to impact EFH (see Section 4.2, Biological Resources). Therefore, no further coordination with NMFS is required related to other harbor activities.

Black Abalone

The DAF previously consulted informally with NMFS regarding effects of dredging activities on black abalone (*Haliotis cracherodii*) in the harbor as the offshore waters off Vandenberg SFB are designated critical habitat for the species. A 2021 assessment determined that the species was not documented in the dredge footprint and there is little stable rock exposed within the dredge footprint that would provide suitable habitat. Therefore, direct mortality would not occur during dredging activities (USAF 2021). In a letter dated February 25, 2021, NMFS concurred with the DAF's determination that harbor dredging may affect, but is not likely to adversely affect, black abalone or its habitat (see Appendix B-2). This concurrence is based on the DAF's compliance with minimization measures identified in the Biological Assessment (BA) prepared for harbor maintenance dredging (USAF 2021), notably the use of silt curtains and pre- and post-dredge surveys that would be conducted on the breakwater (rocky seawall creating the barrier that protects the harbor) to determine effects from dredge activities (see Section 2.4.1, Environmental Protection Measures – Biological Resources).

1.4.6 U.S. Army Corps of Engineers

A revised dredge permit No. SPL-2022-00504-TS was obtained from USACE in January 2023 (USACE 2023). The USACE reviews and authorizes disposal of dredged sediments under Section 404 of the CWA and Section 10 of the RHA. The Dredge Plan has been prepared to support USACE issuance of a 10-year Standard Individual Permit for ongoing maintenance dredge activities within the harbor. This permit requires preparation of a sediment Sampling and Analysis Plan (SAP) and SAP Results (SAPR) report. The SAP and SAPR were approved by the South Coast Dredge Materials and Management Team (SC-DMMT). Members of the SC-DMMT include the U.S. Environmental Protection Agency (USEPA) Region 9, CCC, California Department of Fish and Wildlife (CDFW), and Central Coast Regional Water Quality Control Board (CCRWQCB). See Section 2.1.1, Harbor Dredging, for additional information on the SAP. The revised dredge permit specifies additional conditions related to eelgrass and Caulerpa surveys, to include additional coordination requirements with USACE, NMFS, and CDFW (see Section 2.4.1, Environmental Protection Measures – Biological Resources).

All other harbor activities (i.e., vessel transit, loading, and unloading; other general recreational activities) would not result in any dredge or fill in Waters of the U.S. (see Section 4.6, Water Resources); therefore, no coordination with USACE is required related to other harbor activities.

1.4.7 Central Coast Regional Water Quality Control Board

The CCRWQCB reviews and authorizes water quality certifications (WQCs) under Section 401 of the CWA for any activity that may result in a discharge to the Waters of the U.S. located within the Central Coast Region. This area encompasses 11,274 square miles within six counties extending from Santa Clara County to northern Ventura County.

Section 401 WQCs have been previously obtained for harbor dredging activities. The most current certification (#34222WQ07) was issued on October 26, 2022, and expires on December 31, 2033. The Dredge Plan was prepared to support issuance of the 401 Certification for ongoing maintenance dredging activities. The 401 Certification defines requirements to document compliance with applicable water quality standards throughout the implementation of the dredging activities.

All other harbor activities (i.e., vessel transit, loading, and unloading; other general recreational activities) would not result in any discharge to Waters of the U.S.; therefore, no coordination with the CCRWQCB is required related to other harbor activities.

1.4.8 Other Regulations

Executive Order (EO) 11990, *Protection of Wetlands,* requires federal agencies to avoid to the extent possible the long- and short-term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative. In addition, EO 11988, *Floodplain Management*, requires federal agencies to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. The Proposed Action is subject to the requirements and objectives of EO 11990 and EO 11988 because it is located in a wetland and floodplain. The DAF published an early public notice in the *Lompoc Record* and *Santa Maria Times* on 2 October 2024 to solicit public comment on the Proposed Action and any practicable alternatives for a period of 30 days from 2 October 2024 through 1 November 2024. One comment was received during this advance public comment period (see Appendix A).

1.5 Objectives of the Environmental Assessment

Consistent with 32 CFR Part 989 and CEQ regulations (40 CFR Parts 1500-1508) revised July 1, 2024, the scope of analysis presented in this PEA is defined by the potential range of environmental impacts resulting from implementing the Proposed Action and Alternatives, including the No-Action Alternative. This PEA identifies, describes, and evaluates the affected environment and environmental consequences of the Proposed Action and identifies measures to prevent or minimize environmental impacts.

The DAF has prepared this analysis as a broad program-wide evaluation of harbor activities occurring at the Vandenberg harbor. Programmatic analysis allows for the assessment of a group of activities or related types of activities that are similar in scope, scale, magnitude, and nature of potential impacts in accordance with CEQ regulations at 40 CFR 1501.11. As a programmatic analysis, it is broadly intended to provide updated analysis regarding "a suite of ongoing, proposed or reasonably foreseeable actions that share a common geography…" (CEQ 2014; see also, 40 CFR 1501.11(a)(1)(i)). Specifically, this PEA is intended to support the DAF in consideration of future internal planning with regards to continued and future users of the harbor, as well as streamline coordination and environmental analysis. When an individual user approaches Vandenberg SFB for harbor usage, this programmatic analysis can be referenced by the DAF to understand whether the proposed harbor use falls within emissions thresholds as identified in this PEA relative to SBCAPCD regulations. Additionally, that user would be required to conduct NEPA analysis for their specific action, which may include vessel transit, loading, and unloading within the harbor, but could also include other launch-related activities. Those EAs would consider the analysis conducted in this PEA as it relates to vessel transit, loading, and unloading within the harbor and tier from it as applicable as per 32 CFR 989.10. Subsequent, tiered NEPA documentation need only summarize potential effects discussed within this PEA and focus on issues specific to that user's intended use of the harbor, where it differs in scope from this Proposed Action.

The resources analyzed in this PEA include the following: air quality; biological resources; geology and earth resources; land use, recreation, and state coastal zone resources; public health and safety; and water resources. The following resources were considered but eliminated from detailed analysis in this PEA since potential impacts would be non-existent or considered negligible:

Cultural Resources. Dredging activities would be conducted within a sub-tidal embayment that was excavated from native rock in 1984 to provide access for delivery of essential equipment to Vandenberg SFB. The entirety of the project area is a previously built environment of modern age. Dredging is considered periodic maintenance and is limited to removing recently deposited sediment within the same footprint of the dock area. This maintenance dredging would have no potential to affect paleontological or cultural resources. Further, all other harbor activities (i.e., vessel transit, loading, and unloading; other general recreational activities) have no potential to affect paleontological or cultural resources. As a result of the Proposed Action, no new facilities are anticipated to be constructed within the harbor to facilitate vessel transit, loading, or unloading activities. Therefore, no consultation is required with the State Historic Preservation Officer for Section 106 of the NHPA (see Section 1.4.1, Interagency and Intergovernmental Coordination – State Historic Preservation Officer).

Transportation. Harbor activities would occur within the harbor and not result in road closures to the surrounding roadways. Dredging would have a beneficial impact on vessel transportation as it would facilitate and ensure continued access to the harbor. Dredge material hauling would

be restricted to designated, pre-approved transportation routes as described in Chapter 2 of this PEA and would be sporadic in nature.

Noise. There are no sensitive noise receptors within 1 mile of the project area, and the area is not open to the general public. Noise generated during dredging activities from operation of heavy equipment would occur over the short-term while dredging took place and during vessel operation. Noise levels would be kept within limits required by the Occupational Safety and Health Act (OSHA) for worker protection. In situations where loud noises are unavoidable, workers would be required to use hearing protection, in accordance with the health and safety plan discussed in Section 4.5, Public Health and Safety. Harbor activities would not result in impacts to nearby sensitive receptors. Noise impacts to protected species are considered in Section 4.2, Biological Resources.

Visual Resources. Harbor activities would be consistent with the general military setting of Vandenberg SFB. In addition, proposed activities would occur in an area that is accessible only to military and authorized personnel. The nearest public access area to the north of the harbor is Surf Beach, located approximately 9 miles away, and the nearest public access area to the south is Jalama Beach, located approximately 7 miles away. The harbor is not visible from either location. Therefore, impacts on visual resources would not occur.

Socioeconomics. Dredging activities would be slightly beneficial in terms of job creation, tax base, and overall economic stimulus. Dredging activities are not anticipated to affect local capacities for temporary housing or demands for public services or changes long-term to baseline socioeconomic conditions of the region (i.e., Lompoc and Santa Maria Valleys). All other harbor activities (i.e., vessel transit, loading, and unloading; other general recreational activities) alone would have minimal to no impacts on socioeconomics; harbor activities in the larger context of space launch operations may have substantial environmental benefits that would be considered in follow-on site-specific NEPA analysis.

Environmental Justice. Pursuant to EO 12898, *Environmental Justice*, potential effects of the Proposed Action on minority and low-income communities were considered. Because the Proposed Action would occur well within Vandenberg SFB boundaries at substantial distance from any nearby population, minority and/or low-income populations would not be affected.

Public Services and Utilities. There would be no new personnel stationed at Vandenberg SFB or new facilities constructed as a result of harbor activities. Minimal utility usage may be required in the harbor for lighting (approximately 300 hours/year). This would be comparable to usage in prior years for harbor activities and represents an overall negligible amount of usage compared to the extensive energy use at Vandenberg SFB. Consequently, the Proposed Action would not affect public services or ability for public services to meet demand.

Groundwater. Harbor activities are not anticipated to affect groundwater resources. There would be no subsurface disturbances that would affect groundwater aquifers and no increase in water demand that may affect groundwater resources.

Chapter 2. Proposed Action and Alternatives

This chapter describes the Proposed Action and Alternatives, including the No-Action Alternative, selected by the DAF to be evaluated in this PEA.

2.1 Alternative 1: Continuation of Harbor Activities Program

Alternative 1 includes continuation of the harbor activities program, which consists of three distinct components: 1) harbor dredging; 2) vessel transit, loading, and unloading; and 3) other general recreational activities. The Proposed Action is defined as implementation of Alternative 1.

2.1.1 Harbor Dredging

Harbor dredging, as defined in the Dredge Plan, consists of maintenance dredging at the harbor to a minimum depth of -10 feet MLLW, plus a 2-foot overdredge allowance for a maximum depth of -12 feet MLLW. The minimum depth would be necessary to accommodate vessel usage at the harbor throughout the 10-year Dredge Plan period. Dredging would occur in the same 3.5-acre subtidal dredge area as previous dredge activities (see Figure 2-1). Predicted sediment volumes would be up to 10,000 cubic yards (cy) annually in years that dredging occurs. The need for dredging would be dictated by whether or not the equipment transport ships can safely moor in the harbor. Dredging would not occur during years when launch hardware would not be delivered. Bathymetric surveys would be conducted within the harbor as needed to determine if dredge activities are required.

Based on previous dredge activities and achieved production, dredging would occur over an approximately 3- to 5-week period, including mobilization and demobilization. It is anticipated that it would take from approximately 1 to 3 weeks to dredge the harbor depending on the amount needed to dredge, with approximately 1 week prior to dredging required for mobilization set up and a week following completion to breakdown and demobilize the equipment. The overall amount of time to conduct dredging would depend on the total dredge volume. It is anticipated that approximately 1,000 cy of sediment would be dredged each day. Weather at the harbor is variable and could cause downtime during project activities, which could impact the overall amount of time to complete dredging. Dredging activities can occur at night, and lights would be staged and turned on prior to dusk so as not to startle wildlife.

Dredging frequency is expected to be approximately once per year, although on occasion additional dredging may be required, depending on vessel delivery schedule and sediment circulation patterns. The frequency of dredging would also be dictated by the extent and intensity of winter storms, sediment loads of the longshore currents, and local conditions.

Maintenance dredging would be conducted using the same dredging means and methods as previous events. Dredging operations in the harbor would include the use of a crane-mounted clamshell bucket operated from the dock and barge-mounted operations as follows:

Figure 2-1. Maintenance Dredging Area

- **Dredging from the Dock.** A crane-mounted clamshell bucket would be positioned on the dock to dredge sediment to an approximately 70-foot radius area adjacent to the dock face. If necessary, a longer boom would be added to the dock-mounted crane, in combination with a smaller clamshell bucket to remove small amounts of sediment from an approximately 200-foot radius area (see Figures 2-2 and 2-3). Dredged sediment would be unloaded on the dock in a contained sediment dewatering area, and the excess water from the dewatering process would be directed and conveyed back to the harbor using appropriate infrastructure such as k-rails. The dewatering area includes a polypropylene product or filter fabric that is specifically designed to allow water to flow while retaining soil and sediment. Water would drain from the excavated material and travel through the filter fabric draining back into the harbor. Sediment dewatering would require several days; then the dewatered sediment would be transported to the sediment disposal site at Point Pedernales, as detailed under Transportation and Disposal below.
- **Dredging from a Barge.** If dockside dredging is unable to remove sediment from beyond the reach of the dockside crane, a fixed boom crane with a clamshell bucket would be mounted on a barge and maneuvered via the use of a tugboat or tender to the sediment removal locations. Dredged sediment would be loaded into a materials barge (i.e., scow), transported to the dock, and unloaded into the sediment dewatering area located on the dock.

Divers may be required to cut kelp by hand, just above the root ball, during the dredging process or for other supporting vessel entry, as needed. Any kelp removed would be hauled off-base to a compost/green waste or reuse facility or taken to an offshore location that would be near the Vandenberg SFB's shoreline.

The number of crew members that may support dredging activities is variable, but based on previous similar activities, is anticipated to be approximately 20 individuals. The average number of vehicles traveling to and from the dock during dredging activities may also vary depending on the size of the crew and amount of dredge material excavated. It is estimated to be approximately 10 trucks and 20 privately owned vehicles per day; however, the number of trucks hauling dredge material could be as many as 50 per day, depending on the size and scale of dredging required.

Transportation and Disposal. Once dewatering is complete and the dredged sediment is sufficiently dewatered to avoid spillage of supernatant from transport vehicles, dewatered sediment would be loaded into dump trucks and transported via existing access roads to the sediment disposal site at Point Pedernales (see Figure 2-4). Point Pedernales is a sediment disposal site on Vandenberg SFB designated to receive sediment from harbor dredging.

Mooring Dolphin Cleaning. Before a vessel that requires use of the mooring dolphins enters the harbor, the mooring dolphins may require cleaning. For cleaning operations, a boat would transport personnel and a power washer and/or bucket to each dolphin during mid to high tide. Sea water and a minimal volume of potable water would be used to wash the mooring dolphins; no soap would be used in the cleaning process. Accessing the tops of each mooring dolphin (i.e., six total) may be required to achieve proper cleaning. Cleaning would take approximately 1 day.

Figure 2-2. Dredging and Sediment Staging with 70-foot Crane

Figure 2-3. Dredging and Sediment Staging with 200-foot Crane

Figure 2-4. Transportation Route for Disposal of Sediments

Turbidity Control. To prevent turbidity in areas outside of the direct dredge area, a turbidity curtain would be deployed to minimize impacts to water quality and the nearby kelp mitigation area. The turbidity curtain would be placed between mooring dolphins and kelp beds present in this area and would be kept in place throughout dredging operations.

Sediment Sampling. The USACE and USEPA require that sediment be sampled for upland disposal. Sampling must be conducted in accordance with the SAP to be submitted to the SC-DMMT for review and approval. Sediment sampling and testing would be conducted every 5 years as approved by the SC-DMMT. Once the sediment test results have been received, a SAPR report is submitted to the SC-DMMT for review and approval. Following approval of the SAPR report, dredging activities may be scheduled and initiated.

Reporting. The USACE permit requires post-construction reporting to document compliance with all general and special conditions in the permit. Reports are to include general information regarding each dredging event, as well as a post-dredging bathymetry survey drawing of the dredging area and are due to USACE within 45 calendar days of the completion of each dredging event.

The Section 401 WQC requires that an Annual Project Status Report be submitted to the CCRWQCB by May 31 of each year following the issuance of the Certification (issued October 26, 2022), regardless of whether dredging is conducted or not. At a minimum, Annual Project Status Reports would address activities conducted during the prior calendar year.

2.1.2 Vessel Usage of the Harbor

The number of ships entering and exiting the harbor varies each year, depending on commercial launch activity. This programmatic analysis considers up to 200 harbor trips per year, based on known commercial launch activity and in consideration of potential future launch activity that would require harbor usage. This number may be lower in any given year depending on launch activity. Harbor trips may not exclusively be tied to launch activity, and not all launch activity requires harbor usage. Each launch could also require more than one harbor trip. The scope of this programmatic analysis considers ship transport within 24 nautical miles from the shore, consistent with the California Air Resources Board (CARB) definition for Regulated California Waters. It is assumed vessels would travel through federal waters prior to reaching Regulated California Waters within Santa Barbara County, before turning towards shore. Authorized ships would enter the harbor to offload CCBs, other equipment needed for space launch programs, or other general equipment or components as necessary. Tugboats may be utilized as necessary to provide safe access to the harbor, depending on harbor conditions and with permit authorization from SBCAPCD. All vessels utilizing the harbor would do so in accordance with all applicable SBCAPCD rules and regulations. Individual users of the harbor would be required to obtain all necessary authorizations, including any necessary approval under follow-on, site-specific NEPA, prior to entering the harbor. Further, follow-on site-specific NEPA would be required for any vessel transit activities that deviate from the scope of this programmatic analysis.

Over the past 20 years the *Rocketship* has been the primary vessel to use the harbor; therefore, this PEA uses the details and operation of this ship as the representative vessel for harbor usage. The *Rocketship* is a self-propelled ship that is 292 feet long, 75 feet wide, with a minimum loaded draft of 8 feet. It has twin fully rotating stern thrusters that allow for maximum control of the stern and two bow thrusters that further enhance its maneuverability. As necessary, the ship can move forward, backward, sideways, or can turn around within its own length.

Vessels would approach the harbor from the open sea to the harbor breakwater. As the vessel approaches to within 3 miles of the harbor, the engine speed would be reduced in order to slow the advance of the ship. As the ship approaches to within approximately 1 mile, it would be turned around to enter the harbor stern first. The ship would tie to the dock and mooring dolphins with the stern facing the dock. The vessel's speed would average 5 knots (nautical miles per hour) from the 3-mile line to the harbor and then would slow to less than 1 knot as it approaches the dock. From the time the vessel crosses the 3-mile boundary, it would take approximately 90 to 120 minutes for the ship to tie up at the dock.

Vessels would typically enter and exit the harbor during daylight hours. If the schedule calls for an early morning delivery such that predawn activities are required, lights would be turned on before dusk the night before and left on all night. This lighting arrangement is based on discussions with the NMFS and is intended to minimize startle effects on the local wildlife (ENSR 2001).

Once docked, unloading activities would occur as tide conditions permit until the ship's cargo is completely unloaded. The amount of time to complete offloading activities can vary depending on tide conditions, payload size, and other extraneous factors, but on average can range from a couple days to approximately 2 weeks. If adverse weather or rough ocean conditions arise while the vessel is docked, conditions may be too unstable to offload cargo. Under such conditions, the vessel would head out to sea beyond the 3-mile limit to wait out the adverse conditions. When stable weather/oceanic conditions return, the vessel would return to the harbor to offload the remainder of the cargo. Refer to Figures 2-5 and 2-6 for representative photos of off-loading operations.

The vessels typically have a crew of 12 to 20 persons and while docked the crew would generally be restricted by contract requirements to not travel beyond the vicinity of the harbor except to visit a nearby SLC or to leave South Vandenberg SFB. The average number of vehicle trips associated with vessel usage is estimated to be 12 vehicles per day, with most of the traffic occurring prior to docking and after the vessel departs.

As needed, kelp may require cutting prior to vessel entry when no dredge is required. Kelp cutting activities would be conducted as described in Section 2.1.1, Harbor Dredging.

2.1.3 General Harbor Recreation

The harbor is occasionally used for general recreational activities that include fishing, boating, jet-skiing, and other general uses. In addition, facilities adjacent to the harbor are available for rent to host general events, such as weddings or picnics. These are ongoing activities that have largely occurred since the establishment of the harbor and are authorized as part of larger Base land use and recreational plans and policies. General harbor recreation is considered within this PEA to better understand impacts from overall harbor usage at Vandenberg SFB.

Figure 2-5. Representative Photo of Off-Loading Operations (1 of 2)

Figure 2-6. Representative Photo of Off-Loading Operations (2 of 2)

2.2 No-Action Alternative

Under the No-Action Alternative, Vandenberg SFB would not continue the harbor activities program. Re-dredging of the harbor would not occur. If the harbor is not re-dredged, the space launch programs at Vandenberg SFB would be jeopardized. Vessel transit, loading and unloading would also no longer continue within the harbor. Where possible, other launches may be redirected to Cape Canaveral Space Force Station, or payloads could be put on other launch vehicles at Vandenberg SFB or elsewhere. Impacts of these consequential actions were considered for the EELV program in previous NEPA analysis (USAF 1998). Redirection to other launch sites would be highly speculative. Payloads may also be redirected to other nearby harbors, such as the Port of Long Beach, and transported over land to Vandenberg SFB. If redirection is necessary, the need for additional NEPA analysis would be considered at such time. General recreation within the harbor would no longer continue. The No-Action Alternative is not considered a reasonable alternative because it does not meet the purpose and need of the Proposed Action; however, it provides a measure of the baseline conditions against which the impacts of the Proposed Action can be compared. In this PEA, the No-Action Alternative is represented by the baseline conditions described in Chapter 3, Affected Environment.

2.3 Alternatives Considered but Dismissed

As part of the DAF's decision-making process, three alternatives were considered but not carried forward for detailed analysis as they did not meet the purpose and need for the Proposed Action as described in Sections 1.2, Purpose of the Proposed Action, and 1.3, Need for the Proposed Action.

2.3.1 Alternative Dredge Method

An alternative using the hydraulic dredge method was considered to remove sediments from the harbor. This method would involve a barge-mounted suction dredge fitted with a rotating cutter head. The cutter head would be connected to the barge through a steel arm that can pivot up and down to adjust the depth of dredging. As the cutter head churns through sediment, water pumps on the barge would suck up a slurry of sediment and water and pump the sediment/water mixture to the dock via a floating pipeline.

The sediment/water mixture would be discharged into a series of temporary settling ponds located on the dock. The settling ponds would be lined with plastic and bermed to retain the sediment/water slurry. Sediment would settle to the bottom of the ponds, and the seawater would be allowed to run into a sump at the end of the pond. Seawater collected in the sump would be discharged back into the harbor via a temporary pipeline that would run from the settling bins to the edge of the dock and back into the harbor. The bermed dewatering area would occupy most of the dock area (approximately 75 feet by 210 feet), with the remaining dock area left open for equipment/vehicle maneuvering room.

Once one cell of the settling pond is filled, the discharge hose would be shifted to a second cell and the remaining freestanding water would be allowed to drain to the sump. After most of the water has drained away, a front-end loader would transfer sediment from the first pond to 20-yard roll-off bins for final dewatering. The final dewatering area would be set up adjacent to the settling ponds. The dewatering area would be plastic lined, slightly sloped, and bermed. Water collected from the holding area would be pumped back into the harbor through the temporary pipeline. After the sediment has dewatered, roll-off bins would be put onto trucks and transported to the sediment disposal site at Point Pedernales, similar to as discussed in Section 2.1.1, Harbor Dredging. The hydraulic method of dredging would take up to 5 weeks, including setup and tear down.

Overall volume of dredge material, frequency of dredging, number of workers supporting dredging activities, survey and sampling requirements, kelp cutting, mooring dolphin cleaning, and best management practices (BMPs) (e.g., use of turbidity curtain) would be similar to that described in Section 2.1.1, Harbor Dredging.

This alternative was considered but dismissed from further consideration as it would likely lead to increased turbidity in the harbor. The larger volume of seawater that would be generated and released back into the harbor from the dewatering area could result in higher turbidity in the discharge water, if it were not allowed to settle fully. Because of the larger amount of seawater that would be captured on the dock dewatering area, the use of suction dredging would necessitate a large and complex settling pond arrangement. Further, there would likely be the need for a comprehensive turbidity management plan that could include the use of such measures as sediment traps, water filters, and similar particulate control measures. In addition to increased environmental impacts, this would result in added costs to the project. Therefore, this alternative was eliminated from further consideration.

2.3.2 Daylight Dredging Only

An alternative was considered to dredging as described in Section 2.1.1, Harbor Dredging, but conducting dredging during daylight hours only. This alternative was considered but dismissed as it would extend the amount of time required to conduct the project, which could result in additional intensity of environmental impacts. This would include greater levels of emissions, greater intensity of impacts to species and vegetation within and around the harbor from a longer duration of noise and dredging activity, greater intensity of impacts to water resources from a longer duration of sediment disturbance, and greater potential for spills. Further, the additional time would result in greater overall costs to implement the project. Therefore, this alternative was eliminated from further consideration.

2.3.3 Daylight Offloading of Vessels of the Harbor Only

An alternative was considered where offloading and related activities would only occur during daylight hours. Actions associated with the offloading would be the same as discussed in Section 2.1.2, Vessel Usage of the Harbor, except that the ship would need to stay at the dock for additional days. It is unlikely that offloading could be completed within one daylight period, especially during the shorter daylight hours of the winter months. This alternative was considered but dismissed as it would unnecessarily limit the number of ships that could use the harbor. Further, the additional time would result in greater overall costs to implement the project. Therefore, this alternative was eliminated from further consideration.

2.4 Environmental Protection Measures

The following environmental protection measures are considered part of the Proposed Action. Measures would be included in all future contracting documents related to project completion. The DAF maintains and follows a comprehensive list of steps employed to avoid and/or minimize environmental impacts as well as monitor and report all protection measures.

2.4.1 Biological Resources

Essential Fish Habitat

In accordance with the August 10, 2022 EFH Assessment for Abbreviated Consultation and associated NMFS concurrence (see Appendix B-2), the following measures would be implemented related to EFH:

- Prior to dredging activities, pre- and post-construction eelgrass surveys would be conducted in accordance with the revised dredge permit (USACE 2023) and the California Eelgrass Mitigation Policy (NMFS 2014). Survey methods and survey areas are described in the Eelgrass Monitoring Plan, located in Attachment A of the Dredge Plan (Appendix C). Status and Trends monitoring would occur with hull-mounted side scan sonar and reporting as specified in the Eelgrass Monitoring Plan during non-dredge years. If impacts to eelgrass are found based on monitoring results, further coordination with NMFS and USACE would occur.
- Prior to dredging activities, pre-construction Caulerpa surveys would be conducted in accordance with the dredge permit (USACE 2023) and the Caulerpa Control Protocol (NMFS and CDFW 2021). If presence of Caulerpa species is noted, further coordination with USACE, NMFS, and CDFW would occur, to include isolation, treatment, and elimination of the species.
- During dredging operations, a turbidity curtain would be installed and maintained between the dredge area and kelp beds to isolate the area of turbidity.
- During dredging operations and for all vessel activities within the harbor, appropriate BMPs would be implemented to minimize the risk of fuel/oil spills, as detailed in Section 2.4.4, Environmental Protection Measures – Water Quality. Spill clean-up materials would be maintained on-site for emergency clean-up. The dredging contractor would be required to prepare a spill response plan and be in the immediate area at all times.

Black Abalone

In accordance with the January 2021 BA and associated NMFS concurrence (see Appendix B-2), the following measures would be implemented related to black abalone:

- Vessels using the harbor and associated tugboats would use a predetermined route. This route would limit traversing through kelp beds and prevent vessels anchoring within the kelp beds or hardbottom habitat outside of the dredge footprint.
- During dredging operations, a closed bucket dredge and a turbidity curtain would be used to minimize possible negative effects to surrounding kelp, black abalone, and suitable habitat. A curtain would also be placed from the entrance to the harbor channel to the beach on the west side of the channel to seal off the work area.
- NMFS-approved biologist(s) would conduct pre- and post-dredging surveys for black abalone on the breakwater to determine effects.
    - The pre-dredging survey would be conducted within 30 days prior to the start of dredging, if feasible.
    - The post-dredging surveys would be conducted as soon as possible after completion of the dredging.
    - The DAF would request participation from NMFS in the design of the surveys and placement of transects.

- Depending on results, future surveys may be required until mutual agreement between NMFS and the DAF has been reached regarding the impacts of dredging to black abalone. If black abalone are found within the dredging footprint during dredging operations, project activities would be suspended until a formal consultation with NMFS is conducted.

Marine Species

In accordance with the 2001 BO for the EELV Program (1-8-99-F27; USFWS 2001), the following measures would be implemented related to marine mammals:

- During dredging activities, biological monitoring of the southern sea otter for presence and potential disturbance would be conducted.
- In the event that dredging activities take place after dark, the lights at the wharf would be illuminated prior to dusk and turned off after dawn to minimize impacts to wildlife in the area.

In accordance with the terms of the USACE permit, the following measure would be implemented related to marine species:

- In the unlikely event that any individuals of fish, whale, abalone, sea turtle, coral, or marine plant species listed by NOAA NMFS under the Endangered Species Act (ESA) appear to be entangled, injured, or killed as a result of the structures or work in navigable Waters of the U.S., the permittee or designated representative shall immediately report the event to the USACE Los Angeles District Regulatory Office of the Los Angeles District or NOAA's West Coast Region Stranding hotline. If these hotlines cannot be reached, the NOAA Regional Stranding Coordinator or the NOAA Assistant Stranding Network Coordinator should be notified. The finder should leave the plant or animal alone, make note of any circumstances likely causing the death or injury, note the location and number of individuals involved and, if possible, take photographs. Adult animals should not be disturbed unless circumstances arise where they are obviously injured or killed by discharge exposure, or some unnatural cause. The finder may be asked to carry out instructions provided by NMFS to collect specimens or take other measures to ensure that evidence intrinsic to the specimen is preserved.

Any future measures outlined in the new Basewide Programmatic BO regarding harbor operations and measures to monitor/avoid southern sea otters would be incorporated into this action.

2.4.2 Air Quality and Climate

Given the requirements of EO 14057, *Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability*, and the increasing concerns that greenhouse gases (GHGs) contribute to global climate change, the DAF would take into consideration and encourage measures that promote efficiency and conservation through education, programs, and incentives to increase efficiency and conserve energy in projects on Base.

The commercial space entities and/or any of their contractor support would be responsible for obtaining any registrations or permits as required by SBCAPCD or required for portable equipment under the CARB Portable Equipment Registration Program (PERP). Commercial space entities and/or any of their contract support would be considered an operator with respect to these registration or permitting requirements as they are expected to operate any vessels docking their space-related equipment. Potential to Emit from vessels used to support the dredging operation, such as tugboats, skiffs, and survey boats, is not expected to exceed 25

tons per year (tpy) of any affected pollutant during any consecutive 12-month period at Vandenberg SFB (see Appendix D). Therefore, these activities may qualify for exemption from permit requirements as per SBCAPCD Rule 202 (F)(7). However, if SBCAPCD determines that these portable units support ongoing activities at Vandenberg SFB, they might not be eligible for PERP registration, in which case, the commercial space contactors would apply for permits from SBCAPCD, as required.

The commercial space contactors that use the harbor for loading and off-loading of space launch-related equipment would be responsible for obtaining any permits to operate from the SBCAPCD and be responsible for complying with permit conditions and rules and regulations pertaining to vessel usage.

In addition, the following measures would be implemented as applicable during harbor activities:

- SBCAPCD recommends dust control measures be implemented during dredging operations to minimize emissions.
- Ultra-low sulfur diesel fuel (15 parts per million by volume) would be used for all diesel equipment.
- CARB diesel would be the only fuel combusted in the engines while in California Coastal Waters.
- Where feasible, electric equipment would be used in lieu of diesel-fired equipment.
- On-road and off-road vehicles used would be in compliance with all applicable CARB mobile source regulations, including idling requirements.
- Engines would be maintained per manufacturer or operator's specification to minimize emissions.

2.4.3 Public Health and Safety

- All equipment would be properly maintained and free of leaks. All necessary equipment maintenance and repairs would be performed in pre-designated controlled, paved areas to minimize risks from accidental spillage or release.
- The DAF and all contractor personnel would comply with all applicable OSHA regulations and requirements during project activities.
- In accordance with the USACE permit, a debris management plan would be developed for dredging activities to prevent unauthorized disposal of large debris or other unsuitable materials. The debris management plan would include sources and expected types of debris if known, debris separation and retrieval methods and equipment to be used, debris disposal location(s), and debris disposal methods (e.g., recycling, landfill, hazardous/toxic/radioactive materials/munitions disposal sites, etc.).

2.4.4 Water Quality

- During dredging operations, a turbidity curtain would be installed and maintained between the dredge area and kelp beds throughout dredging operations to isolate the area of turbidity. A curtain would also be placed from the entrance to the harbor channel to the beach on the west side of the channel to seal off the work area.
- Sediment removed from the harbor during dredging operations would be placed on the adjacent wharf and contained by settlement tanks, k-rails, supersacks, or similar barrier materials, allowing stockpiled sediment to dewater and dry out before being hauled off-

site for disposal. Return water from this contained area would pass through a polypropylene product that filters remaining sediment from the water before it returns to the harbor.

- During dredging operations, return water from designated dewatering areas would be directed back to the harbor using k-rail diversions, which limit the return water to a predetermined course.
- During dredging operations, sediment control measures such as k-rails or filter fabric would be appropriately maintained to capture sediments on the dock prior to reentering the harbor.
- Sediment remaining in the dewatering area on the dock after heavy equipment removal would be removed by sweeping and would be disposed of at the sediment disposal site at Point Pedernales.
- Any fueling of equipment used during dredging would be required to adhere to requirements of 40 CFR 112 as applicable.
- The dredging contractor would be required to maintain a spill response plan (in accordance with 40 CFR 112, as applicable) and spill control materials on-site at all times. This spill response plan should detail hazardous waste management practices following spill response operations.
- During dredging operations, equipment used on-site would be checked daily for fuel, oil, and hydraulic fluid leaks, as well as other problems that might result in spills.
- During dredging operations, fueling would occur at least 100 feet away from the edge of the dock and within designated staging areas.
- Drip pans or absorbents would be used during any fueling occurring during dredging operations, or fueling would be performed in a fueling area on an impermeable surface with containment berms.
- Trash and debris would be stored in appropriate bins and removed from the site at least once weekly during dredging operations or loading and unloading operations.
- Any equipment or materials no longer needed would be removed from the site following completion of dredging operations.
- In the event of a spill into the water during any harbor activity, all necessary manpower, equipment, and materials would be committed to control and remove the spill.
- The project area would be visually inspected and areas of waters of the State during dredging operations would be observed for excessive turbidity, spills, affected marine wildlife, or other water quality impacts in the dredging area. Visual monitoring would ensure that excessively turbid water is not entering the breakwater kelp bed and that sediment is not released from the dredged spoils placed on the dock. If the Proposed Action does cause water quality or other beneficial use impacts, corrective actions would be implemented and the CCRWQCB staff member overseeing the project would be contacted.
- Vessel operators would be required to submit documentation demonstrating they have a Shipboard Oil Pollution Emergency Plan and an oil spill contingency plan that meets USCG's and CDFW Office of Spill Prevention and Response (OSPR) requirements for such plans prior to the arrival of that vessel. No vessel would be allowed to enter the

harbor until it has submitted documentation to the Base that it has an approved spill plan.

- Vessel operators or commercial clients would contact the USCG and the Vandenberg SFB Fire Department prior to the arrival of the first ship at the harbor to discuss procedures to be followed in the event of a major emergency in the harbor area.

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Chapter 3. Affected Environment

3.1 Air Quality and Climate

Air quality refers to the atmospheric concentration of a specific compound (i.e., amount of pollutants in a specified volume of air) that occurs in a particular geographic location. Air quality levels at a particular location are determined by the interaction of emissions (e.g., type and amount of pollutant emitted into the atmosphere), meteorology (e.g., weather patterns affecting pollutant dispersion), and chemistry (e.g., chemical reactions that transform emissions into other substances). Air quality is defined by pollutant concentrations that are often expressed in units of parts per million (ppm) or micrograms per cubic meter (ug/m^3).

The Clean Air Act (CAA) of 1963 and subsequent amendments specify the federal law for regulating air emissions from stationary and mobile sources. Under the CAA, the USEPA establishes National Ambient Air Quality Standards (NAAQS) to protect public health and welfare. NAAQS have been established for the following six major pollutants of concern, which are called "criteria pollutants": carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), sulfur dioxide (SO_2), and particulate matter (with an aerodynamic size less than or equal to 10 microns [PM_{10}] and with an aerodynamic size less than or equal to 2.5 microns [$PM_{2.5}$]). These standards represent the maximum allowable atmospheric concentrations that may occur and still protect public health and welfare with a reasonable margin of safety. Other basic elements of the CAA include hazardous air pollutant standards, attainment plans, motor vehicle emission standards, stationary source emission standards and permits, and enforcement provisions.

The CAA sections 111 and 112 allow USEPA to transfer primary implementation and enforcement authority for most of the federal standards to state, local, or tribal regulatory agencies. In California, CARB is responsible for air quality regulations, with implementation and enforcement of stationary source regulations delegated to the regional Air Districts. California standards, as established by CARB, are termed the California Ambient Air Quality Standards (CAAQS). CAAQS are at least as restrictive as the NAAQS and include four additional pollutants for which there are no national standards. Table 3.1-1 presents the national and state ambient air quality pollutant standards. Areas that exceed a standard are designated as "nonattainment" for that pollutant, while areas that meet a standard are in "attainment" for that pollutant.

Table 3.1-1. National and California Ambient Air Quality Standards

Pollutant	Averaging Time	NAAQS[1]		CAAQS[2]
		Primary[3]	Secondary[4]	Concentration[5]
Ozone, O_3 (ppm)	1 hour	-	-	0.09
	8 hours	0.070	0.070	0.070
Carbon Monoxide, CO (ppm)	1 hour	35	-	20
	8 hours	9	-	9
Nitrogen Dioxide, NO_2 (ppm)	1 hour	0.10	-	0.18
	Annual arithmetic mean	0.053	0.053	0.03
Sulfur Dioxide, SO_2 (ppm)	1 hour	0.075	-	0.25
	3 hours	-	0.5	-

Table 3.1-1. National and California Ambient Air Quality Standards

Pollutant	Averaging Time	NAAQS[1]		CAAQS[2]
		Primary[3]	Secondary[4]	Concentration[5]
	24 hours	-	-	0.04
Respirable Particulate Matter (PM_{10}) (ug/m^3)	24 hours	150	150	50
	Annual arithmetic mean	-	-	20
Fine Particulate Matter ($PM_{2.5}$) (ug/m^3)	24 hours	35	35	-
	Annual arithmetic mean	9	15	12
Lead, Pb (ug/m^3)	Rolling 3-month average	0.15	0.15	-
	30-day average	-	-	0.15
Vinyl Chloride (ppm)	24 hours	-	-	0.01
Sulfates (ug/m^3)	24 hours	-	-	25
Hydrogen Sulfide, HS (ppm)	1 hour	-	-	0.03
Visibility Reducing Particles	8 hours	-	-	In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70 percent.

Notes:
CAAQS = California Ambient Air Quality Standards; CO = carbon monoxide; HS = hydrogen sulfide; NAAQS = National Ambient Air Quality Standards; NO_2 = nitrogen dioxide; O_3 = ozone; Pb = lead; PM_{10} = respirable particulate matter; $PM_{2.5}$ = fine particulate matter; ppm = parts per million; SO_2 = sulfur dioxide; ug/m^3 = micrograms per cubic meter
Source: CARB 2024
[1]NAAQS (other than O_3, particulate matter, and those based on annual averages or annual arithmetic mean/average) are not to be exceeded more than once per year. The O_3 standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when 99 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard. Contact the USEPA for further clarification and current federal policies.
[2]CAAQS for O_3, CO (except Lake Tahoe), SO_2 (1- and 24-hour), NO_2, PM_{10}, and visibility reducing particles, are values that are not to be exceeded. All others are not to be equaled or exceeded.
[3]Primary Standards are the levels necessary, with an adequate margin of safety, to protect public health.
[4]Secondary standards are the levels necessary to protect the public welfare from any known or anticipated effects of a pollutant.
[5]Concentration expressed first in units in which it was promulgated. ppm in this table refers to ppm by volume or micromoles of pollutant per mole of gas.

Toxic air contaminants (TACs) include air pollutants that can cause serious illnesses or increased mortality, even in low concentrations. TACs are compounds that generally have no established ambient standards but are known or suspected to cause short-term (acute) and/or long-term (chronic non-carcinogenic or carcinogenic) health effects. The CARB designates diesel particulate matter (DPM) from the combustion of diesel fuel as a TAC.

The main pollutants of concern considered in this air quality analysis include the criteria air pollutants.

3.1.1 Regional Setting

The Region of Influence (ROI) for the Proposed Action includes the South Central Coast Air Basin (SCCAB), in which the project area is located. The SCCAB includes Santa Barbara, San Luis Obispo, and Ventura counties. The SBCAPCD regulates stationary sources of air pollution in this area and establishes emission limitations and control requirements for various sources, based upon their source type and magnitude of emissions. SBCAPCD additionally implements a permit program for new or modified stationary sources of air pollutants. Jointly, CARB and

SBCAPCD operate a network of ambient air monitoring stations in Santa Barbara County to measure ambient concentrations of air pollutants and determine whether air quality meets the CAAQS and NAAQS. The nearest monitoring station to the project area is the South H Street station in Lompoc (CARB 2023).

Santa Barbara County is classified as an attainment/unclassified area for the NAAQS for all criteria pollutants. However, the County is currently nonattainment-transitional for the state O_3 standard and nonattainment for the state PM_{10}.

Air quality within the project area is expected to be comparable to or better than that of the more developed portions of Vandenberg SFB, as the project area is exposed to open ocean breezes and is isolated from the rest of the Base.

3.1.2 Greenhouse Gas Emissions

GHGs occur from both natural processes and human activities. GHGs trap heat in the atmosphere, the accumulation of which influences the long-term range of average atmospheric temperatures. Scientific evidence indicates a trend of increasing global temperature over the past century due to an increase in GHG emissions resulting from human activities. Climate change is anticipated to produce negative economic and social consequences across the globe. Predictions of long-term impacts resulting from climate change include sea level rise, changing weather patterns with increases in the severity of storms and droughts, changes to local and regional ecosystems, and a reduction in winter snowpack. In California, climate change effects are anticipated to include exacerbation of air quality problems, a reduction in municipal water supply from the Sierra snowpack, a rise in sea level that would displace coastal businesses and residences, damage to marine and terrestrial ecosystems, and an increase in the incidence of infectious diseases, asthma, and other human health problems (California's Fourth Climate Change Assessment 2018).

The most common GHG emissions occurring as a result of natural processes and human activities include carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). Emissions of fluorinated gases (hydrofluorocarbons and perfluorocarbons) and sulfur hexafluoride occur primarily as a result of human activity. GHGs have varying global warming potential (GWP). GWP is a measure of how much energy the emissions of 1 ton of a gas absorbs over a given period of time (usually 100 years), relative to the emissions of 1 ton of CO_2 (U.S. Environmental Protection Agency, 2024). The reference gas for GWP is CO_2; therefore, CO_2 has a GWP of 1. Other common GHGs that result from human activity include CH_4, which is estimated to have a GWP of 27 to 30 over 100 years; and N_2O, which has a GWP of 273.

Currently, there are no regulatory thresholds of significance for GHG emissions; however, the CEQ has released interim guidance on when and how federal agencies should consider GHG emissions and climate change in NEPA analyses (CEQ 2023). The guidance emphasizes that when conducting climate change analyses in NEPA reviews, agencies should consider the following: (1) the potential effects of a proposed action on climate change, including by assessing both GHG emissions and reductions from the proposed action; and (2) the effects of climate change on a proposed action and its environmental impacts.

The guidance also recommends that "agencies provide additional context for GHG emissions, including through the use of the best available social cost of GHG (SC-GHG) estimates, to translate climate impacts into the more accessible metric of dollars, allow decision makers and the public to make comparisons, help evaluate the significance of an action's climate change effects, and better understand the tradeoffs associated with an action and its alternatives." (CEQ 2023). The SC-GHG is the monetary value of the net harm to society associated with

adding a small amount of that GHG to the atmosphere in a given year. In principle, it includes the value of all climate change impacts, including (but not limited to) changes in net agricultural productivity, human health effects, property damage from increased flood risk, natural disasters, disruption of energy systems, risk of conflict, environmental migration, and the value of ecosystem services. The SC-GHG, therefore, should reflect the societal value of reducing emissions of the gas in question by 1 metric ton. There is no established dollar-value threshold for the SC-GHG.

3.2 Biological Resources

NEPA and Section 7 of the ESA of 1973, as amended (16 United States Code [U.S.C.] §§ 1531 to 1544), require federal agencies to consider the potential effects of a project on federally listed threatened and endangered species, in an effort to prevent jeopardizing the continued existence of such species. The ESA is jointly implemented by USFWS and NMFS.

Section 7 requires federal agencies to consult with USFWS and/or NMFS if it is determined that the project has the potential to adversely affect federally listed species, either directly or indirectly, or the potential to destroy or adversely modify critical habitat designated for such species. The MSA Section 305(b)(2) requires federal agencies to consult with NMFS on any proposed action that may adversely affect EFH.

Also, when evaluating project impacts, DAF policy is to consider other federal special status species (i.e., migratory birds and bald and golden eagles), state-listed protected species (i.e., species listed or candidate under the California ESA), and species protected by other state laws. In California, species protected by other state laws include species that the CDFW designates per the California Fish and Game Code Sections 3511, 4700, 5050, and 5515 as “fully protected” wildlife species, as well as species of special concern. A "fully protected" designation means the species is at risk of extinction within California. This term was used before California’s Endangered Species Act became law. California also protects species of special concern. Although SLD 30’s Integrated Natural Resource Management Plan is not subject to California’s requirements, SLD 30 protects and conserves these species when practicable and consistent with the military mission. SLD 30 also must comply with requirements of the Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. Sections 703-712) as amended. The MBTA protects native migratory birds, including their eggs, active nests, and young. Lastly, SLD 30 must comply with the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d), which prohibits anyone, without a permit from "taking" bald or golden eagles, including their parts (including feathers), nests, or eggs.

3.2.1 Methodology

Potential occurrence of plant and wildlife species was determined through project-specific field surveys, coordination with relevant regulatory agencies and Vandenberg SFB biologists, and past documentation of special status species and suitable habitat known to occur within the project area. For the purpose of this analysis, the ROI for biological resources was defined as the harbor, to include the maintenance dredge area, and the sediment disposal site at Point Pedernales, as well as a 7-kilometer (approximately 4.5-mile) buffer for aquatic wildlife and a 1,600-foot buffer for terrestrial wildlife to account for potential noise impacts. Seven kilometers has been identified by Clarke et al. (2002) and Dickerson et al. (2001) as the distance at which underwater noise originating from dredging activities would generally cease (Suedel et al. 2019). The 1,600-foot terrestrial buffer was established to capture the distance at which noise levels from the Proposed Action would reach below a range of 55 to 60 decibels (dB), the

threshold at which deleterious physiological responses to noise exposure have been observed (Barber et al. 2009).

A BA was submitted to NMFS in January 2021 to provide information about federally listed species and designated or proposed critical habitat existing within the project area that could be affected by maintenance dredging of the Vandenberg harbor. The BA was prepared per legal requirements set forth under regulations (50 CFR Part 402) implementing Section 7 of the ESA. The NMFS concurred with this determination in a letter dated February 25, 2021.

3.2.2 Terrestrial Vegetation and Wildlife Species

The vegetation community on the bluff directly above the harbor consists of disturbed, non-native annual grassland that has been continually used for cattle grazing for at least the past 80 years. Surveys of terrestrial vegetation on this bluff were last conducted in July and November of 2000. Dominant plant species present in the 15-acre survey area at that time are listed in Table 3.2-1 (ENSR 2001).

Table 3.2-1. Plant Species Identified during 2000 Surveys

Common Name	Scientific Name
Black Mustard	*Brassica nigra*
California Plantain	*Plantago erecta*
Costal morning-glory	*Calystegia macrostegia ssp. cyclostegia*
Common Vetch	*Vicia sativa*
Coyote Bush	*Baccharis pilularis*
Dove Weed	*Eremocarpus setigerus*
Foxtail	*Hordeum murinum ssp. glaucum*
Green Everlasting	*Gnaphalium californicum*
Italian Rye	*Lolium multiflorum*
Lupine	*Lupinus sp.*
Mock Heather	*Ericameria ericoides*
Sawtooth Goldenbush	*Hazardia squarrosa var. squarrosa*
Soft Chess Brome	*Bromus hordeaceus*
Wild Oat	*Avena fatua*

A reconnaissance-level terrestrial wildlife survey of the area above the harbor was last conducted in September of 2000 to characterize wildlife habitat and to document the presence of wildlife, as determined by direct observation or other evidence, such as tracks, burrows, or scat. The survey covered a 15-acre area around the harbor (ENSR 2001).

Terrestrial wildlife species directly observed on-site during the survey included side-blotched lizard (*Uta stansburiana*), southern alligator lizard (*Gerrhonotus multicarinatus*), western fence lizard (*Sceloporus occidentalis*), Brewer's blackbird (*Euphagus cyanocephalus*), California towhee (*Pipilo crissalis*), house finch (*Carpodacus mexicanus*), and western gull (*Lanus occidentalis*). Burrows from the Botta's pocket gopher (*Thomomys bottae*) and scat from the

brush rabbit (*Sylvilagus bachmani*) were also observed on-site. The white-tailed kite (*Elanus caeruleus*), a non-migratory bird species, was observed at a distance from the site (ENSR 2001; VSFB 2021). Migratory bird species identified during previous surveys are discussed in Section 3.2.4, Biological Resources – Special Status Species.

A terrestrial wildlife survey has not been completed in the area of the harbor since 2000, although ongoing monitoring does occur for select marine wildlife species protected by the ESA and the Marine Mammal Protection Act of 1972 (MMPA). During the pre- and post-dredge surveys completed to comply with species-specific monitoring requirements, incidental wildlife, including birds, that are observed during this time are also recorded. Incidental bird species observed during 2021 pre- and post-dredge surveys and a 2022 pre-dredge survey are listed in Table 3.2-2 (VSFB 2022; United Launch Alliance, LLC 2022).

Table 3.2-2. Bird Species Observed during 2021 and 2022 Pre- and Post-Dredge Surveys

Species Name		Pre-dredge (June-July 2021)	Post-dredge (August 2021)	Pre-dredge (May 2022)
Common	Scientific			
Black turnstone	*Arenaria melanocephala*		X	
California brown pelican	*Pelecanus occidentalis*	X	X	X
Heerman's gull	*Larus heermanni*	X	X	
Western gull	*Larus occidentalis*	X	X	X
Pelagic cormorant	*Phalacrocorax pelagicus*	X	X	X
Osprey	*Pandion haliaetus*		X	
Ringbilled gull	*Larus delawarensis*			X
Western grebe	*Aechmophorus occidentalis*			X
Great egret	*Ardea alba*			X
Elegant tern	*Thalasseus elegans*			X
European starling	*Sturnus vulgaris*			X
Turkey vulture	*Cathartes aura*			X

The vegetation community present at the sediment disposal site at Point Pedernales consists primarily of invasive herbaceous plant species. Wildlife species near the sediment disposal site at Point Pedernales with state or federal protections are discussed below in Section 3.2.4, Biological Resources – Special Status Species.

3.2.3 Marine Vegetation and Wildlife Species

While the dredging footprint itself consists primarily of sand, the surrounding harbor offers a variety of marine habitats, including the breakwater (rocky seawall creating the barrier that protects the harbor), submerged reefs, rocky outcroppings, and sandy pockets. The project area supports two types of marine habitat, intertidal and shallow subtidal, both of which consist primarily of rocks extending into the subtidal to a depth of approximately 25 feet, about 1,000 feet from shore. The shallow subtidal environment is characterized by heavy surge and frequent sand movement and is therefore only suitable for species that can survive periodic shifts in their environment (USAF 2021, ENSR 2001).

A series of marine biological surveys was conducted in the harbor in 1978 and 1979, prior to and following the construction of the dock. Following the completion of the initial dredging effort in the harbor, studies were conducted in September 1984 and July 1985 to assess the effects of

the dredging operations. In September 2000 a survey was completed to update information on marine resources in support of the EELV program, which required harbor modifications and dredging (ENSR 2001, USAF 2021).

A comprehensive marine biological survey of the harbor has not been completed since 2000, although ongoing monitoring does occur for select species protected by the ESA and the MMPA. Incidental wildlife species that were observed and recorded during the 2021 and 2022 pre- and post-dredge surveys are included in the below discussion.

The sediment disposal site at Point Pedernales is considered to be an upland disposal site, located along the coast but slightly inland. It does not directly connect with the beach, and therefore, does not include marine vegetation or wildlife species in the affected environment (USAF 2021). The discussion below focuses on the affected marine environment of the harbor area.

Vegetation

Prior to construction of the dock, surveys showed that the original vegetative community in the harbor was dominated by surf grasses (*Phyllospadix torreyi* and *P. scouleri*), palm kelp (*Pterogophera californica*) and various sand-tolerant species of red algae, including *Gigartina canaliculate*, *Cryptoplerua violacea*, *Stenogramme interrupta*, and *Neoagardhiella baileyi* (ENSR 2001). The marine biological survey conducted in 2000 observed a similar vegetative community continuing to exist in the project area. Kelp and red algae species were observed anchoring to the rocky substrate located below the sand within the dredge footprint, and the area adjacent to the dredge footprint was observed to contain abundant surf grass, giant kelp (*Macrocystis pyrifera*), and feather boa kelp (*Egregia menziesii*) (ENSR 2001). Vegetation observed during 2021 pre- and post-dredge surveys included surf grass, wire weed (*Sargassum muticum*), and tangle (*Laminaria* sp.) (VSFB 2022). Eelgrass (*Zostera* spp.) occurs within the project area and is monitored before and after each dredge event (USAF 2021). Because eelgrass and kelp canopy serve as critical habitat for federally protected species, both are discussed in more detail in Section 3.2.4, Biological Resources – Special Status Species.

Invertebrate Species

Prior to construction of the dock, surveys show that dominant marine wildlife species included crustaceans such as the cumaceans *Lamprops* sp. and *Cyclaspis* sp., the amphipods *Euhaustorius* sp. and *Synchelidium* sp., and the polychaete *Dispio uncinate* (ENSR 2001). Since these early surveys, permanent survey methods have been established in the harbor to collect updated data on algae and invertebrates, including three subtidal transects located directly within the dredging footprint, three subtidal transects located less than 100 yards northwest of the dredge area, and three intertidal transects (USAF 2021). The most commonly observed invertebrate species during the survey conducted in 2000 were barnacles (*Chthamalus fissus* and *Chthamalus dali*), littorine snails (*Littorina planaxis*), and limpets (*Collisella* sp.) (ENSR 2001). Incidental invertebrate species observed during 2021 pre- and post-dredge surveys and a 2022 pre-dredge survey are listed in Table 3.2-3 (VSFB 2022; United Launch Alliance, LLC 2022).

Table 3.2-3. Invertebrate Species Observed during 2021 and 2022 Pre- and Post-Dredge Surveys

Species Name		Pre-dredge (June-July 2021)	Post-dredge (August 2021)	Pre-dredge (May 2022)
Common	Scientific			
Sunburst anemone	*Anthopleura sola*	X	X	X
Ochre star	*Piaster ochraceus*	X	X	X
Bat star	*Asterina miniate*	X	X	X
Sea lemon	*Doris/Peltodoris* spp.	X		X
California sea hare	*Aplysia californica*	X		X
Norris topsnail	*Norrisia norris*	X	X	X
Olivella	*Olivella biplicate*	X	X	X
Moon snail	*Euspira lewisii*	X	X	X
Scaled wormsnail	*Thylacodes squamigerus*		X	
California mussel	*Mytolius californianus*	X	X	X
Red abalone	*Haliotis rufescens*	X		X
Little brown barnacle	*Chthamalus dalli*	X	X	X
Shield-backed kelp crab	*Pugettia producta*	X		X
Slender crab	*Cancer gracilis*	X	X	X
Striped shore crab	*Pachygrapsus crassipes*	X	X	X

A May 2022 pre-dredge survey identified red abalone, as well as black abalone, a federally listed endangered species, within the project area (Bell 2022). Black abalone is discussed in more detail in Section 3.2.4, Biological Resources – Special Status Species.

Fish Species

Prior to construction of the dock, surveys show that fish in the harbor were typical of those reported in similar areas located off the central California coast. During the 2000 survey, 43 species of fish were identified within the harbor. Four species of surfperch (*Brachyistius frenatus, Damalichthys vacca, Micrometrus minimus,* and *Hyperprosopon argenteum*) and topsmelt (*Atherinops affinis*) were the most commonly observed (ENSR 2001).

Incidental fish species observed during 2021 pre- and post-dredge surveys and a 2022 pre-dredge survey are listed in Table 3.2-4 (VSFB 2022; United Launch Alliance, LLC 2022).

Table 3.2-4. Fish Species Observed during 2021 Pre- and Post-Dredge Surveys

Species Name		Pre-dredge (June-July 2021)	Post-dredge (August 2021)	Pre-dredge (May 2022
Common	Scientific			
Kelp rockfish	*Sebastes atrovirens*	X	X	X
Olive rockfish	*Sebastes serranoides*	X		X
Pile perch	*Rhacochilus vacca*	X		X
Black perch	*Embiotica jacksoni*	X		X
Barred surfperch	*Amphistichus argenteus*	X		X
Kelp surfperch	*Brachyistius frenatus*	X		X

Table 3.2-4. Fish Species Observed during 2021 Pre- and Post-Dredge Surveys

Species Name		Pre-dredge (June-July 2021)	Post-dredge (August 2021)	Pre-dredge (May 2022
Common	Scientific			
Giant kelpfish	*Heterostichus rostratus*	X	X	X
Halibut	*Paralichthys californicus*	X	X	X
Cabezon	*Scorpeanichthys marmorata*	X	X	
Midshipman	*Porichthys* sp.		X	
Bat ray	*Myliobatis californica*	X	X	X

Marine Mammals

Marine mammals that occur in the harbor are protected by the MMPA, with the exception of the southern sea otter, which is protected under the ESA. As such, marine mammals are discussed in more detail in Section 3.2.4, Biological Resources – Special Status Species.

3.2.4 Special Status Species

Species were considered “special status” if they met at least one of the criteria listed in Table 3.2-5. Potential occurrence was determined based on past documentation of special status species within the vicinity of the ROI and suitability of habitat and occurrence within the region.

Table 3.2-5. Special-Status Biological Resources

Special-Status Biological Resources
Plant and wildlife species that are federally listed, proposed for listing, or candidates for listing
Plant and wildlife species that have been delisted
Plant and wildlife species that are state listed or candidates for listing under the California ESA
California fully protected species
Wildlife species considered California Species of Special Concern by CDFW
Plant species listed as endangered, threatened, or rare by the state of California
Golden eagles and bald eagles protected under the Bald and Golden Eagle Protection Act
Federal Birds of Conservation Concern
Winter roost locations for monarch butterflies protected under the Local Coastal Plan of Santa Barbara County

Notes:
CDFW = California Department of Fish and Wildlife

A summary of consultation with USFWS and NMFS regarding special status species and habitat known to exist within the project area is provided in Sections 1.4.4, Interagency and Intergovernmental Coordination – U.S. Fish and Wildlife Service, and 1.4.5, Interagency and Intergovernmental Coordination – National Marine Fisheries Service. In accordance with the 2024 LOA issued by NMFS, pinnipeds are monitored semi-monthly, during low-tide conditions when possible (less than +2 feet) (see Appendix E).

Federal- and State- Listed Species and Critical Habitats

As part of this analysis, the USFWS Information for Planning and Conservation system Official Species List under section 7(c) of the ESA (USFWS 2024), California Natural Diversity Database (CNDDB) (CDFW 2023a; 2023b), Vandenberg SFB subject matter experts, and other sources were consulted to determine which species may have a potential to occur within the project area. Species with federal or state protections with a potential to occur within or near the project area are discussed in Table 3.2-6.

Table 3.2-6. Special Status Species Identified within Project Area

Species Name		Status		Habitat	Potential to Occur in Project Area
Common	Scientific	Federal	State		
Mammals					
California sea lion	*Zalophus Californianus*	MMPA	–	Rocks and beach haul-outs, nearshore coastal waters, and open ocean	Possible. The species is known to occur within and nearby the harbor area. Haul out counts observed during routine monitoring in 2024 identified one haul out in the area of the harbor.
Northern elephant seal	*Mirounga angustirostris*	MMPA	–	Beaches for breeding and molting, nearshore waters	Possible. The species is known to occur in waters off the coast of Vandenberg SFB. Haul out counts observed during routine monitoring in 2024 identified one haul out in the area of the harbor.
Northern fur seal	*Callorhinus ursinus*	MMPA	–	Rocks and beach haul-outs, nearshore coastal waters, and open ocean	Possible. The species is known to occur in waters off the coast of Vandenberg SFB.
Pacific harbor seal	*Phoca vitulina richardii*	MMPA	–	Rocks and beach haul-outs, nearshore coastal waters, and open ocean	Possible. The species is commonly observed in the harbor, including during the 2021 pre- and post-dredge monitoring and 2022 pre-dredge survey. Haul out counts observed during routine monitoring in 2024 identified 15 haul outs in the area of the harbor.
Southern sea otter	*Enhydra lutris nereis*	FT	FP	Coastal waters near the shore, taking refuge in kelp, coves, or inlets during rough weather	Possible. Suitable habitat exists within the harbor, and the species has been observed during past monitoring efforts. Along the coast of Vandenberg SFB, species counts have ranged between 48 to 85 for surveys conducted in 2016, 2017, 2018, and 2019 (uncorrected count data that should be considered a measure of minimum abundance). Species is assumed to occur within the project area infrequently as a transient visitor resting in the calm water provided by areas of kelp canopy.

Table 3.2-6. Special Status Species Identified within Project Area

Species Name		Status		Habitat	Potential to Occur in Project Area
Common	Scientific	Federal	State		
Blue whale	*Balaenoptera musculus*	MMPA	–	Coastal, open ocean	Possible. The species is known to occur in waters off the coast of Vandenberg SFB.
California gray whale	*Eschrichtius robustus*	MMPA	–	Nearshore and offshore areas	Possible. The species passes Vandenberg SFB annually on its migration between Alaska and Baja California and is routinely sighted along the coast between December and May.
Common dolphin	*Delphinus delphis*	MMPA	–	Coastal, offshore	Possible. The species is known to occur within and nearby the harbor area.
Common minke whale	*Balaenoptera acutorostrata*	MMPA	–	Nearshore and offshore areas	Possible. The species is known to occur in waters off the coast of Vandenberg SFB.
Dall's porpoise	*Phocoenoides dalli*	MMPA	–	Nearshore and offshore areas	Possible. The species is known to occur in waters off the coast of Vandenberg SFB.
Fin whale	*Balaenoptera physalus*	MMPA	–	Offshore, open ocean	Possible. The species is known to occur in waters off the coast of Vandenberg SFB.
Harbor porpoise	*Phocoena phocoena*	MMPA	–	Nearshore and offshore areas	Possible. The species is known to occur in waters off the coast of Vandenberg SFB.
Humpback whale	*Megaptera novaeangliae*	MMPA	–	Coastal, open ocean	Possible. The species is known to occur in waters off the coast of Vandenberg SFB.
Killer whale	*Orcinus orca*	MMPA	–	Nearshore, open ocean	Possible. The species is known to occur in waters off the coast of Vandenberg SFB.
Northern right-whale dolphin	*Lissodelphis borealis*	MMPA	–	Open ocean	Possible. The species is known to occur in waters off the coast of Vandenberg SFB.

Table 3.2-6. Special Status Species Identified within Project Area

Species Name		Status		Habitat	Potential to Occur in Project Area
Common	Scientific	Federal	State		
Pacific white-sided dolphin	*Lagenorhynchus obliquidens*	MMPA	–	Offshore, open ocean	Possible. The species is known to occur within or nearby the harbor area.
Risso's dolphin	*Grampus griseus*	MMPA	–	Nearshore and offshore areas	Possible. The species is known to occur in waters off the coast of Vandenberg SFB.
Sperm whale	*Physeter macrocephalus*	MMPA	–	Nearshore and offshore areas	Possible. The species is known to occur in waters off the coast of Vandenberg SFB.
Striped dolphin	*Stenella coeruleoalba*	MMPA	–	Offshore	Possible. The species is known to occur in waters off the coast of Vandenberg SFB.
Birds					
American peregrine falcon	*Falco peregrinus anatum*	Delisted	FP	In California, breeds in areas ranging from cliffs to tall buildings or bridges.	Possible. There is a known nesting site near the sediment disposal site at Point Pedernales.
California condor	*Gymnogyps californianus*	FE	–	Coastal ranges and rugged canyons at elevation and open terrain for foraging.	Unlikely. Since the USFWS listed the California condor (*Gymnogyps californianus*) in 1967, there has been only one known condor occurrence on or near Vandenberg SFB. Though condors are not currently present on Vandenberg SFB, this instance indicates that condors could potentially utilize Vandenberg SFB in the future for some portion of their life history as their population continues to rebound. Vandenberg SFB, to include the project area, does have suitable foraging, roosting, and potentially limited nesting habitat that condors could utilize if they were present.
California least tern	*Sterna antillarum browni*	FE	SE / FP	Generally, beaches free of vegetation with foraging in near-shore ocean and open waters,	Unlikely. No suitable habitat for nesting, hunting, or foraging exists within the

Table 3.2-6. Special Status Species Identified within Project Area

Species Name		Status		Habitat	Potential to Occur in Project Area
Common	Scientific	Federal	State		
				such as estuaries and lagoons. Typically present on Vandenberg SFB from April to mid-August.	project area, but transient individuals may occur.
Hawaiian petrel	*Pterodroma sandwichensis*	FE	–	Nests in burrows in barren areas of mountain slopes.	Unlikely. No suitable habitat for nesting, hunting, or foraging exists within the project area, but transient individuals may occur.
Least bell's vireo	*Vireo bellii pussillus*	FE	–	Dense brush or woodlands, often near water.	Unlikely. No suitable habitat for nesting, hunting, or foraging exists within the project area, but transient individuals may occur.
Marbled murrelet	*Brachyramphus marmoratus*	FT	–	Coastal areas, typically within 2 kilometers of shore.	Possible. Suitable habitat exists within the project area.
Short-tailed albatross	*Phoebastria [=Diomedea] albatrus*	FE	–	Typically occurs in areas with high marine productivity, nesting on the ground and feeding at the water surface.	Unlikely. No suitable habitat for nesting occurs within the project area, but the species hunts and forages on water surfaces and occasionally off ships, when present.
Southwestern willow flycatcher	*Empidonax trailii extimus*	FE	SE	Riparian and wetland thickets.	Unlikely. No suitable habitat for nesting, hunting, or foraging exists within the project area, but transient individuals may occur.
Western snowy plover	*Charadrius nivosus nivosus*	FT	SSC	Tidal flats or shoreline, or riparian areas, nesting on the ground on broad open beaches or salt or dry mud flats with sparse vegetation.	Unlikely. No suitable habitat for nesting, hunting, or foraging exists within the project area, but transient individuals may occur.
Yellow-billed cuckoo	*Coccyzus americanus*	FT	–	Scrub-shrub wetlands, riparian areas, and woodland.	Unlikely. No suitable habitat for nesting, hunting, or foraging exists within the project area, but transient individuals may occur.

Table 3.2-6. Special Status Species Identified within Project Area

Species Name		Status		Habitat	Potential to Occur in Project Area
Common	Scientific	Federal	State		
Reptiles					
Southwestern pond turtle	*Actinemys pallida*	FT (proposed)	–	Shallow waters, riparian areas, herbaceous wetlands, and sand/dune.	Unlikely. No suitable habitat present.
Amphibians					
California red-legged frog	*Rana draytonii*	FT	SSC	Perennial ponds and streams.	Unlikely. California red-legged frogs typically occur near freshwater systems such as streams, marshes, or ponds, where small mammal burrows or leaf litter are present for respite from summer heat; therefore, species is unlikely to occur near the harbor. The sediment disposal site at Point Pedernales is not located within dispersal distance for the species.
Western spadefoot	*Spea hammondii*	FT (proposed)	–	Shallow, freshwater systems such as pools and creeks as well as grasslands, woodland, and cropland/hedgerow.	Unlikely. No suitable habitat present.
Fish					
Tidewater goby	*Eucyclogobius newberryi*	FE	–	Shallow, freshwater systems such as lagoons, lower reaches of streams, and the uppermost portions of large bays.	Unlikely. No suitable habitat present.
Unarmored threespine stickleback	*Gasterosteus aculeatus williamsoni*	FE	SE / FP	Freshwater systems with low turbidity, such as the pooled areas of slow-flowing streams.	Unlikely. No suitable habitat present.
Sea Turtles					
Leatherback sea turtle	*Dermochelys coriacea*	FE	Candidate	Nearshore and offshore areas	Possible. The species is known to occur in waters off the coast of Vandenberg SFB, although is not known to occur within the harbor.

Table 3.2-6. Special Status Species Identified within Project Area

Species Name		Status		Habitat	Potential to Occur in Project Area
Common	Scientific	Federal	State		
Olive ridley sea turtle	*Lepidochelys olivacea*	FE	-	Nearshore and offshore areas	Possible. The species is known to occur in waters off the coast of Vandenberg SFB, although is not known to occur within the harbor.
Loggerhead turtle	*Caretta caretta*	FE	-	Offshore areas	Possible. Present in small numbers in offshore waters generally north of Point Conception, although is not known to occur within the harbor.
Invertebrates					
Black abalone	*Haliotis cracherodii*	FE	–	Rocky, intertidal and shallow subtidal habitats on exposed outer coasts, primarily in crevice microhabitats.	Possible. Surveys conducted before and after each dredge event (most recent survey conducted in May 2022) have identified black abalone within the harbor Additionally, the project area occurs within designated critical habitat for the species.
Vernal pool fairy shrimp	*Branchinecta lynchi*	FT	–	Vernal pools or similar ephemeral wetlands.	Unlikely. No suitable habitat present.
Insects					
Monarch butterfly	*Danaus plexippus*	Candidate species	–	Herbaceous wetlands, scrub-shrub wetlands, grasslands, and woodlands.	Possible. Monarch butterflies have not been identified within the project area but are known to occur nearby.
Flowering Plants					
Gambel's watercress	*Rorippa gambellii*	FE	–	Permanent wetlands, marshes, or along lakes, streams, or ditches	Unlikely. No suitable habitat present.
Gaviota tarplant	*Deinandra increscens ssp. villosa*	FE	SE / CA Rare Plant 1B	Terrestrial habitats consisting of grassland and/or shrubs.	Unlikely. No suitable habitat present.
Marsh sandwort	*Arenaria paludicola*	FE	–	Herbaceous wetland habitats such as bogs or freshwater marshes, typically within	Unlikely. No suitable habitat present.

Table 3.2-6. Special Status Species Identified within Project Area

Species Name		Status		Habitat	Potential to Occur in Project Area
Common	Scientific	Federal	State		
				shallow standing water or no standing water.	
Salt marsh bird's-beak	*Cordylanthus maritimus spp. maritimus*	FE	–	Herbaceous wetlands located on upper terraces or near coastal marshes where tidal inundation is periodic.	Unlikely. No suitable habitat present.
Beach layia	*Layia carnosa*	FT	CA Rare Plant 1 B	Sparsely vegetated semi-stabilized dunes near sea level to 100 feet.	Unlikely. Although the sediment disposal site at Point Pedernales is within the species range, the species is not known to be present in this area.

Notes:
FE = Federally Listed Endangered Species; FT = Federally Listed Threatened Species; MMPA = Marine Mammal Protection Act
FP = fully protected; SE = California Endangered Species; SSC = species of special concern
California Rare Plant 1B = species that are rare throughout their range, with the majority endemic to California. All plants with this rank are eligible for state listing.
Sources**:** CDFW 2023a; CDFW 2023b; ENSR 2001; NatureServe Explorer 2024; United Launch Alliance, LLC 2022; USAF 2021; USFWS 2024; USFWS 2023a; USGS 2019; USSF 2022b; VSFB 2023a; VSFB 2024

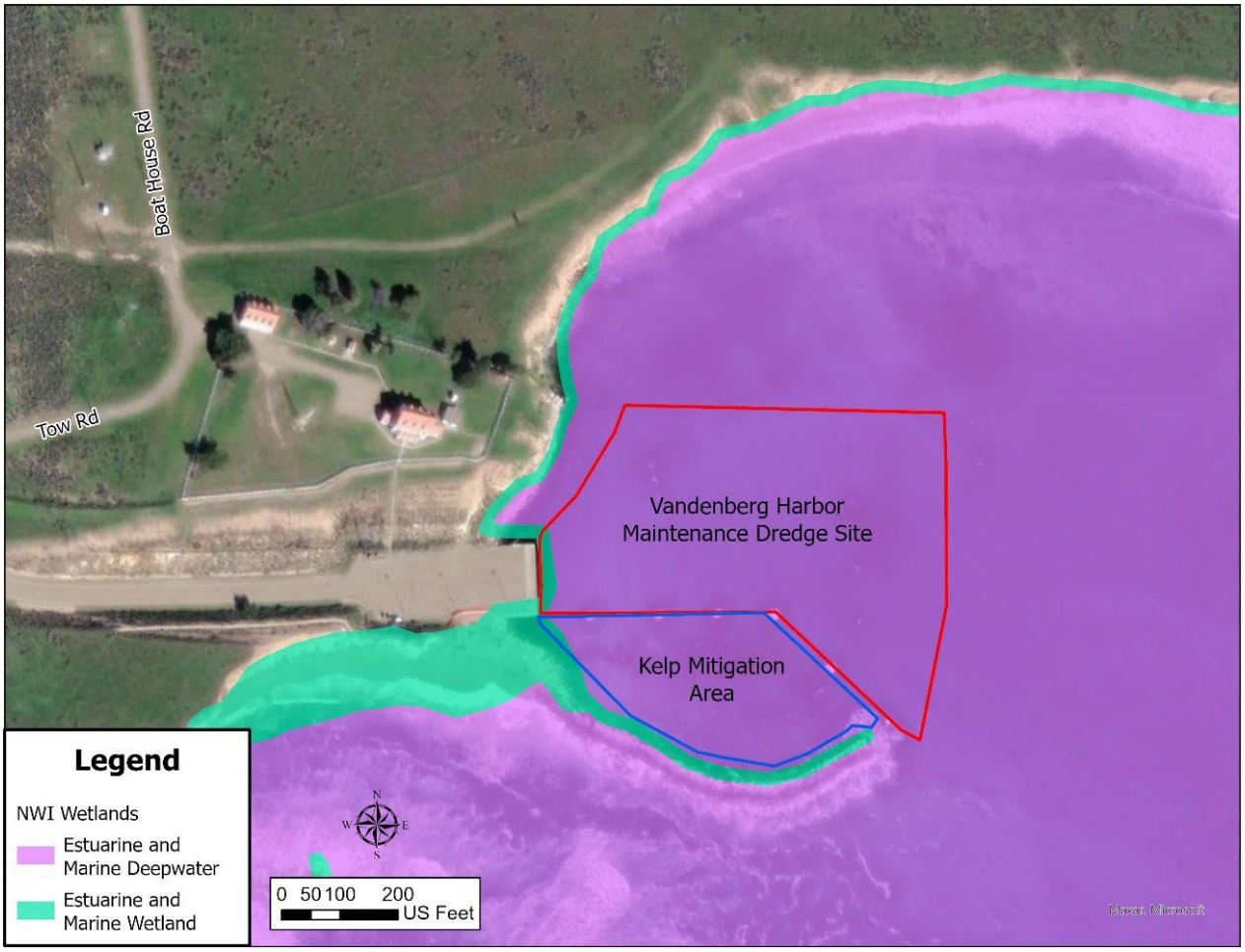
Essential Fish Habitat

As discussed in Section 1.4.5, Interagency and Intergovernmental Coordination – National Marine Fisheries Service, EFH has been previously identified in the project area for at least 18 federally managed fish species within the Coastal Pelagics and Pacific Groundfish FMPs through consultations with the NMFS. Kelp canopy designated as a habitat area of particular concern for various federally managed fish species within the Pacific Groundfish FMP, as well as EFH prey species foraging on infaunal and bottom-dwelling organisms, also occurs within the harbor. Surveys were conducted in support of a 2001 EFH consultation, and at that time, no eelgrass (*Zostera* spp.) or Caulerpa (*Caulerpa* sp.) were observed. Subsequent to that consultation, and pursuant to Section 305(b)(4)(A) of the MSA and in order to mitigate for lost habitat, a Kelp Mitigation Plan (ENSR 2002) was implemented and completed in 2009 to minimize temporal losses associated with the 2001 kelp habitat impact. Approximately 150 tons of boulders were placed in the harbor to provide substrate for kelp recruitment and establish a kelp mitigation area (see Figure 3.2-1). Surveys conducted in March 2010 indicated there were 1.05 acres of kelp canopy in the project area, which is 0.34 acre more than found in the pre-project survey; therefore, in 2010, consistent with the Kelp Mitigation Plan, the NMFS stated that no further mitigation was required. Based on 2019 aerial imagery, there was an estimated 0.64 acre of kelp cover within the maintenance dredge area and mitigation area. Kelp canopy with giant kelp (*Macrocystis pyrifera*) in these areas have flourished; based on 2021 post-dredge surveys, kelp canopy in a 0.89-acre reference area between the dolphins and breakwater increased by 0.27 acre and increased 20 percent in the overall survey area of 2.77 acres (VSFB 2022). In a 2022 pre-dredge survey, the density of kelp obstructed sonar and made detection of eelgrass difficult. Kelp stands dominated over 90 percent of the reference site (United Launch Alliance, LLC 2022).

Eelgrass has also been identified within the harbor in association with openings in the kelp canopy, and pre- and post-dredge surveys along with annual monitoring are conducted. Pre- and post-dredge eelgrass surveys within the project area during 2021 did not indicate a substantial change in eelgrass cover (115.83 square meters pre-dredge compared to 157.88 square meters post-dredge) or spatial distribution (2,097.27 square meters pre-dredge compared to 2,268.50 square meters post-dredge). Overall, 2021 data suggests that the vegetated cover of eelgrass beds within the study area expanded between pre- and post-dredge surveys, increasing their ecological function and value compared with smaller beds and isolated turions. No Caulerpa species were identified during these surveys (VSFB 2022).

Other Species of Management Concern

Table 3.2-5 provides a full list of the types of species that could be considered “special status.” Other species of management concern include nesting avian species protected under the MBTA and bat species protected by the CDFW. Bird species known to occur within or adjacent to the project area that are also protected under the ESA are included in Table 3.2-6, although other transient individuals may occur. The most recent reconnaissance-level terrestrial survey of the area above the harbor was completed in September of 2000, and identified the northern harrier (*Circus cyaneus*) and the turkey vulture (*Cathartes aura*) at a distance from the site (ENSR 2001). Although no specific habitat for bat species was identified within the project area, bat species that may inhabit Vandenberg SFB include (but are not limited to) western mastiff bat (*Eumops perotis*), pallid bat (*Antrozous pallidus*), Townsend’s big-eared bat (*Corynorhinus townsendii*), silver-haired bat (*Lasioncycteris noctivagans*), western red bat (*Lasirurs blossevillii*), and hoary bat (*Lasiurus cinereus*) (CDFW 2023a; 2023b).



Source: USFWS 2023b

Figure 3.2-1. Kelp Mitigation Area and Wetlands and Waters of the U.S. Near the Harbor

Additionally, the Arguello slender salamander (*Batrachoseps wakei*), a species of special interest to Vandenberg SFB (VSFB 2023a), is known to occur in the area of the sediment disposal site at Point Pedernales (Sweet & Jockusch 2021). While not protected by federal or state regulations, the Arguello slender salamander is included on the list of "special animals" maintained by the CNDDB. It is identified as critically imperiled throughout its global range, as well as critically imperiled in the State of California (CDFW 2022).

3.2.5 Waters of the U.S. and Wetlands

Waters of the U.S. encompass the jurisdictional limits of the authority of the USACE and include perennial and intermittent streams and their tributaries that have defined bed and banks, have an ordinary high-water mark, or are below the high tide line. The ordinary high-water mark is a line on the shore established by the fluctuations of ordinary water flows, while the high tide line is equivalent to the highest predicted high tide for the calendar year. In September 2023, USEPA and USACE issued a final rulemaking, revising the definition of Waters of the U.S. to include (Federal Register 2023):

1. Traditional navigable waters, the territorial seas, and interstate waters (together referred to as paragraph (a)(1) waters);

2. Impoundments of "waters of the United States" (together referred to as paragraph (a)(2) impoundments);
3. Tributaries to traditional navigable waters, the territorial seas, interstate waters, or paragraph (a)(2) impoundments when the tributaries meet the relatively permanent standard (together referred to as paragraph (a)(3) waters);
4. Wetlands adjacent to paragraph (a)(1) waters or wetlands adjacent to and with a continuous surface connection to relatively permanent paragraph (a)(2) impoundments or paragraph (a)(3) waters (together referred to as paragraph (a)(4) waters); and
5. Intrastate lakes and ponds not identified in paragraphs (a)(1) through (4) that meet the relatively permanent standard and have a continuous surface connection to waters identified in paragraph (a)(1) or (a)(3).

EO 11990, *Protection of Wetlands*, requires federal agencies to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands. Federal agencies must avoid undertaking or assisting construction activities located in wetlands unless there is no practicable alternative to such construction and the Proposed Action includes all feasible measures to minimize harm to wetlands that may result from such use. EO 11990 also requires an evaluation of alternatives prior to proceeding with federal actions that may affect wetlands. The DAF requested advance public comment in compliance with EO 11990 to determine if there were any public concerns regarding the project's potential impacts or comments on potential project alternatives (see Section 1.4.8, Interagency and Intergovernmental Coordination – Other Regulations).

Potential for wetlands within the project area was determined with the use of aerial photography, the USFWS National Wetland Inventory (NWI) database, and knowledge of the project area. The Vandenberg harbor is located in the Pacific Ocean, which the NWI database defines as Estuarine and Marine Deepwater wetlands (see Figure 3.2-1). The adjacent area consists of rocky shoreline and a disturbed, grassy bluff located above the harbor. The NWI database defines the area of the harbor closest to the shore as a narrow strip of Estuarine and Marine Wetland. The harbor is located within Waters of the U.S. and is within the jurisdictional limits of the authority of USACE (USFWS 2023b).

The sediment disposal site at Point Pedernales is considered to be an upland disposal site. No wetlands or Waters of the U.S. occur in this area.

3.3 Geology and Earth Resources

3.3.1 Geology

Vandenberg SFB is situated along the coastline in the Santa Maria basin. Vandenberg SFB is a geologically complex area that includes the transition zone between the Southern Coast Range (to the northeast) and Western Transverse Range (to the south) geomorphic provinces (VSFB 2021).

Extensive geological activity in the Vandenberg SFB region has created four structural regions: the Santa Ynez Range; the Lompoc lowland; the Los Alamos syncline; and the San Rafael Mountain uplift. Vandenberg SFB is characterized by generally northwest trending ridges and valleys. Major geologic features within Vandenberg SFB include the Santa Ynez Mountains, Casmalia Hills, Purisima Hills, Santa Ynez Valley Dune Complex, Sudden Flats, beaches, and rocky headlands. The Santa Ynez River and San Antonio Creek are the two major drainages that traverse Vandenberg SFB (VSFB 2021; USSF 2022a). The ROI for geology and earth

resources is the harbor, to include the 3.5-acre maintenance dredge area, and the sediment disposal site at Point Pedernales.

3.3.2 Soils

Vandenberg SFB is characterized by coastal sand dunes and alluvium (i.e., sediment deposited by flowing water), and is underlain predominately by marine sedimentary rocks (e.g., shales and limestone) of Late Mesozoic period (140 to 70 million years before the present) and Cenozoic period (70 million years to the present). Basement rock underlying Vandenberg SFB is the Franciscan Formation, which consists of a series of sedimentary and volcanic rocks (Dibblee 1950).

The Vandenberg harbor has been active in its present configuration since the early 1980s. Because the harbor is located along a very dynamic section of the California coast, sand movement causes sediments to accumulate in the harbor as soon as dredging is complete and the sedimentation rate in the harbor is highly variable. Since 2001, the DAF has conducted maintenance dredging in a 3.5-acre area of the harbor nine times. A summary of previous dredging activities is provided in Table 1-1 in Section 1.1, Background. This table demonstrates that while the initial dredging in 2001 removed approximately 16,000 cy of sediment, dredging activities since that time have removed between 58.5 and 5,055 cy of sediment from the 3.5-acre maintenance dredging area. In accordance with the Inland Testing Manual (USEPA & USACE 1998), periodic testing of sediment prior to dredging (i.e., bulk chemistry and grain size) was completed most recently in 2019. The sediment has been characterized as fine-grained sand particles with low levels of chemical constituents (USACE 2022; see Section 3.5, Public Health and Safety).

Based on Vandenberg SFB GIS data, soils at the sediment disposal site at Point Pedernales are mapped as rough broken and stony land, Los Trancos Soil Material; and Los Trancos stony loam, hilly and steep (VSFB 2023b). Soils at the sediment disposal site are assumed to be disturbed due to the area's historic use.

3.3.3 Seismicity, Faulting and Geologic Hazards

The California Geological Survey (CGS) classifies faults as either active or potentially active, according to the Alquist-Priolo Special Studies Zone Act of 1972. According to this definition, an active fault has exhibited surface displacement within the Holocene Epoch (the last 11,000 years), and a potentially active fault has exhibited surface displacement during the Pleistocene Epoch (which began about 1.6 million years ago and ended about 11,000 years ago). Pre-Pleistocene faults are considered inactive. The CGS has established Alquist-Priolo Special Study Zones around faults identified by the State Geologist as being active. The Alquist-Priolo Special Studies Zone Act limits development along the surface trace of active faults to reduce the potential for structural damage and/or injury due to fault rupture. The CGS also suggests that active faults, located within a 60-mile radius of a project area, be evaluated with respect to regional seismicity (CGS 2010; 2018).

Santa Barbara County is a seismically active region with a major earthquake occurring in the region about every 15 to 20 years (USSF 2022a; Alterman et al. 1994). The Santa Ynez-Pacifico Fault Zone, the Lompoc-Solvang (Santa Ynez River)-Honda Fault Zone, the Lions Head-Los Alamos-Baseline Fault Zones, and their potential offshore extensions, are three of the primary fault zones that run through Vandenberg SFB (Alterman et al. 1994). No active faults directly traverse the project area; however, the Santa Ynez River fault zone is approximately 0.5 mile from the sediment disposal site at Point Pedernales.

The areas most prone to liquefaction on Vandenberg SFB are located near San Antonio Creek (approximately 16 miles north of the Vandenberg harbor and 13 miles north of the sediment disposal site at Point Pedernales) and the Santa Ynez River (approximately 9 miles north of the harbor and 7 miles north of Point Pedernales). The potential for liquefaction on Vandenberg SFB, despite these areas, is considered low (USAF 1987). Other geologic hazards at Vandenberg SFB include the potential for surface erosion, landslides, sea cliff retreat, streambank erosion, and tsunamis.

3.4 Land Use, Recreation, and Coastal Zone Resources

Vandenberg SFB is located on approximately 99,572 acres along the coast of Santa Barbara County (refer to Figure 1-1). The Base has 42 miles of coastline, consisting of a variety of natural communities, including coastal dunes and coastal dune scrubland, coastal salt marshes, coastal bluffs, and rocky coastlines and beaches (USSF 2021). Although the Base is located within Santa Barbara County, the local government does not have jurisdictional authority over federal land use on Vandenberg SFB because it is a federal military facility. General land uses at Vandenberg SFB include administrative, Air Education and Training Command (space and missile training area), agriculture/grazing, airfield, community (commercial and service), housing, industrial, launch operations, medical, open space, outdoor recreation, and water/coastal (VAFB 2011).

The Santa Ynez River and SR 246 divide Vandenberg SFB into two distinct areas: North Vandenberg SFB and South Vandenberg SFB. The ROI for the Proposed Action is the harbor, the sediment disposal site at Point Pedernales, and adjacent areas located on South Vandenberg SFB. The majority of South Vandenberg SFB is undeveloped; the developed portion includes launch complexes, test/launch facilities, technical support areas, several mountaintop tracking stations, and a 150-acre administrative/industrial area. Some of the undeveloped areas on South Vandenberg SFB are leased for grazing.

The harbor is located approximately 10 miles northeast of Point Conception and 3 miles southeast of Point Arguello. Land access to the harbor is through the Vandenberg SFB South Gate entrance via SR 246, then over USSF-controlled secondary roadways, including Arguello Boulevard, Bear Creek Road, and Coast Road.

The harbor was excavated by blasting the shallow bedrock and excavating the rubble with a dredge to a minimum depth of -10 feet MLLW. The dock is an earth-filled concrete and asphalt structure approximately 240 feet long and 100 feet wide. A low breakwater approximately 500 feet in length and +15 to +20 feet MLLW protects the harbor.

Land use in the vicinity of the proposed dredging area consists primarily of recreational (e.g., fishing, kayaking, other recreational water activities, picnicking, etc.), commercial, and open range use. Users must have an affiliation with the Base to recreate in this area. Camping is occasionally permitted, typically by private groups who receive authorization. Several buildings located near the harbor are used by USSF for social functions. The adjacent Boat House is used for meetings, family gatherings, and occasionally weddings.

Vessels such as the *Rocketship* currently utilize the harbor for loading and off-loading aerospace-related cargo in support of the space launch programs at Vandenberg SFB. No USSF or other military vessels are based in or operate out of the harbor, and the harbor is off limits to civilian boat traffic.

3.4.1 Coastal Zone Management

In 1972, Congress passed the CZMA to "preserve, protect, develop, and where possible, to restore or enhance, the resources of the nation's coastal zone for this and succeeding generations" and to "encourage and assist the states to exercise effectively their responsibilities in the coastal zone through the development and implementation of management programs to achieve wise use of the land and water resources of the coastal zone" (16 U.S.C. 1452, Section 303(1) and (2)).

The Proposed Action is subject to a federal Coastal Zone Consistency Review because it would involve activities that may affect the coastal zone of California. Vandenberg SFB is owned by the U.S. under the administrative control and management of the DAF. Although the CZMA excludes federal lands from the definition of coastal zone, actions that may affect the coastal zone as defined in the CZMA off federal lands, are to be consistent. If actions cannot be consistent, they are to adhere to the maximum extent practicable to the enforceable policies of the California Coastal Management Plan, California's federally approved coastal management program pursuant to the CZMA, and the California Coastal Act.

3.5 Public Health and Safety

Hazardous Materials and Waste

A hazardous material or waste is a substance that, due to its quantity, concentration, or chemical/physical characteristics, may present substantial risk to public health and welfare, workers, or the environment. Hazardous materials and wastes are those substances defined as hazardous by the Comprehensive Environmental Response, Compensation, and Liability Act, as amended by the Superfund Amendments and Reauthorization Act (42 U.S.C. 9601-0675), Toxic Substances Control Act (15 U.S.C. 2601-2671), the Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act (42 U.S.C. 6901-6992), and as defined in state laws and regulations. In addition, federal and some state OSHA regulations govern protection of personnel in the workplace[1]. In general, these regulations govern exposure to substances that, because of their quantity, concentration, or physical, chemical, or infectious characteristics, may present substantial danger to public health (to workers), welfare, or the environment, when released into the environment. The ROI for hazardous materials and waste management for the Proposed Action is Vandenberg SFB.

Hazardous material use on Vandenberg SFB follows procedures stipulated in Air Force Manual 32-7002, *Environmental Compliance and Pollution Prevention*, and the Base Hazardous Materials Management Plan. Vandenberg SFB requires that all hazardous materials be obtained through the Hazardous Materials Tracking Activity (HTA), a Base function that centrally manages the procurement of hazardous materials. Specifically, the HTA approves the use of hazardous materials only after it reviews the composition of the commodity and how it is to be used to ensure compliance with environmental, safety, and occupational health regulations and policies.

Management of hazardous waste at Vandenberg SFB complies with Resource Conservation and Recovery Act Subtitle C (40 CFR 240-299) and with California hazardous waste control laws as administered by the California Environmental Protection Agency's Department of Toxic Substances Control, under California Code of Regulations Title 22, Division 4.5. These regulations require that hazardous wastes be handled, stored, transported, disposed of, or

[1] All personnel that are not state employees are covered by federal OSHA regulations when working on Vandenberg SFB.

recycled according to defined procedures. The Base Hazardous Waste Management Plan outlines hazardous waste management procedures.

Lease and license agreements between commercial use clients that utilize the harbor and Vandenberg SFB require that such entities manage, handle, store, transport, dispose, and recycle their hazardous waste. There are no hazardous materials or hazardous waste stored in the vicinity of the Vandenberg harbor.

Periodic testing of sediment prior to dredging (i.e., bulk chemistry and grain size) was completed most recently in 2019, in accordance with USACE and USEPA requirements for sediment sampling prior to upland disposal. Sediment samples were collected from the dredge footprint, analyzed, and results were compared to the effects range-low (ER-L) and effects range-medium (ER-M) outlined in NOAA's Sediment Quality Guidelines developed for the National Status & Trends Program (NOAA 1999). Four samples were collected and analyzed for metals (i.e., arsenic, cadmium, chromium, copper, lead, nickel, selenium, silver, zinc, and mercury) as well as total organic carbon and total oil and grease, and grain size. All sample results were below the ER-L and ER-M screening thresholds and averaged 98 percent sand and 2 percent silt (USSF 2022b).

Health and Safety Requirements

The affected environment for health and safety is the regulatory environment for health and safety issues established to minimize or eliminate potential risk to the general public and personnel involved in a proposed project. The Proposed Action would involve manual labor and heavy equipment operation activities where workers would potentially be exposed to conditions that could impact their health and safety. The ROI for these potential impacts is the project area and surrounding vicinity where the following activities could occur:

- Usage of hazardous materials, primarily petroleum, oil, and lubricants (POLs), for operating heavy equipment under the Proposed Action. The potential exists for unexpected releases of these POLs, which could generate hazardous waste.
- Unloading of hazardous materials such as propellant, ordnance, chemicals, and payload components, which must conform to U.S. Department of Transportation regulations for shipment of hazardous substances.
- Heavy equipment operation activities that create noise.

Because of the above conditions, the potential exists for persons participating in the Proposed Action to become exposed to hazardous materials and hazardous waste. In addition to these more obvious risks to public health and safety, the following also have the potential to impact the health and safety of the site workers or users in and around the harbor:

- Physical hazards including road traffic, holes and ditches, uneven terrain, sharp or protruding objects, slippery soils or mud, unstable ground, or drowning.
- Biological hazards such as animals (e.g., insects, spiders, and snakes), and disease vectors (e.g., ticks and rodents).

The DAF and all contractor personnel are subject to all applicable OSHA regulations and requirements during project activities. Vandenberg SFB has established health and safety requirements, including industrial hygiene and ground safety, to minimize potential risk to the general public and personnel.

Due to the nature of the Proposed Action, many of the Installation's range safety requirements do not apply. However, because the harbor area is situated down-range from launch facilities, Range Operations must be given advanced notification prior to the onset of any extended harbor activity, including dredging.

Vandenberg SFB is a secure, federal military installation. Access to the Base, including the project area, is controlled by the USSF and restricted to military personnel and authorized contractors and visitors. Access to the harbor area is permitted only through the Vandenberg SFB South Base Gate. All other potential access points are secured by fencing.

3.6 Water Resources

The RHA, Section 10, provides USACE with the authority to regulate activities within navigable waters. Under the RHA, a USACE-issued permit is required for development of harbors as well as other construction and excavation in navigable waters, including dredging activities.

The federal CWA provides for the restoration and maintenance of the physical, chemical, and biological integrity of the nation's waters, and is not limited to navigable waters. The CWA and implementing USEPA regulations provide the authority and framework for state laws and regulations. The Porter-Cologne Water Quality Act (California Water Code) is the state law for water quality protection in California. It provides a framework for establishing beneficial uses of water resources and the development of local water quality objectives to protect these beneficial uses. The Central Coast Water Quality Control Plan (Basin Plan) assigns beneficial uses to waterbodies in this region and provides local water quality objectives to protect these beneficial uses when it has legal jurisdiction over such waterbodies on Vandenberg SFB as provided under federal laws.

Section 303(d) of the CWA requires states to identify surface waterbodies that are polluted (i.e., water quality limited segments). These surface waterbodies do not meet water quality standards even after discharges of wastes from point sources have been treated by the minimum required levels of pollution control technology.

Section 404 of the CWA requires USACE-issued permits to discharge dredged or fill materials into Waters of the U.S. Section 401 of the CWA requires that any applicant for a federal permit or license with the potential to discharge into Waters of the U.S. must provide the authorizing federal agency with a state- or tribe-issued WQC, certifying that the activity meets state water quality standards. In California, the State Water Resources Control Board (State Water Board) and the Regional Water Quality Control Boards (Regional Water Boards) regulate discharges into waters of the state under both Section 401 of the CWA and the California Water Code.

Section 402 of the CWA mandates the National Pollutant Discharge Elimination System (NPDES) Program, which requires a permit for the discharge of any pollutant to Waters of the U.S. from point and non-point sources. Non-point sources include stormwater runoff from industrial, municipal, and construction sites. The NPDES program in California is implemented by the California Water Code and administered by the State Water Board and the Regional Water Quality Control Board through General Permits. The CCRWQCB is the state agency responsible for the Vandenberg SFB area, including the project area.

EO 11988, *Floodplain Management*, requires federal agencies to avoid, to the extent possible, long- and short-term adverse impacts associated with the modification of floodplains, and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. In accomplishing this objective, "each agency shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by flood plains in carrying out its responsibilities" for federal actions. EO 13690, *Establishing a Federal Flood Risk Management Standard and Process for Further Soliciting and Considering Stakeholder Input*, updated the definition of floodplains to include the 500-year floodplain.

EO 11988 also requires an evaluation of alternatives prior to proceeding with federal actions that may affect floodplains. The DAF requested advance public comment in compliance with EO 11988 to determine if there were any public concerns regarding the project's potential impacts or comments on potential project alternatives (see Section 1.4.8, Interagency and Intergovernmental Coordination – Other Regulations).

The project area is located in the Pacific Ocean U.S. Geological Survey Hydrologic Unit Code 8-digit watershed (18060013) (USGS 2020). The ROI for water resource impacts includes the Vandenberg harbor, the area immediately surrounding the harbor, and the sediment disposal site at Point Pedernales, where dredged material would be deposited.

Surface Water

No freshwater resources are located within the project area, as the project area occurs primarily within the Vandenberg harbor, located in the Pacific Ocean, and at the upland sediment disposal site at Point Pedernales. No streams outlet to the harbor within or adjacent to the project area; however, Honda Creek is located approximately 0.4 mile northeast of the sediment disposal site at Point Pedernales. None of the waterbodies within or near the project area are listed as impaired per the most recently approved 2020-2022 303(d) List and Integrated Report, approved by the USEPA on May 11, 2022. The 2024 Integrated Report, submitted to the USEPA on 26 March 2024, does not include any waterbodies within or near the project area on its list of additions to the 303(d) List (State Water Board 2024). As described in Section 3.2, Biological Resources, the project area occurs primarily within Estuarine and Marine Deepwater wetlands, with a narrow area of Estuarine and Marine wetland occurring adjacent to the shoreline.

The harbor is isolated from major sources of stormwater and receives runoff primarily from Boat House Road, Tow Road, and the dock. Runoff from the dock flows directly into the harbor, whereas runoff from the adjacent roadways drains to the harbor by way of surface drainage channels located on either side of the dock.

In an analysis completed in support of the *Final USAF EA for Harbor Activities Associated with the Delta IV Program at Vandenberg Air Force Base* (ENSR 2001), samples of interstitial water were collected from a 12-inch hole dug in front of the dock during maximum low tide on one of the lowest tides of the year, allowing water to accumulate in the hole before collection. Half of the collected water sample was filtered, the other half remained unfiltered, and both were tested for ten metals. Neither the filtered nor unfiltered interstitial water contained metal concentrations greater than the standards of the State Water Board's California Ocean Plan that was in effect at the time. Additionally, concentrations were not greater than the standards of the current California Ocean Plan (State Water Board 2019). See Section 3.5, Public Health and Safety, for a discussion of sediment sampling historically conducted in accordance with past dredging activities.

Floodplains

The harbor and the shoreline are located within a Federal Emergency Management Agency (FEMA) designated 100-year floodplain within Zone VE, which is defined as a special flood hazard area without base flood elevation. The FEMA Flood Rate Insurance Map is provided in Figure 3.6-1 (FEMA 2018a). The sediment disposal site at Point Pedernales is located outside of the FEMA-mapped 100-year floodplain but is located within Zone D, which is defined as "areas where there are possible but undetermined flood hazards or unstudied areas" (FEMA 2018b; 2022). The Point Pedernales is an upland disposal site, located along the coast but slightly inland, and does not have any known flooding concerns.

Figure 3.6-1. Floodplains within Vandenberg Harbor

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Chapter 4. Environmental Consequences

4.1 Air Quality and Climate

For air quality impact assessments, significance is defined by the extent or degree to which implementation of an alternative would potentially affect public health or safety. For this action, the air quality impact of air pollutants emitted by activities in the Pacific Ocean, bays, and inland locations in the project area (i.e., up to 12 nautical miles from the coast) are assessed under NEPA. The General Conformity Analysis is not applicable because Santa Barbara County is classified as an attainment/unclassified area for the NAAQS for all criteria pollutants.

For actions that occur within NAAQS attainment areas, the DAF has established legally defensible significance values (indicators). Significance thresholds are USEPA-established annual emission rates that, if exceeded, would trigger a regulatory requirement. For this action, a threshold of 250 tpy is used for ozone precursors, oxides of nitrogen (NO_x) or volatile organic compounds (VOCs), CO, PM_{10}, and $PM_{2.5}$, which is the Major Source threshold under the Prevention of Significant Deterioration (PSD) program.

For climate action impact assessments, significance is defined by the action's potential impact through its incremental contribution combined with the cumulative increase of all other sources of GHGs. Currently, there are no federal numeric thresholds that determine when a proposed action may have an adverse impact. The DAF has adopted the PSD threshold for GHG of 75,000 tpy of CO_2e (or 68,039 metric ton of CO_2e per year) as an indicator or threshold of significance for NEPA air quality impacts in all areas. The SC-GHG estimates are also evaluated for the Proposed Action to translate climate impacts into the more accessible metric of dollars. There is no established dollar-value threshold for the SC-GHG.

4.1.1 Alternative 1: Continuation of Harbor Activities Program

Air quality impacts under the Proposed Action would primarily occur from (1) activities associated with dredging activities, including staging, hauling, and disposal of sediment; and (2) vessel operations in the harbor (minimal or no emissions are expected from continuation of recreational activities). Emissions would be generated from the use of fossil fuel-powered equipment, material transport trucks, and vessels. On-road vehicle emissions associated with personnel supporting the dredging and vessel operations were also estimated. Air emissions estimates for dredging operations were developed using the Air Force's Air Conformity Applicability Model (ACAM). A supplementary analysis was also conducted using activity data and emissions factors from other published sources, including USEPA emission factors, to verify ACAM results. Data associated with the Proposed Action (e.g., equipment usage, dredging schedule, vessel usage) were used to estimate combustion emissions. The analysis assumed vessel emissions from a ship comparable to the *Rocketship* plus two tugboats, as they are representative of the most common and highest emitting vessels utilizing the harbor in the past 20 years. Other similar ships may be utilized with varying emissions profiles, but use of the *Rocketship* is assumed to be a conservative, worst case analysis. Up to 200 harbor trips per year by vessels and tugboats were evaluated in this analysis. Non-road emission factors for criteria pollutants and GHG are based on the USEPA "MOtor Vehicle Emission Simulator" (MOVES2014) database. Vessel emission factors for criteria pollutants and GHG are based on the data in the USEPA's Methodologies for Estimating Port-Related and Goods Movement Mobile Source Emission Inventories. The EMFAC2021 (v1.0.2) Model was used to estimate the criteria pollutant and GHG emissions from on-road vehicles (CARB 2024). The emission results from this supplementary modeling effort were higher than ACAM results for the dredging

operations and are presented in this section. Appendix D-1 includes data and assumptions used to calculate proposed emissions under the Proposed Action.

For purposes of conservative analysis, emissions from implementation of the dredge plan were assumed based on the occurrence of up to 10 dredging events per year. As discussed in Section 2.1.1, dredging is only expected to occur in practice up to once per year, although on occasion additional dredging may be required, depending on vessel delivery schedule and sediment circulation patterns. As shown in Table 1-1, dredging historically does not occur every year and has only occurred twice in one year one time since 2001.

Table 4.1-1 summarizes the total emissions estimated for dredging activities and vessel operation for the Proposed Action within Regulated California Waters of Santa Barbara County (i.e., within 24 nautical miles of the California coast, as defined by CARB) (CARB 2017). Table 4.1-2 presents the emissions within 12 nautical miles.

Table 4.1-1. Proposed Emissions (Tons/Year) – Total, within Regulated California Waters, 24 Nautical Miles from the Shore

Emissions	Total Emissions, ton/yr					
	CO	NO_x	VOC	SO_x	PM_{10}	$PM_{2.5}$
Implementation of the Dredge Plan	0.87	2.19	0.22	0.02	4.40	0.11
Continued use of the harbor for vessel entry and off-loading	36.22	238.93	3.36	7.93	10.79	3.97
Total	**37.09**	**241.12**	**3.58**	**7.95**	**15.18**	**4.09**

Notes:
Numbers may not add up exactly due to rounding.
CO = carbon monoxide; NO_x = oxides of nitrogen; PM_{10} = respirable particulate matter; $PM_{2.5}$ = fine particulate matter; SO_x = sulfur oxide; VOC = volatile organic compound; yr = year

Table 4.1-2. Proposed Emissions (Tons/Year) Total, within 12 Nautical Miles

Emissions	Total Emissions, ton/yr					
	CO	NO_x	VOC	SO_x	PM_{10}	$PM_{2.5}$
Implementation of the Dredge Plan	0.87	2.19	0.22	0.02	4.40	0.11
Continued use of the harbor for vessel entry and off-loading	19.19	124.43	1.75	4.12	8.82	2.07
Total	**20.05**	**126.62**	**1.96**	**4.14**	**13.22**	**2.18**
Significance Threshold	250	250	250	250	250	250
Exceeds Threshold?	No	No	No	No	No	No

Notes:
Numbers may not add up exactly due to rounding.
CO = carbon monoxide; NO_x = oxides of nitrogen; PM_{10} = respirable particulate matter; $PM_{2.5}$ = fine particulate matter; SO_x = sulfur oxide; VOC = volatile organic compound; yr = year

As shown in Tables 4.1-1 and 4.1-2, the proposed emissions would not exceed the significance threshold for any criteria pollutant. As a result, emissions from proposed activities would not produce air quality impacts.

The Proposed Action would utilize fuel burning equipment that emits TACs that could potentially impact public health. The main source of TACs is DPM. Due to the mobile and intermittent operation of proposed diesel-powered dredging and vessel operation and given the distance to downwind receptors, TAC emissions are not expected to contribute to human health risks in areas where public presence is expected. Section 2.4.2, Environmental Protection Measures – Air Quality and Climate, identifies measures that would be implemented to minimize project diesel emissions.

Greenhouse Gases and Global Climate Change

Table 4.1-3 summarizes the total GHG emissions for the Proposed Action, generated from equipment operation during dredging activities and vessel operations in the harbor. The annual estimated GHG emissions are well below the DAF threshold of significance for GHG (i.e., 68,039 metric ton of CO_2e per year).

Table 4.1-3. Proposed Action GHG Emissions (MT/Year), Total

Activity	CO_2 Emissions (MT/yr)
Implementation of the Dredge Plan	613
Continued use of the harbor for vessel entry and off-loading	12,201
Total	**12,814**

Notes:
CO_{2e} = carbon dioxide equivalent; MT = metric ton

Emissions of GHGs are considered to have a potential cumulative impact on global climate. Currently, there are no formally adopted or published NEPA thresholds for GHG emissions. Additionally, there are no adopted federal plans, policies, regulations, or laws mandating reductions in the GHG emissions from sources used in the Proposed Action. The climate change research community has yet to develop tools specifically intended to evaluate or to quantify endpoint impacts attributable to the emissions of GHGs from a single source.

To provide context for the GHG and climate change effects of the Proposed Action on a global scale, Table 4.1-4 compares the net change in GHG emissions to California and U.S. annual emissions for 2025–2045.

Table 4.1-4. Greenhouse Gas Emissions Relative Significance

Years	Location	CO_2e Emissions (MT)
2025-2045	California Total	7,110,039,447
2025-2045	U.S. Total	108,435,217,758
2025-2045	Proposed Action	269,091

Notes:
CO_{2e} = carbon dioxide equivalent; MT = metric ton

Social Cost of Carbon

Table 4.1-5 presents the SC-GHG from 2025 to 2045 (GHG Discount Factor: 2.5%). The calculations conservatively assume that dredging activities would occur every year. The SC-GHG emissions estimates, in 2020 U.S. dollars, the economic damages that would result from

emitting 1 additional ton of GHG into the atmosphere and associated physical damages (e.g., temperature increase, sea level rise, infrastructure damage, human health effects) in a particular year. The SC-GHG estimates were derived using the methodology and discount factors in the "Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990," released by the Interagency Working Group on Social Cost of Greenhouse Gases (Interagency Working Group on Social Cost of Greenhouse Gases 2021).

Table 4.1-5. Estimated Social Cost of Greenhouse Gas

IWG Annual SC-GHG Cost per Metric Ton ($/MT [In 2020 $])				Annual SC-GHG ($K/yr [In 2020 $])
Year	CO_2	CH_4	N_2O	
2025	$83.00	$2,200.00	$30,000.00	$1,063.55
2026	$84.00	$2,300.00	$30,000.00	$1,076.36
2027	$86.00	$2,300.00	$31,000.00	$1,101.99
2028	$87.00	$2,400.00	$32,000.00	$1,114.80
2029	$88.00	$2,500.00	$32,000.00	$1,127.62
2030	$89.00	$2,500.00	$33,000.00	$1,140.43
2031	$91.00	$2,600.00	$33,000.00	$1,166.06
2032	$92.00	$2,600.00	$34,000.00	$1,178.87
2033	$94.00	$2,700.00	$35,000.00	$1,204.50
2034	$95.00	$2,800.00	$35,000.00	$1,217.31
2035	$96.00	$2,800.00	$36,000.00	$1,230.13
2036	$98.00	$2,900.00	$36,000.00	$1,255.76
2037	$99.00	$3,000.00	$37,000.00	$1,268.57
2038	$100.00	$3,000.00	$38,000.00	$1,281.38
2039	$102.00	$3,100.00	$38,000.00	$1,307.01
2040	$103.00	$3,100.00	$39,000.00	$1,319.83
2041	$104.00	$3,200.00	$39,000.00	$1,332.64
2042	$106.00	$3,300.00	$40,000.00	$1,358.27
2043	$107.00	$3,300.00	$41,000.00	$1,371.08
2044	$108.00	$3,400.00	$41,000.00	$1,383.89
Total				$25,909.58

Notes:
Interagency Working Group on Scientific Collections GHG Discount Factor: 2.5%
SC-GHG are calculated based on CO_2 emissions of 12,813 MT/year times the Social Cost of CO_2 per year.
CH_4 = methane; CO_2 = carbon dioxide; IWG = Interagency Working Group; $K = thousands of dollars; MT = metric ton; N_2O = nitrogen dioxide; SC-GHG = social cost of greenhouse gas
Source: Interagency Working Group on Social Cost of Greenhouse Gases. 2021.

Table 4.1-6 provides a relative comparison between the Proposed Action's SC-GHG and California and U.S. projected SC-GHG for the same time period.

Table 4.1-6. Comparison of Social Cost of Greenhouse Gases

Years	Location	Total SC-GHG ($K, In 2020 Dollars)
2025-2045	California Total	$816,286,516
2025-2045	U.S. Total	$13,039,244,030
2025-2045	Proposed Action	$25,910

Notes:
$K = thousands of dollars; SC-GHG = social cost of greenhouse gas

4.1.2 No-Action Alternative

Implementing the No-Action Alternative would cause harbor activities to cease. As a result, no additional impacts to air quality or climate would occur.

4.2 Biological Resources

The following factors were used to determine if a significant impact on biological resources would result from implementation of each alternative:

- Per 40 CFR 1501.3(d), "agencies shall examine both the context of the action and the intensity of the effect. In assessing context and intensity, agencies should consider the duration of the effect. Agencies may also consider the extent to which an effect is adverse at some points in time and beneficial in others (for example, in assessing the significance of a habitat restoration action's effect on a species, an agency may consider both any short-term harm to the species during implementation of the action and any benefit to the same species once the action is complete). However, agencies shall not offset an action's adverse effects with other beneficial effects to determine significance (for example, an agency may not offset an action's adverse effect on one species with its beneficial effect on another species)."

Impacts would be significant if the USFWS or NMFS determine that the action would be likely to jeopardize the continued existence of a federally listed threatened or endangered species or would result in destroying or adversely modifying federally designated critical habitat.

Impacts on biological resources would occur if project-related activities directly or indirectly affect special status species or their habitats. These impacts can be short- or long-term impacts. For example, short-term or temporary impacts can be from noise or increased turbidity and long-term impacts can be from the lost habitat supporting wildlife populations.

4.2.1 Alternative 1: Continuation of Harbor Activities Program

Terrestrial Vegetation and Wildlife Species

No terrestrial wildlife habitat exists within the harbor, including the maintenance dredging area of disturbance; therefore, no impacts to terrestrial wildlife or habitat would occur from harbor activities. Following harbor dredging, dewatered sediment would be transported to the sediment disposal site at Point Pedernales via existing access roads and would be disposed of in previously disturbed areas. As a result, impacts to terrestrial vegetation communities in these areas would be negligible.

Temporary, negligible, indirect impacts to terrestrial wildlife species may occur within adjacent wildlife habitat near the bluff above the harbor due to an increase in noise from harbor activities, and particularly during dredging operations. The noise levels expected from dredging

equipment, as well as the background noise measured at the dock area, are presented in Table 4.2-1. Noise levels decrease (attenuate) with distance from the source. The decrease in sound level from any single noise source normally follows the “inverse square law.” That is, the sound level change is inversely proportional to the square of the distance from the sound source. A generally accepted rule is that the sound level from a stationary source would drop approximately 6 dB each time the distance from the sound source is doubled (Nave 2017). Barriers, both manmade (e.g., sound walls) and natural (e.g., forested areas, hills, etc.) may reduce noise levels, as may other natural factors, such as temperature and climate. A dredging crane at the edge of the dock producing 88 A-weighted decibel (dBA) of noise would still be quite noisy (approximately 74 dBA) at the nearest beach or the end of the breakwater, approximately 250 feet away.

Table 4.2-1. Noise Levels of Dredging Equipment

Type of Equipment	Typical Noise Level (dB) at 50 feet	dB at 100 feet	dB at 200 feet	dB at 400 feet	dB at 800 feet	dB at 1600 feet	dB at 3200 feet
Clamshell Dredge	87	81	75	69	63	57	51
Roll-off truck transporter	76	70	64	58	52	46	40
Ambient background noise at the harbor: 35-48 dBA							

Notes:
dB = decibel
Ambient background noise level measured at the dock by Acentech (1998) approximately 250 feet from the beach.
Sources: USDOT 2006; ENSR 2001

Elevated noise levels would occur at the dock, within the harbor, and near the sediment disposal site at Point Pedernales during dredging or dredge material offloading operations such that noise sensitive wildlife would leave the area. Noise levels on the bluff above the harbor where terrestrial wildlife would most likely be present (i.e., 250 feet away) would be 74 dB, although noise levels would likely be further attenuated due to natural barriers and other factors, including the gradient of the land. Noise levels from vessel usage of the harbor and recreational activities would be lower than levels occurring related to the dredging activity. Noise levels for typical equipment that would be used (e.g., cranes and trucks) would result in approximately 84 dBA at 50 feet and 70 dBA at 250 feet (USDOT 2006). Overall, disturbances would be short-term and would not be anticipated to significantly impact wildlife. Wildlife would be expected to return to the project areas when activities cease.

Marine Vegetation and Wildlife Species

Impacts to marine vegetation and wildlife species could occur directly from substrate removal during dredging, or indirectly due to increased turbidity and disturbance caused by increased activity and noise in the area. Continued use of the harbor (i.e., vessel transit, loading, and unloading; recreational activities) may also impact marine vegetation and wildlife species.

Permanent, minor, direct impacts to marine species could occur from the removal of substrate during maintenance dredging. Algae and sessile invertebrates living within the dredge footprint may be lost; however, as large populations of these organisms occur in the harbor area surrounding the dredge footprint, these impacts would be less than significant. Fish and mobile invertebrates would not be directly impacted as they would likely leave the area during dredging activities.

Permanent, minor, direct impacts could occur to marine vegetation and habitat from the cutting and removal of kelp. The project would remove kelp located within the dredge footprint;

however, the amount of kelp likely to be removed represents a small portion of the overall kelp available in the harbor. Because kelp canopy provides critical habitat to federally protected species, it is discussed in more detail in the *Special Status Species* section below.

Dredging operations would result in the disturbance of underwater sediments, resulting in increased turbidity in the harbor. Permanent, minor, indirect impacts to marine wildlife could occur from increased turbidity, which can clog the gills of sensitive animals, impair proper respiratory and excretory function and feeding activity, and potentially bury sedentary organisms. Turbidity also reduces the amount of light available to marine vegetation that rely on light for photosynthesis. Sediment in the dredge footprint consists primarily of fine-grained sand, which settles quickly, minimizing the effects of turbidity. Observed turbidity following previous dredge operations or strong storms has been observed to dissipate within a day or two, limiting the amount of time that marine species spend in turbid conditions (USAF 2021). LaSalle et al. (1991) reported that dredging-related turbidity impacts are expected to be confined to an area within 500 meters (1,640 feet) of the dredged area, with maximum concentrations generally restricted to the lower water column and decreasing rapidly with distance. In southern California, turbidity resulting from dredging activities has been observed to be more limited, and typically confined to within 70 to 170 meters of the disturbance (USACE 2016). Intertidal and shallow subtidal communities in this area are adapted to large seasonal sand movements and shifting weather conditions and are therefore more equipped to handle periods of turbidity (ENSR 2001; USAF 2021). Several measures would be taken during dredging operations to further minimize and mitigate the effects of turbidity on marine vegetation and wildlife species (see Section 2.4.1, Environmental Protection Measures – Biological Resources).

The sediment disposal site at Point Pedernales is an upland disposal site, located along the coast but slightly inland, and does not include marine vegetation or wildlife; therefore, no impacts to marine vegetation or wildlife would occur from dredge material disposal.

Continued use of the harbor, to include harbor dredging, vessel usage, and recreation, would maintain general activity and noise levels in the area, which have the potential to cause temporary disturbance to marine species within and near the harbor. Vessel transit, loading, and unloading, as well as the presence of people, heavy machinery, and artificial lighting, would all constitute a disturbance, resulting in short-term, minor, indirect impacts to marine wildlife in the area. It is likely that mobile animals, such as marine mammals and birds, would leave or avoid the area during times of increased activity, but would be expected to return when disturbances or activities cease (see *Marine Mammal Protection Act* and *Other Species of Management Concern* discussion below). Measures taken to minimize temporary disturbances associated with increased activity and noise resulting from the Proposed Action are described in Section 2.4.1, Environmental Protection Measures – Biological Resources.

Special Status Species

Table 4.2-2 summarizes the potential effects to federally and state protected species under the Proposed Action. Species determined not likely to occur within the project area as described in Table 3.2-6 are not expected to be impacted by the Proposed Action; therefore, they are dismissed from further consideration within this PEA.

Table 4.2-2. Potential Effects to Special Status Species

Species	Status	Potential Impact Summary
Mammals		
California sea lion (*Zalophus californianus*)	MMPA	No effects to this species anticipated. Refer to Potential Impact Summary for the southern sea otter.
Northern elephant seal (*Mirounga angustirostris*)	MMPA	No effects to this species anticipated. Refer to Potential Impact Summary for the southern sea otter.
Northern fur seal (*Callorhinus ursinus*)	MMPA	No effects to this species anticipated. Refer to Potential Impact Summary for the southern sea otter.
Pacific harbor seal (*Phoca vitulina richardii*)	MMPA	No effects to this species anticipated. Refer to Potential Impact Summary for the southern sea otter.
Southern sea otter (*Enhydra lutris nereis*)	FT; FP	Southern sea otters have not been frequently observed during past dredging and other harbor activities, and previous sea otter monitoring has indicated that they are not disturbed by these dredging activities, when present. Due to lack of documented disturbance to pinnipeds, including the southern sea otter, the DAF previously determined in April 2019 there was very low potential for Level B harassment of marine mammals during dredging activities (USAF 2021). It is expected that individuals would leave the area during dredging operations or periods of increased noise or activity during other harbor activities and return afterwards. With implementation of the impact avoidance measures summarized in Section 2.4.1 Environmental Protection Measures – Biological Resources, there would be no effect to this species. The southern sea otter is covered under the current Basewide Programmatic BO; it is also anticipated that additional minimization measures would be included in the updated Basewide Programmatic BO expected in 2025.
Blue whale (*Balaenoptera musculus*)	MMPA	Potential for direct mortality is considered highly unlikely as species would be expected to avoid the harbor area during dredging activities. Potential indirect impacts from noise and increased turbidity during dredging, vessel operations, and recreational activities in the harbor are anticipated to be minimal. Prior study of marine mammals impacts from dredging indicate minimal potential for impacts to cetaceans from dredging noise (Clarke et al. 2002; Dickerson et al. 2001). With implementation of the impact avoidance measures summarized in Section 2.4.1, Environmental Protection Measures – Biological Resources, including use of turbidity curtain, no effects to this species are anticipated.
California gray whale (*Eschrichtius robustus*)	MMPA	No effects to this species anticipated. Refer to Potential Impact Summary for the blue whale.
Common dolphin (*Delphinus baindi*)	MMPA	No effects to this species anticipated. Refer to Potential Impact Summary for the blue whale.
Common minke whale (*Balaenoptera acutorostrata*)	MMPA	No effects to this species anticipated. Refer to Potential Impact Summary for the blue whale.
Dall's porpoise (*Phocoenoides dalli)*	MMPA	No effects to this species anticipated. Refer to Potential Impact Summary for the blue whale.

Table 4.2-2. Potential Effects to Special Status Species

Species	Status	Potential Impact Summary
Fin whale (*Balaenoptera physalus)*	MMPA	No effects to this species anticipated. Refer to Potential Impact Summary for the blue whale.
Harbor porpoise (*Phocoena phocoena*)	MMPA	No effects to this species anticipated. Refer to Potential Impact Summary for the blue whale.
Humpback whale (*Megaptera novaeangliae*)	MMPA	No effects to this species anticipated. Refer to Potential Impact Summary for the blue whale.
Killer whale (*Orcinus orca*)	MMPA	No effects to this species anticipated. Refer to Potential Impact Summary for the blue whale.
Northern right-whale dolphin (*Lissodelphis borealis*)	MMPA	No effects to this species anticipated. Refer to Potential Impact Summary for the blue whale.
Pacific white-sided dolphin (*Lagenorhynchus obliquidens*)	MMPA	No effects to this species anticipated. Refer to Potential Impact Summary for the blue whale.
Risso's dolphin (*Grampus griseus*)	MMPA	No effects to this species anticipated. Refer to Potential Impact Summary for the blue whale.
Sperm whale (*Physeter macrocephalus*)	MMPA	No effects to this species anticipated. Refer to Potential Impact Summary for the blue whale.
Striped dolphin (*Stenella coeruleoalba*)	MMPA	No effects to this species anticipated. Refer to Potential Impact Summary for the blue whale.
Birds		
American peregrine falcon (*Falco peregrinus anatum*)	Delisted from ESA; FP	No suitable habitat for nesting, hunting, or foraging exists adjacent to the harbor area and it is assumed that transient individuals would avoid the area during most harbor activities, particularly dredging and vessel usage in the harbor. While there is a known nesting site near the sediment disposal site at Point Pedernales (VSFB 2023a), disturbance associated with offloading dredged materials would be temporary, infrequent, and insignificant.
Marbled murrelet (*Brachyramphus marmoratus*)	FT	While the Proposed Action may cause temporary disruptions to feeding and foraging activity, there would be no impact to nesting behavior, as marbled murrelet typically nest in forested areas (NatureServe Explorer 2024), and there is no suitable nesting habitat located within the project area. It is anticipated that individuals would avoid the area during most activities, particularly dredging and vessel usage in the harbor. No effects to this species anticipated.
Sea Turtles		
Leatherback sea turtle (*Dermochelys coriacea)*	FE; Candidate species under California ESA	Potential for direct mortality is considered highly unlikely as species is not known to occur within the harbor. Potential indirect impacts from noise and increased turbidity during dredging, vessel operations, and recreational activities in the harbor are anticipated to be minimal. Prior study of impacts from dredging suggest minimal potential for impacts to sea turtles from dredging noise (Popper et al. 2014). With implementation of the impact avoidance measures summarized in Section 2.4.1, Environmental Protection Measures – Biological Resources, including use of turbidity curtain, no effects to this species are anticipated.

Table 4.2-2. Potential Effects to Special Status Species

Species	Status	Potential Impact Summary
Olive ridley sea turtle (*Lepidochelys olivacea)*	FE	No effects to this species anticipated. Refer to Potential Impact Summary for the leatherback sea turtle.
Loggerhead turtle (*Caretta caretta)*	FE	No effects to this species anticipated. Refer to Potential Impact Summary for the leatherback sea turtle.
Invertebrates		
Black abalone (*Haliotis cracherodii*)	FE	The DAF has determined that the Proposed Action may affect but is not likely to adversely affect black abalone or black abalone critical habitat (USAF 2021). Refer to discussion following this table.
Insects		
Monarch butterfly (*Danaus plexippus*)	Candidate species under ESA	While this species is known to occur nearby, it has not been identified within the project area, and it is assumed that any transient individuals would avoid the area during dredging activities. No overwintering groves or breeding/nectaring habitat occurs within the project area. No effects to this species anticipated.

Notes:
Consideration of potential effects by vessel transit, loading, and unloading from space launch programs would be conducted for site-specific NEPA analyses as needed by individual harbor users.
DAF = Department of the Air Force; ESA = Endangered Species Act; FE = Federally Listed Endangered Species; FT = Federally Listed Threatened Species; FP = fully protected (by the State of California); MMPA = Marine Mammal Protection Act; SE = California Endangered Species

Black Abalone

Black abalone was identified during a May 2022 pre-dredge survey (Bell 2022). Dredging activities may affect the rocky substrate and water quality Primary Constituent Elements of Critical Habitat for black abalone if conducted adjacent to rocky intertidal habitats. Dredging can cause wave patterns and sediment transport mechanisms to be altered near the dredge site, as well as physical changes to the seafloor geomorphology (e.g., substrate type and composition, surface texture) that can affect water circulation and nutrient distribution (USAF 2021), and cause sedimentation of the rocky substrate. Contaminants that have been previously absorbed into the sediments could be released into the water column by the dredging, affecting water quality. If dredging were to result in a large amount of silt reaching habitat suitable for black abalone, some impacts to abalone could occur. Kelp removal within the dredge footprint could also affect the food resources available for black abalone and turbidity could affect the recruitment and growth of juvenile kelp plants adjacent to the dredging footprint.

Turbidity during dredging would be controlled by placing a silt curtain between the mooring dolphins and the kelp bed, minimizing impacts to black abalone on the breakwater and kelp adjacent to the dredging footprint. In addition, the sediments to be dredged within the harbor embayment are predominantly sand, which is expected to settle rapidly and produce little turbidity. Therefore, it is unlikely that substantial amounts of silt or fine sediment would reach kelp or black abalone adjacent to the harbor. In addition, turbidity in the harbor area can be quite high due to natural events such as storms. As a result, species living within the harbor are expected to be tolerant of occasionally high turbidity. Thus, even if some turbidity resulting from dredging were to reach habitats where abalone occur, impacts would be insignificant. Dredging has occurred several times within the harbor and no noticeable decline in kelp has occurred post-dredging.

Considering the results of prior dredging actions and following the minimization and monitoring measures that would be implemented, adverse effects to black abalone and Critical Habitat within the action area would be minimized. Therefore, the DAF has determined that the harbor dredging may affect but is not likely to adversely affect black abalone or black abalone Critical Habitat. The NMFS concurred with this determination in a letter dated February 25, 2021, assuming implementation of specified minimization measures and the continuation of pre- and post-dredge surveys on the breakwater, conducted to determine effects from each dredge event.

The DAF has determined that vessel usage and recreational activities within the harbor would not adversely effects to black abalone, as these activities are unlikely to result in direct mortality or increase turbidity in the harbor. Implementation of specified minimization measures described in Section 2.4.1, Environmental Protection Measures – Biological Resources, particularly use of pre-determined routes for vessels, would avoid impacts to this species.

Marine Mammal Protection Act

Prior to harbor dredging in September 2001, NMFS issued an opinion that marine mammals were not likely to be impacted by harbor activities. This was based on the assumption that marine mammals would leave the area during dredging activities and return once the harbor was quiet. Based on this opinion, an Incidental Harassment Authorization (IHA) was not required for maintenance dredging at the Vandenberg harbor. This opinion was reversed following the dredging operations in 2001, after it was observed that Pacific harbor seals (*Phoca vitulina*) did not avoid the site as expected, and instead were subject to several noise and visual disturbances that caused them to flush from nearby rocks outside the harbor. An IHA was issued in May 2002, under Section 101(a)(5)(D) of the MMPA, to harass small numbers of Pacific harbor seals, California sea lions, and northern elephant seals incidental to harbor maintenance dredging. The IHA was renewed annually for approximately six dredging actions before maintenance dredging was included in a closely related LOA (USAF 2021).

Following the issuance of the IHA and subsequent LOA, no impacts to marine mammals were noted; therefore, marine mammals are no longer monitored during dredge operations. While impacts associated with noise and visual disturbances would be anticipated during dredging activities, impacts would be temporary, minor, and indirect in nature, with affected individuals expected to return to the harbor following dredging operations. During both the 2017 and 2020 dredge actions, northern elephant seals were hauled out on Boathouse Beach, often less than 100 feet from the dredging operation, but no disturbance was noted (USAF 2021).

Other harbor activities (i.e., vessel transit, loading, and unloading; and other general recreational activities) are expected to result in less noise and in turn less disturbance to marine mammals; therefore, the DAF has determined that the Proposed Action has a very low potential to result in harassment of marine mammals.

Essential Fish Habitat

Dredging activities within the dredge maintenance area would result in a temporary reduction of EFH in the area. This could occur directly through the removal of kelp canopy within the dredging footprint or use of vessels causing propeller damage, or indirectly as a result of increased turbidity during the duration of dredging activities.

As of 2021 assessments, the colony within the kelp mitigation area was observed to be thriving, having increased by 20 percent within the survey area according to post-dredge surveys (USAF 2021, USSF 2022b). This is in part due to the prior implementation of the Kelp Mitigation Plan (see Section 3.2, Biological Resources). The kelp mitigation area provides a source for kelp

recolonization into the active dredge area where possible and provides an abundance of kelp canopy outside the dredge footprint to offset any losses resulting from the Proposed Action. Eelgrass present in the kelp mitigation area provides a source for eelgrass re-colonization into the dredge area, and likewise provides eelgrass in a protected area to potentially offset EFH losses within the dredge footprint. Vegetation removed from the dredge footprint would continue to provide ecological benefit for invertebrate and wildlife habitat on the ocean surface, surf zone, and along the coastline, and provide detritus and carbon sequestration at the ocean bottom (VSFB 2022).

Implementation of minimization measures described in Section 2.4.1, Environmental Protection Measures – Biological Resources, would reduce impacts to EFH. Pre- and post-dredge eelgrass surveys in accordance with the Eelgrass Monitoring Plan would provide trends on habitat stability to inform actions that could further reduce impacts over time (VSFB 2022). Because of the temporary nature of the effects on kelp, eelgrass, and marine wildlife, and with the implementation of recolonization and minimization measures, adverse effects on EFH from dredging are expected to be temporary, minor, and direct. In an email dated September 2, 2022, NOAA concurred with this determination and approved the mitigation measures proposed.

Increased presence of vessels in the harbor during vessel transit, loading, and unloading; as well as recreational activities, are not expected to have impacts on EFH.

Other Species of Management Concern

There would be temporary, negligible, indirect impacts to transient nesting avian and bat species protected under the MBTA or by CDFW, respectively. The only nesting avian habitat identified within the project area is located at the sediment disposal site at Point Pedernales. Disturbance in this area associated with offloading dredged materials would be short-term and infrequent, and it is expected that transient individuals would avoid the project area during offloading activities. No specific bat habitat has been identified within the project area, and it is assumed that transient individuals would avoid the area during harbor activities.

There would be temporary, negligible, indirect impacts to the Arguello slender salamander, as disturbance in the area of the sediment disposal site at Point Pedernales would be short-term and infrequent, and it is expected that individuals would avoid the area when dredged materials are being offloaded. Transportation of dredged material would occur on existing roads, and all activity would occur in previously disturbed areas.

Waters of the U.S. and Wetlands

Impacts to jurisdictional Waters of the U.S. and wetlands are considered adverse if the Proposed Action results in a net loss of wetland area or habitat value, either through direct or indirect impacts to wetland vegetation, loss of habitat for wildlife, degradation of water quality, or alterations in hydrological function.

The Proposed Action would result in direct disturbance to Waters of the U.S. and wetlands; as such, a CWA Section 401 WQC from the CCRWQCB, as well as both a CWA Section 404 permit and an RHA Section 10 permit from the USACE would be required. The DAF would adhere to all conditions of the CWA 401 and 404 and RHA Section 10 authorizations to minimize the potential for adverse impacts to Waters of the U.S. and wetlands located within the project area, as described in Section 2.4.4, Environmental Protection Measures – Water Quality. As stated in Section 1.4, Interagency and Intergovernmental Coordination, the most current Section 401 WQC (#34222WQ07) was issued on October 26, 2022, and expires on December 31, 2033. USACE issued a Standard Individual Permit in January 2023, authorizing the

Proposed Action under both Section 404 of the CWA and Section 10 of the RHA. Impacts would be less than significant with implementation of these measures.

The DAF has determined that there is no practicable alternative for locating the project within wetland areas. This is due to the fact that 1) harbor activities must be located on the water and 2) the harbor is a fixed location aboard Vandenberg SFB. Locating within wetlands therefore cannot be avoided, and there is no practicable alternative to the Proposed Action. As described, impacts from direct disturbances to Waters of the U.S. and wetlands would be minimized through implementation of the stated permits.

4.2.2 No-Action Alternative

Implementing the No-Action Alternative would cause harbor activities to cease. Beneficial impacts could occur as it would be anticipated that plant and wildlife communities in the area would increase. No other impacts to biological resources would occur.

4.3 Geology and Earth Resources

Factors considered in determining if an alternative would have impacts on geology and earth resources include the extent or degree to which implementation of an alternative would:

- Result in substantial erosion;
- Change the physiography of the area;
- Impact any unique geologic features or geologic features of unusual scientific value; or
- Expose people or structures to potential substantial effects, involving rupture of a known earthquake fault, strong seismic ground shaking, and/or liquefaction.

4.3.1 Alternative 1: Continuation of Harbor Activities Program

The Proposed Action would include periodic dredging within the existing 3.5-acre harbor area to its previously dredged depth of approximately 10 feet below MLLW plus a 2-foot overdredge. As a result, sediments disturbed by the Proposed Action would consist primarily of those previously disturbed by past dredging activities. The method of dredging would be consistent with previous dredging and would be performed in accordance with USACE permit requirements. Predicted sediment volumes could be as much as 10,000 cy per year in the years that dredging occurs, but previous dredging activities (with the exception of dredging in 2001) have removed only between 58.5 and 5,055 cy of sediment (see Table 1-1).

Temporary, negligible, direct impacts to soil resources are anticipated from dredging activities. Dredged sediment would be unloaded on the dock in a contained sediment dewatering area, which would limit the potential for sediment runoff back into the harbor. The dewatering area would include a polypropylene product or filter fabric that is specifically designed to allow water to flow while retaining soil and sediment. Water would drain from the excavated material and travel through the filter fabric draining back into the harbor. During sediment staging prior to disposal, minimal erosion or transport by wind would be anticipated as the sediment would be saturated. After the sediments have adequately drained, they would be transported to the sediment disposal site at Point Pedernales. The sediment removed during dredging has not changed substantially over time, and previous sediment testing has determined that dredged materials from this area are not contaminated and do not exhibit a potential for bioaccumulation (USACE 2022; see Section 3.5, Public Health and Safety).

Other harbor activities, including vessel usage and recreation, are not anticipated to affect geology or earth resources.

There are no unique geologic features or geologic features of unique scientific value in the harbor; therefore, no impacts to geology are anticipated to result from the implementation of the Proposed Action.

Because of the seismic nature of the region, active faults located in the region could result in strong seismically induced ground shaking. The potential for surface fault rupture and liquefaction on Vandenberg SFB, including within the project area, would be minimal due to natural conditions in the area. No impacts associated with seismically induced ground shaking would be expected to occur under the Proposed Action.

4.3.2 No-Action Alternative

Implementing the No-Action Alternative would cause harbor activities to cease. As a result, no impacts to geology and earth resources would occur, and it is anticipated that sediments would continue to collect within the maintenance dredge area, making it potentially inaccessible to vessels.

4.4 Land Use, Recreation, and Coastal Zone Resources

Factors considered in determining if an alternative would have impacts on land use and state coastal zone resources include the extent or degree to which implementation of an alternative would:

- Result in land uses within the project area that are incompatible with, or would have an impact on, the existing character of land uses;
- Conflict with substantive requirements of Installation land use plans or policies; or
- Result in potential impacts to state coastal zone resources.

4.4.1 Alternative 1: Continuation of Harbor Activities Program

Land Use

The Proposed Action would include the continuation of harbor dredging activities, use of the harbor by authorized vessels, and recreation activities. Therefore, the Proposed Action would be consistent with past and present uses of the project area and would not permanently alter or significantly impact the designated, existing Installation land use.

Recreational use of the harbor area by persons authorized access to the Installation would be temporarily impacted during dredging activities, disposal of dredged materials, and vessel operations, as the harbor and dock area may be closed to recreational visitors for the duration of those activities. During dredging events, the dock would be utilized as a temporary staging area for dredging equipment and as the location where dredged sediment would undergo dewatering prior to transport to the disposal site at the sediment disposal site at Point Pedernales. Based on previous dredging events, dredging could take up to 5 weeks. The harbor area, including the dock, could likewise be closed to recreational users as long as vessels are in the harbor. The amount of time to complete offloading activities can vary depending on tide conditions, payload size, and other extraneous factors, but on average can range from a couple days to approximately 2 weeks. During periods of increased vessel activity, there could be increased closures of the harbor for recreational activities. Up to 200 annual trips are considered in this PEA; which in a worst case scenario could result in closure of the harbor for

recreational activities such as boating, jet-skiing, fishing, and water-related activities for the majority of the year. This number may be lower in any given year depending on launch activity. Certain recreational activities may be permitted to continue, depending on the nature of activity and as authorized by the SLD 30 Commander. Considering the sporadic nature of recreational use of the harbor, overall impacts to recreational activities would be short-term, moderate, and direct. Because there would be no permanent reduction in access to public facilities, temporary closure of the harbor or dock area would not represent a significant effect.

Implementation of the Proposed Action may also provide long-term benefits to recreational users of the harbor, as maintenance dredging would maintain, sustain, and support military, commercial, and recreational uses of the harbor by reducing the potential navigational hazards.

Coastal Zone Management

Federal activity in, or affecting, a coastal zone requires preparation of a Coastal Zone Consistency Determination or a Negative Determination in compliance with the CZMA. The Proposed Action is subject to a federal Coastal Zone Consistency Review because it would involve activities that may have affected the coastal zone of California.

The DAF has analyzed the potential effects of maintenance dredging under the Proposed Action by evaluating reasonably foreseeable direct and indirect effects on state coastal uses and resources in the state coastal zone and has determined that there would be no effects. Implementation of proposed maintenance dredging activities would be consistent with existing land uses of the area within the boundaries of Vandenberg SFB and would not substantially differ from existing military and authorized industrial activities in the project vicinity. Notification of this determination was filed with the CCC on July 6, 2022. The CCC concurred with the DAF's determination in a letter dated August 17, 2022 (refer to Appendix B-1).

Consistency review related to vessel transit, loading, and unloading within the harbor by space launch programs would be incorporated into site-specific NEPA analyses by individual harbor users, as applicable.

4.4.2 No-Action Alternative

Implementing the No-Action Alternative would cause harbor activities to cease. Recreational opportunities in the harbor would cease, which would result in permanent, moderate, direct impacts to recreation on Vandenberg SFB. No other impacts to land use or coastal resources would occur as there would be no other changes to these resources.

4.5 Public Health and Safety

Factors considered in determining whether implementing an alternative may have an impact on public health and safety include the extent or degree to which implementation of an alternative would result in the following:

- Noncompliance with applicable regulatory requirements; or
- Human exposure to hazardous materials and wastes, or environmental release above permitted limits.

Potential impacts associated with public health and safety are evaluated using federal, state, and local regulatory requirements, contract specifications, and Base operating constraints, as outlined in Section 3.5, Public Health and Safety. Hazardous materials management requirements are stipulated in federal and state Environmental Protection Agency and federal

OSHA regulations, contract specifications, and the Base Hazardous Materials Management Plan.

4.5.1 Alternative 1: Continuation of Harbor Activities Program

The Proposed Action includes typical industry-standard activities, and any project-specific risks affecting project workers would be reduced based on strict adherence to federal OSHA standards and other applicable safety laws, rules, and regulations. Dredge activities; disposal of dredged materials; and vessel transit, loading, and unloading would be conducted in accordance with applicable federal, state, and local regulations to minimize general workplace hazards. The DAF would comply with Air Force Occupational Safety and Health or federal OSHA standards requirements during project activities, per Air Force Instruction 91-202, to ensure the protection of workers and the public during dredging activities.

All applicable federal OSHA requirements and agency regulations would be specified in any agreements with commercial clients that utilize the harbor and implemented with standard BMPs associated with the Proposed Action. Impacts from potential health risks to onsite personnel and the public would not be significant because work would be done by experienced, licensed workers and the project activities would follow applicable safety requirements.

No hazardous materials would be used at the harbor aside from the fuels and lubricants used in vehicles and vessels. Potential effects occurring from the use of these materials would be limited to spills. All equipment would be properly maintained and free of leaks. All necessary equipment maintenance and repairs would be performed in pre-designated controlled, paved areas to minimize risks from accidental spillage or release. The dredge contractor would maintain a spill response plan and spill control materials on site and would implement BMPs to avoid spills. All fueling would be done away from the edge of the dock. No refueling of ships would occur within the project area. Any waste generated from spill events, or any other activities conducted as part of the Proposed Action, would be properly handled and disposed in accordance with proper federal, state, and local rules and regulations. With implementation of these measures, potential effects resulting from spills of hazardous materials would be expected to be temporary, minor, and direct.

Although dredged sediments have been shown to contain low levels of chemical constituents during past sampling events, no impacts to public health and safety are expected from exposure or disturbance to dredged sediments, as they have not shown potential for bioaccumulation of contaminants, nor would they be considered a California hazardous waste. Sampling would be conducted in accordance with the SAP and submitted to the SC-DMMT for review and approval every 5 years, as approved by the SC-DMMT (USSF 2022b; USACE 2023).

Maintenance dredging would result in long-term, beneficial impacts to navigation in the harbor as it would reduce the hazards created by shoaling, the process by which sand or sediment build up over time as a result of erosion. Shoaling in the harbor poses a hazard to vessels navigating this area and has the potential to reduce operating depth, which would affect current operations within the harbor. Reduced operating depths would restrict Vandenberg SFB's ability to continue operations within the harbor, inhibiting loading and off-loading aerospace-related cargo in support of space launch programs. The implementation of the Proposed Action would prevent or minimize the negative effects of shoaling on the safety of vessels operating within the harbor, and therefore provide a beneficial impact on public health and safety.

No impacts to public health and safety are expected from recreational use in the harbor, as the harbor and dock area would be closed to recreational visitors for the duration of dredging and loading and unloading activities.

4.5.2 No-Action Alternative

Implementing the No-Action Alternative would cause harbor activities to cease. As a result, no impacts to public health and safety would occur.

4.6 Water Resources

Factors considered in determining whether implementing an alternative may have impacts on water resources include the extent or degree to which implementation of an alternative would do the following:

- Cause substantial flooding or erosion;
- Reduce surface water quality of creeks, rivers, streams, lakes, or the ocean; or
- Reduce surface or groundwater quality or quantity.

4.6.1 Alternative 1: Continuation of Harbor Activities Program

Dredging operations would result in the disturbance of underwater sediments. Additionally, it is likely that small amounts of sediment would reenter the harbor during dredging if not fully contained within the dredge bucket or during sediment unloading from barges, or in the event that fine-grained sediment reenters the harbor from designated dewatering areas. These activities have the potential to affect water quality by resulting in increased, temporary turbidity in the harbor. There could also be a slight increase in localized turbidity from vessel propellers each time a large vessel enters and leaves the harbor.

Sediment sampling in the harbor demonstrates that material within the dredge maintenance area is 98 percent sand and 2 percent silt (USSF 2022b). When disturbed, fine sands settle quickly, minimizing the effects of turbidity. Turbidity in the harbor has been observed in the years following original construction, during all past dredging operations and during strong storms that produce large waves. It has been observed that turbidity in the harbor typically dissipates within a day or two (USAF 2021). Impacts from turbidity as a result of vessel usage would be short-term, minor, and indirect, considering the fact that the vessel would be travelling at low speed, would only utilize the harbor a handful of times a year, and that turbidity is a common natural phenomenon in this area.

Impact reduction measures specified in the Dredge Plan and prescribed in the USACE permit would be implemented to minimize impacts from turbidity, as discussed in Section 2.4.4, Environmental Protection Measures – Water Quality. With implementation of these measures, overall impacts to water resources would be less than significant.

Impacts to water quality from metals, oil and grease, or other contaminants as a result of sediment disturbance are not anticipated, based on historical interstitial water and sediment sampling that have occurred in conjunction with past dredging events (see Section 3.5, Public Health and Safety and 3.6, Water Resources). Sediment sampling would be conducted in accordance with the Vandenberg Harbor Maintenance Dredge SAP dated September 30, 2022 (see Sections 1.4.6, Interagency and Intergovernmental Coordination and Consultation – U.S. Army Corps of Engineers, and 2.1, Continuation of Harbor Activities Program). In the event the mooring dolphins require cleaning, a boat would transport personnel with a power washer and/or bucket to each mooring dolphin during mid to high tide. Sea water and a minimal volume of potable water would be used to wash the mooring dolphins; no soap would be used in the cleaning process. Therefore, no impacts to water quality would occur from cleaning of mooring dolphins.

No impacts to water quality are expected from vessel usage or continuation of recreational activities within the harbor.

Spills

Fuel spills could result should an accident occur during refueling of equipment during dredging activities. Poorly maintained equipment could also result in leaks of fuel, oil, or hydraulic fluid. Implementation of BMPs would minimize the risk of fuel/oil spills, and the dredging contractor would be required to prepare a spill response plan (in accordance with 40 CFR 112, as applicable) for the project as described in Section 2.4.4, Environmental Protection Measures – Water Quality. With implementation of these measures, overall impacts to water resources from dredging activities would be less than significant.

Impacts to harbor waters could also result during vessel operations in the event of accidental spills associated with an accidental release from the ship. While vessels are in harbor, spill prevention and response measures would be in effect in accordance with 40 CFR 110 and 40 CFR 112 as applicable and the spill response plan, including immediately cleaning up spilled fluids, maintaining an adequate supply of absorbent materials and storage/disposal containers, maintaining equipment in proper repair, and reporting spills as applicable.

Typically, ships associated with rocket launch activities that utilize the harbor are designed to minimize the potential for accidental spills. Fuel tanks are separated from the hull so that a rupture of the hull would not necessarily result in a fuel leak. Based on past, similar harbor usage events, the vessel would typically arrive at the harbor with its fuel tank approximately 1/3 full (approximately 30,000 gallons) and would not refuel within the harbor. In addition, vessels generally are maximally maneuverable with dual, fully rotating stern thrusters and dual bow thrusters. The ships would be operated by experienced crews familiar with both the vessels and the local operating conditions. Therefore, the potential for a spill to occur is considered minimal.

In the event of a spill into the water, all necessary manpower, equipment, and materials would be committed to the expeditious control and removal of the spill. All spills into the water would be reported as required under federal (33 CFR 151.15 and 40 CFR 112, as applicable) and state (Section 25507 California Health and Safety Code) laws. Vessels operating in the harbor would maintain a Shipboard Oil Pollution Emergency Plan that would be approved by the USCG. Vessel operators would also be required to submit documentation demonstrating they have an oil spill contingency plan that meets USCG's and CDFW OSPR requirements for such plans prior to the arrival of that vessel. No vessel would be allowed to enter the harbor until it has submitted documentation to the Base that it has an approved spill plan. Prior to operation in California waters, the vessel operator would also submit an oil spill contingency plan to OSPR for review and concurrence. Spill response measures would also be required for loading and unloading operations at the harbor. Vessels in port would be required to adhere to any applicable requirements of the Base's Spill Prevention, Control, and Countermeasure Plan. With the implementation of these measures, the likelihood of impacts to water resources from spills during vessel operations in the harbor would be minimized.

While operators would be prepared for minor spills into the harbor, a major event would be deferred to the USCG. Vessel operators or commercial clients would contact the USCG and the Vandenberg SFB Fire Department prior to the arrival of the first ship at the harbor to discuss procedures to be followed in the event of a major emergency in the harbor area.

Spills from recreational activities such as jet-skiing and boating would have a low potential for impacts to water resources, given their relatively low fuel capacity and low frequency of operating around the harbor.

Floodplains

The harbor and shoreline are located within a FEMA designated 100-year floodplain within Zone VE, which is defined as a special flood hazard area without base flood elevation. The Proposed Action utilizes only existing infrastructure (existing pier) and would not increase the ground elevation anywhere within the project area. As a result, no additional flood risk to the shoreline would result from the Proposed Action. The DAF has determined that there is no practicable alternative for locating the project within floodplains. This is due to the fact that 1) harbor activities must be located on the water and 2) the harbor is a fixed location aboard Vandenberg SFB. Locating within floodplains therefore cannot be avoided, and there is no practicable alternative to the Proposed Action.

The sediment disposal site at Point Pedernales is located outside of the FEMA-mapped 100-year floodplain but is located within Zone D, which is defined as “areas where there are possible but undetermined flood hazards or unstudied areas” (FEMA 2018b, 2022). Point Pedernales is an upland disposal site, and the Proposed Action would not result in additional flood risk.

4.6.2 No-Action Alternative

Implementing the No-Action Alternative would cause harbor activities to cease. Beneficial impacts to water resources could occur due to the cessation of disturbance to sediments and potential for spills. No other impacts to water resources would occur.

4.7 Cumulative Impacts

Cumulative impacts result from the incremental effects of the Proposed Action when added to past, present, and reasonably foreseeable future actions. The cumulative effects analysis recognizes that the Proposed Action does not happen in a vacuum, but instead occurs alongside other actions that together may have effects that are less readily anticipated when considering actions individually.

Table 4.7-1 lists the past, present, and reasonably foreseeable future actions that may contribute to the cumulative impact of the Proposed Action.

Table 4.7-1. Past, Present, and Reasonably Foreseeable Federal Actions

Federal Projects	Status
Refurbishment of SLC-4E and SLC-4W (SpaceX)	NEPA process complete. Action completed.
SLC-3E refurbishment/construction project (ULA)	NEPA process complete. Action ongoing.
SLC-9 Construction Project (currently undeveloped land)	Reasonably foreseeable.
SLC-6 Demo/Construction Project	Reasonably foreseeable.
Further infrastructure development for Expanded Commercial Space Launch Capabilities at South Base	Reasonably foreseeable.
Up to 110 space vehicle launches annually with DoD and commercial payloads from VSFB	Reasonably foreseeable
Regular aircraft take-offs and landings occurring at the airfield	Action ongoing and recurring.
GBSD Infrastructure Construction Project at main Base and North Base	NEPA process complete. Action ongoing.
Sierra Space Dream Chaser space vehicle alternate landing location at VSFB	NEPA process underway.

Table 4.7-1. Past, Present, and Reasonably Foreseeable Federal Actions

Federal Projects	Status
Rocket Launch Projects	
Firefly Alpha at SLC-2W	NEPA process complete. Action completed.
Commercial Spaceport at SLC-8	NEPA process complete. Action completed.
ABL RS-1 at 576-E	NEPA process complete. Action completed.
Minotaur at SLC-8, TP-01	NEPA process complete. Action completed.
ULA Vulcan at SLC-3E	NEPA process complete. Action ongoing.
SpaceX Falcon 9 at SLC-4E	NEPA process complete. Action completed.
Phantom at SLC-5	NEPA process complete.
Blue Origin New Glenn at SLC-9	NEPA process underway.
Missile Launch Projects	
MDA – multiple locations	NEPA process complete. Action completed.
Minuteman III – multiple locations	NEPA process complete. Action completed.
GBSD – multiple locations	NEPA process complete. Action ongoing.

Notes:
GERTS = General Electric Radio Tracking System; GBSD = Ground Base Strategic Deterrent; MDA = Missile Defense Agency; SLC = Space Launch Complex; ULA = United Launch Alliance

4.7.1 Alternative 1: Continuation of Harbor Activities Program

Generally, impacts anticipated to result from the Proposed Action would be very localized and would be unlikely to yield impacts that could extend beyond the immediate harbor area, existing paved roads, and the sediment disposal site at Point Pedernales. The potential for cumulative impacts to each resource area analyzed in this PEA are discussed below.

Air Quality

Vandenberg SFB is located within the SCCAB, which includes San Luis Obispo, Santa Barbara, and Ventura counties. Santa Barbara County, in which the project area is located, is classified as an attainment/unclassified area for the NAAQS for all criteria pollutants, as detailed in Section 3.1, Air Quality. Air emissions resulting from the Proposed Action would not be anticipated to affect this classification. Air emissions from other projects, and especially from rocket and missile launches, would be localized and short-term in nature. Long-term emissions from identified projects are not anticipated to increase. Cumulative emissions from the Proposed Action combined with other concurrent construction projects and launch operations would be unlikely to produce significant cumulative air quality impacts, as individual projects would be subject to review and permitting approval to ensure construction and operational air emissions remain within applicable limits and do not violate any local or regional air quality plans.

Biological Resources

Impacts from the Proposed Action would be temporary in nature and limited to marine vegetation and wildlife species within the harbor itself, and terrestrial wildlife species adjacent to the project area. These same wildlife species may also be affected by temporary noise disturbances resulting from rocket and missile launch projects. Given the sporadic and temporary nature of harbor-related and launch-related disturbances, it is unlikely that these two actions would result in significant cumulative impacts to biological resources. Likewise, cumulative impacts from successive episodes of maintenance dredging would not be expected

to occur, as disturbance would not be so frequent as to result in wildlife permanently leaving the area. Through the establishment of new kelp habitat, as discussed in Section 3.2, Biological Resources, kelp lost in subsequent maintenance dredging efforts has already been successfully mitigated.

Infrastructure development and related construction projects anticipated to occur at Vandenberg SFB in the reasonably foreseeable future are unlikely to result in significant cumulative impacts to biological resources, due to the harbor's location and activity, which is approximately 10 miles south of most Base facilities and where future projects may occur.

Geology and Earth Resources

Other projects occurring at Vandenberg SFB may involve grading, excavations, and construction or demolition that could result in erosion-inducing sedimentation of adjacent drainages and waterbodies. These impacts would be minimized by the use of BMPs and site restoration to minimize soil erosion and reduce fugitive dust. As the current project is located approximately 10 miles south of most Base facilities and where future projects may occur, it is unlikely that impacts to geology and earth resources associated with separate projects would result in cumulative impacts.

All projects occurring within the region are subject to seismically induced ground shaking in the event of an earthquake on a local or regional fault. It is assumed that projects occurring within the region in the past, present, and reasonably foreseeable future would incorporate modern construction engineering and safety standards to address the risks associated with continued development in this region. As the Proposed Action does not involve construction or operations not already occurring with some regularity, it is not anticipated that the Proposed Action would result in significant cumulative impacts on geology and earth resources.

Land Use, Recreation, and Coastal Resources

The Proposed Action would not alter any designated land uses in the region. As proposed activities are consistent with maintenance dredging and routine harbor operations that are already occurring, there would be no changes to existing recreational uses by authorized personnel with access to the Installation within the harbor. Similarly, no impacts to the state coastal zone are anticipated, as discussed in Section 4.4, Land Use, Recreation, and Coastal Zone Resources. Therefore, the Proposed Action would not result in cumulative impacts on land use, recreation, or coastal resources.

Public Health and Safety

The Proposed Action would not create a long-term negative effect on public health and safety, and maintenance dredging would improve the safety of navigation in the harbor. As a result, no cumulative impacts on public health and safety would result from implementation of the Proposed Action.

Water Resources

Cumulative impacts on water resources could occur if other projects were to affect water resources at project locations. However, projects taking place at Vandenberg SFB properties, including the Proposed Action, are required to utilize site-specific BMPs and conduct site restoration, as necessary, to minimize impacts to water quality. Impacts from construction to water quality tend to be localized and temporary in nature. Additionally, the DAF would follow all conditions of the CWA Section 401 WQC and the Standard Individual Permit issued by USACE under CWA Section 404 and RHA Section 10. As a result, the Proposed Action is not anticipated to result in significant cumulative effects on water resources.

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Chapter 6. List of Agencies, Organizations, and Persons Contacted

California Coastal Commission – Energy, Ocean Resources, and Federal Consistency Division, San Francisco, CA

California Department of Fish & Wildlife, South Coast Region, Sacramento, CA

California Environmental Protection Agency, Sacramento, CA

California Native Plant Society, Channel Islands Chapter, Ojai, CA

California Trout, Ventura, CA

Central Coast Regional Water Quality Control Board, San Luis Obispo, CA

Central Coast Regional Water Quality Control Board, Central Coast Ambient Monitoring Program, San Luis Obispo, CA

NOAA - Channel Islands National Marine Sanctuary, Santa Barbara, CA

City of Lompoc, Economic & Community Development, Lompoc, CA

Environmental Defense Center, Santa Barbara, CA

La Purisima Audubon Society, Vandenberg Village, CA

Lompoc Public Library, Lompoc, CA

NOAA - National Marine Fisheries Service, West Coast Regional Office, Long Beach, CA

National Park Service, Channel Islands National Park, Ventura, CA

Office of the Governor, Office of Planning and Research, Sacramento, CA

Santa Barbara County Air Pollution Control District, Santa Barbara, CA

Santa Barbara County Board of Supervisors, Planning and Development, Santa Barbara, CA

Santa Barbara Museum of Natural History, Santa Barbara, CA

Santa Maria Public Library, Santa Maria, CA

Santa Ynez Band of Chumash Indians Elders Council, Santa Ynez, CA

Sierra Club, Los Padres Chapter, Santa Barbara, CA

U.S. Army Corps of Engineers, Vandenberg SFB, CA

U.S. Army Corps of Engineers Regulatory Division, Los Angeles District, Ventura, CA

U.S. Coast Guard, Waterways Analysis and Management, Eleventh Coast Guard District, Alameda, CA

U.S. Department of Transportation, Federal Aviation Administration, Washington, DC

U.S. Environmental Protection Agency, Region 9, Environmental Review Branch, San Francisco, CA

U.S. Fish and Wildlife Service, Ventura Fish and Wildlife Office, Ventura CA

Federal Aviation Administration Office of Commercial Space Transportation, Washington, DC

Santa Barbara County Planning & Development, Santa Barbara, CA

Vandenberg SFB Library, Vandenberg SFB, CA

Gaviota Coast Conservancy, Goleta, CA

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VSFB. 2023b. Vandenberg SFB GIS data provided by Eric Nocerino. Layer Enterprise_Mainbase_Standalone.gdb, environmentalNaturalResources, SoilSurvey_A.

VSFB. 2022. *Essential Fish Habitat Assessment Vandenberg Harbor Maintenance Dredge, Vandenberg Space Force Base, CA, 10 August 2022*.

VSFB. 2021. *Integrated Natural Resources Management Plan*. Website: https://www.vandenberg.spaceforce.mil/Portals/18/documents/Environmental/VSFB_INRMP_Main%20Body_Sep2021.pdf?ver=204_c7R-mjWmRkK7aJZ7Hg%3d%3d. Accessed January 15, 2023.

Appendix A
Public Review and Comment Process

DEPARTMENT OF THE AIR FORCE
UNITED STATES SPACE FORCE
SPACE LAUNCH DELTA 30

2 October 2024

EARLY PUBLIC NOTICE FOR THE POTENTIAL IMPACT TO FLOODPLAIN/WETLANDS FOR HARBOR ACTIVITIES AT VANDENBERG SPACE FORCE BASE, CALIFORNIA

1. The Department of the Air Force (DAF) at Space Launch Delta 30 (SLD 30) is preparing a Draft Programmatic Environmental Assessment (PEA) in compliance with the National Environmental Policy Act (NEPA) to evaluate the potential impacts associated with ongoing harbor activities for the boat harbor at Vandenberg Space Force Base (SFB) in Santa Barbara County, California. Harbor activities are defined as a range of actions that primarily include harbor dredging; vessel transit, loading, and unloading; and other general recreational activities. Harbor activities were last assessed in the 2001 *Final USAF Environmental Assessment for Harbor Activities Associated with the Delta IV Program at Vandenberg Air Force Base.* The updated programmatic NEPA analysis will consider the potential impacts associated with ongoing harbor activities in light of current harbor users and will provide the DAF meaningful insight into long term agency planning and decision making related to use of the harbor, primarily by various launch providers and users. Notably, the PEA will inform DAF's decision making with regards to the allowable number of harbor users conducting vessel transit within the harbor, within Santa Barbara County Air Pollution Control District (SBCAPCD) regulations. Specific users of the harbor conducting vessel transit, loading, and unloading would be required to conduct follow-on site-specific environmental analysis tiering from this document. Vandenberg SFB is currently working under a 10-year Clean Water Act (CWA) Section 404 Standard Individual Permit from the United States Corps of Engineers (USACE) for ongoing maintenance dredging activities within the harbor. Onshore harbor activities that occur within the 100-year floodplain include staging of equipment, dredged sediment, and loading and unloading of vessel equipment.

2. The Proposed Action is subject to requirements and objectives of Executive Order (EO) 11990, *Protection of Wetlands,* EO 11988, *Floodplain Management*, and EO 13690, *Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input*, as harbor activities, to include ongoing dredging activities would occur within a 100-year floodplain. There are no practicable alternatives outside of floodplains and wetlands and a No Action Alternative would risk unsafe navigation conditions and potential closure of the harbor should shoaling continue undeterred. The Proposed Action would utilize only existing infrastructure (existing pier) and would not increase ground elevation anywhere within the harbor. As a result, no additional flood risk to the shoreline would result.

3. Pursuant to EO 11990, EO 11988, EO 13690, and Department of the Air Force Manual 32-7003, *Environmental Conservation*, the DAF requests advance public comment to determine if there are any public concerns regarding the Proposed Action's potential to impact floodplains and wetlands. The Proposed Action will be analyzed in the forthcoming Draft PEA and the public will have the opportunity to review and comment when released (anticipated Winter 2024). This notice and future notices related to the PEA will be circulated within the Santa Maria Times, Lompoc Record, and can also be found online at https://www.vandenberg.spaceforce.mil/About-Us/Environmental/EAS/. The DAF has engaged or will engage with state and federal agencies with a resource or permitting concern on the project, including USACE, National Marine Fisheries Service, SBCAPCD, the California Coastal Commission, and the Central Coast Regional Water Quality Control Board. Comments may be submitted to Kathleen Loetzerich, 30 CES/CEIEA Environmental Planner via email (kathleen.loetzerich.1@spaceforce.mil) or by standard mail to: 30 CES/CEIEA, Attn: Kathleen Loetzerich 1028 Iceland Avenue, Building 11146, Vandenberg SFB, CA 93437. Comments will be accepted from 2 October to 1 November 2024.

BEATRICE L. KEPHART
Chief, Installation Management Flight

From: Stevens, Theresa CIV USARMY CESPL (USA) <Theresa.Stevens@usace.army.mil>
Sent: Wednesday, October 2, 2024 8:33 AM
To: LOETZERICH, KATHLEEN R CIV USSF SSC 30 CES/CEIEC <kathleen.loetzerich.1@spaceforce.mil>
Cc: Stevens, Theresa CIV USARMY CESPL (USA) <theresa.stevens@usace.army.mil>; Allen, Aaron O CIV USARMY CESPL (USA) <Aaron.O.Allen@usace.army.mil>
Subject: Transmittal_Comment.on.Early.Public.Notice_VandenbergSpaceForceBase

The U.S. Army Corps of Engineers Los Angeles District Regulatory Division North Coast Branch Ventura Field Office (USACE), is in receipt of the 'Early Public Notice for the Potential Impact to Floodplain/Wetlands For Harbor Activities at Vandenberg Space Force Base, California' (dated October 2, 2024).

This office has reviewed and authorized the 10-year maintenance dredging standard permit under section 10 of the Rivers and Harbors Act (RHA). This office has also reviewed and authorized other activities on the base which have resulted in discharges of dredged or fill material subject to our section 404 Clean Water Act jurisdiction, or required work and structures (also subject to our section 10 RHA jurisdiction) in waters of the United States (WOTUS).

In response to the early public notice, this office respectfully requests early coordination and pre-application meetings with the Space Force or Air Force for any actions on the base that may affect WOTUS so that we may assist the Space Force or Air Force in identifying permit requirements.

Thank you for the opportunity to comment.

During the Coronavirus Health Emergency, please do not mail printed documents to any Regulatory staff or office. For further details on corresponding with us, please view our COVID-19 special public notice at:
https://www.spl.usace.army.mil/Portals/17/docs/publicnotices/COVID19%20Regulatory_SPN.pdf?ver=2020-03-19-134532-833

Theresa Stevens, Ph.D.
U.S. Army Corps of Engineers
Los Angeles District
Regulatory Division
60 South California Street, Suite 201
Ventura, CA 93001-2598

PHONE: 805-585-2146
http://www.spl.usace.army.mil/Missions/Regulatory/

Assist us in better serving you!
You are invited to complete our customer survey, located at the following link:
https://regulatory.ops.usace.army.mil/customer-service-survey/

DEPARTMENT OF THE AIR FORCE
UNITED STATES SPACE FORCE
SPACE LAUNCH DELTA 30

January 16, 2025

Gretchen Swinehart
Chief, Installation Management Flight
30 CES/CEI
1028 Iceland Avenue
Vandenberg SFB CA 93437-6010

Theresa Stevens, Ph.D.
U.S. Army Corps of Engineers
Los Angeles District
Regulatory Division
60 South California Street, Suite 201
Ventura, CA 93001-2598

Dear Ms. Stevens,

We received your email dated October 2, 2024, outlining comments and recommendations from your agency regarding the Early Public Notice for the Potential Impact to Floodplain/Wetlands for Harbor Activities at Vandenberg Space Force Base, California. We appreciate your input. The Early Public Notice is for an update to an existing Environmental Assessment for harbor activities that the U.S. Army Corps of Engineers (USACE) authorized in the 10-year Maintenance Dredge Standard Permit under Section 10 of the Rivers and Harbors Act. There are no new or additional actions that affect waters of the United States (WOTUS) with respect to this public notice. For all actions that affect WOTUS, the Space Force will engage in early coordination and pre-application meetings with your office. If you need additional information, or if you have questions, please do not hesitate to call me at (805) 605-7924 or email me at gretchen.swinehart@spaceforce.mil. You can also direct your questions or comments to Kathleen Loetzerich at kathleen.loetzerich.1@spaceforce.mil.

Sincerely

SWINEHART.GRETCHEN.1230170823
Digitally signed by SWINEHART.GRETCHEN.1230170823
Date: 2025.01.17 16:32:32 -08'00'

GRETCHEN SWINEHART
Chief, Installation Management Flight

DEPARTMENT OF THE AIR FORCE
UNITED STATES SPACE FORCE
SPACE LAUNCH DELTA 30

24 January 2025

MEMORANDUM FOR ALL INTERESTED GOVERNMENT AGENCIES, PUBLIC OFFICIALS, ORGANIZATIONS, AND INDIVIDUAL PARTIES

FROM: 30 CES/CEI
1028 Iceland Avenue
Vandenberg SFB CA 93437-6010

SUBJECT: Draft Programatic Environmental Assessment (PEA) and Finding of No Significant Impact (FONSI)/Finding of No Practicable Alternative (FONPA) for Harbor Activities, Vandenberg Space Force Base (SFB), California.

1. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Department of the Air Force (DAF) NEPA regulations, Space Launch Delta 30 (SLD 30) prepared a Draft PEA and FONSI/FONPA evaluating potential environmental impacts associated with Harbor Activities on Vandenberg SFB, California.

2. The Proposed Action consists of an evaluation of harbor activities, including dredging; vessel transit, loading, and unloading; and general recreational activities. In addition, the Proposed Action would provide the DAF insight into the combined use of the current and potential future users of the harbor; in particular vessel transit, loading, and unloading activities within the harbor by individual users. This insight would allow the DAF to determine the maximum threshold of harbor usage that can be achieved with the Santa Barbara County Air Pollution Control District emission limitation rules. This Draft PEA concludes that there will be no significant environmental impacts resulting from the Proposed Action.

3. The Proposed Action is subject to requirements and objectives of Executive Order (EO) 11990 *Protection of Wetlands;* EO 11988, *Floodplain Management*; and EO 13690, *Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input*, as harbor activities, to include ongoing dredging activities, would occur within a 100-year floodplain and Estuarine and Marine Deepwater wetlands, as defined by the National Wetland Invetory database. The DAF concludes that there are no practicable alternatives outside of floodplains and wetlands for the Proposed Action and a No Action Alternative would risk unsafe navigation conditions and potential closure of the harbor should shoaling continue undeterred. The No Action Alternative would not meet the Purpose and Need for the Proposed Action.

4. This Draft PEA and FONSI/FONPA are available at: the Lompoc, Santa Maria, and the Vandenberg SFB Library, and can also be found online at https://www.vandenberg.spaceforce.mil/About-Us/Environmental/EAS/. The public comment period for this Draft PEA and Draft FONSI/FONPA will be from 24 January 2025 through 23 February 2025. Comments may be submitted to Space Launch Delta 30, Installation Management Flight Environmental Assets Section, Building 11146, 1028 Iceland Avenue, Vandenberg SFB,

California 93437, Attention: Kathleen Loetzerich; via email to kathleen.loetzerich.1@spaceforce.mil; or faxed to (805) 606-6137. If you have any questions, please contact Kathleen Loetzerich at (805) 606-0392.

SWINEHART.GRETCHEN.1230170823

Digitally signed by SWINEHART.GRETCHEN.1230170823
Date: 2025.01.21 19:52:44 -08'00'

GRETCHEN SWINEHART
Chief, Installation Management Flight

Attachment:
Draft PEA and FONSI/FONPA for Harbor Activities, Vandenberg Space Force Base, California

DRAFT PROGRAMMATIC ENVIORNMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT IMPACT/FINDING OF NO PRACTICABLE ALTERNATIVE FOR HARBOR ACTIVITIES AT VANDENBERG SPACE FORCE BASE, CALIFORNIA

The Department of the Air Force (DAF) has prepared a Draft Programmatic Environmental Assessment (PEA) and Finding of No Significant Impact (FONSI)/Finding of No Practicable Alternative (FONPA) that evaluates the potential environmental impacts of harbor activities at Vandenberg Space Force Base (SFB) in Santa Barbara County, California. The Proposed Action consists of an evaluation of harbor activities, including dredging; vessel transit, loading, and unloading; and general recreational activities. In addition, the Proposed Action would provide the DAF insight into the combined use of the current and potential future users of the harbor; in particular vessel transit, loading, and unloading activities within the harbor by individual users. This insight would allow the DAF to determine the maximum threshold of harbor usage that can be achieved with the Santa Barbara County Air Pollution Control District emission limitation rules. Resources analyzed in the attached Draft PEA include air quality and climate; biological resources; geology and earth resources; Vandenberg SFB land use, recreation, and coastal resources; public health and safety; and water resources. The Draft PEA concludes that there will be no significant environmental impacts resulting from the Proposed Action.

This Draft PEA and FONSI/FONPA are available at: the Lompoc, Santa Maria, and the Vandenberg SFB Libraries, and can also be found online at https://www.vandenberg.spaceforce.mil/About-Us/Environmental/EAS/. The public comment period for this Draft PEA and FONSI/FONPA will be from 24 January 2025 through 23 February 2025. Comments may be submitted to Kathleen Loetzerich, 30 CES/CEIEA Environmental Planner via email (kathleen.loetzerich.1@spaceforce.mil) or by standard mail to: 30 CES/CEIEA, Attn: Kathleen Loetzerich 1028 Iceland Avenue, Building 11146, Vandenberg SFB, CA 93437. If you have any questions, please contact Kathleen Loetzerich at (805) 606-0392.

Appendix B
Regulatory Correspondence

Appendix B-1
California Coastal Commission Consultation

CALIFORNIA COASTAL COMMISSION
455 MARKET STREET, SUITE 300
SAN FRANCISCO, CA 94105
FAX (415) 904-5400
TDD (415) 597-5885

August 17, 2022

Beatrice Kephart
Chief
Installation Management Flight
Department of the Air Force
1028 Iceland Avenue
Vandenberg SFB CA 93437

Re: Negative Determination No. ND-0032-22: Ten-Year Maintenance Dredging Plan at the Vandenberg Space Force Base (VSFB) Harbor

Dear Ms. Kephart:

We have received your letter dated July 6, 2022, in which you have determined that the above-referenced proposal to implement a ten-year maintenance dredging plan at the VSFB harbor would have no adverse effect on coastal resources for the reasons identified in Negative Determination No. ND-0032-22. 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 Wesley Horn at Wesley.Horn@coastal.ca.gov if you have any questions regarding this matter.

Sincerely,

CASSIDY TEUFEL
Federal Consistency Coordinator
(for)

JOHN AINSWORTH
Executive Director

Appendix B-2
National Marine Fisheries Service Consultation

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

February 25, 2021

Refer to NMFS No: WCRO-2021-00243

Beatrice L. Kephart
Chief, Installation Management Flight
30 CES/CEI
1028 Iceland Avenue
Vandenberg AFC CA 93437-6010

Re: Endangered Species Act Section 7(a)(2) Concurrence Letter for Harbor Maintenance Dredging at Vandenberg Air Force Base.

Dear Ms. Kephart:

This letter responds to your February 11, 2021, request for concurrence from the National Marine Fisheries Service (NMFS) pursuant to Section 7 of the Endangered Species Act (ESA) for the subject action. Your request qualified for our expedited review and concurrence because it contained all required information on your proposed action and its potential effects to listed species and designated critical habitat.

We reviewed the Vandenberg Air Force Base's consultation request document and related materials. Based on our knowledge, expertise, and your action agency's materials, we concur with the action agency's conclusions that the proposed action is not likely to adversely affect the NMFS ESA-listed species and/or designated critical habitat.

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). The concurrence letter will be available through NMFS' Environmental Consultation Organizer [https://appscloud.fisheries.noaa.gov]. A complete record of this consultation is on file at the NMFS Long Beach Office.

Reinitiation of consultation is required and shall be requested by the Vandenberg Air Force Base or by NMFS, where discretionary Federal involvement or control over the action has been retained or is authorized by law and (1) the proposed action causes take; (2) 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;

(3) 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 the written concurrence; or (4) 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 consultation.

Please direct questions regarding this letter to Susan Wang at Susan.Wang@noaa.gov.

Sincerely,

Penny Ruvelas
Branch Chief
Long Beach Protected Resources Division

cc: Rhys Evans, VAFB
Chiharu Mori, NMFS WCR

bcc: CHRON File (pdf)
Division- File copy
Administrative Record Number: 151422WCR2021PR00032

From:	Bryant Chesney - NOAA Federal
To:	LUM, LUANNE H CIV USSF SSC 30 CES/CEIEA
Cc:	KAISERSATT, SAMANTHA O CIV USSF SSC 30 CES/CEIEA
Subject:	[URL Verdict: Neutral][Non-DoD Source] Re: Abbreviated Essential Fish Habitat Consultation for Vandenberg Harbor Maintenance Dredge
Date:	Friday, September 2, 2022 3:34:40 PM

Luanne,
NOAA's National Marine Fisheries Service (NMFS) has reviewed the essential fish habitat (EFH) assessment dated August 10, 2022, for the Vandenberg Space Force Base's (VSFB) proposed harbor maintenance dredging activities. NMFS believes the proposed dredging activities will adversely affect EFH via benthic and noise disturbances, removal of prey organisms, increased turbidity, and potential functional loss of eelgrass and kelp habitat. However, NMFS believes VSFB has incorporated adequate mitigation measures to address these adverse impacts, and has no additional EFH conservation recommendations to provide at this time. If impacts to eelgrass are found based on monitoring results, Vandenberg should coordinate further with NMFS and consider re-initiation of the EFH consultation to address potential offsetting and/or compensatory mitigation measures. In addition, if monitoring indicates presence of any Caulerpa species, please notify NMFS prior to bottom disturbing activities consistent with the conservation measure in the EFH assessment, and the Caulerpa Control Protocol. Thank you for consulting with NMFS.
Regards,
Bryant

On Thu, Aug 11, 2022 at 12:18 PM LUM, LUANNE H CIV USSF SSC 30 CES/CEIEA <luanne.lum@spaceforce.mil> wrote:

> Good afternoon Bryant,
>
> To follow up with our discussion last month on 20 July, attached is the revised EFH assessment and Eelgrass Monitoring Plan to support our abbreviated EFH consultation. Based on your recommendation, the option to take cut kelp offshore along Vandenberg SFB's coastline is included in the Project Description. For pre- and post-dredge surveys in the monitoring plan, the survey area was increased to cover the entire dredge APE to be more consistent with the CEMP, and a Status and Trends section is included to describe annual surveys. Let me know if you have any questions.
>
> Thank you, Luanne
>
> ***Luanne Lum***
>
> Botanist & Biological Scientist
>
> 1028 Iceland Avenue, B11146
>
> Vandenberg SFB, CA 93437

luanne.lum@spaceforce.mil

(805)606-5299

dsn: 276-5299

From: LUM, LUANNE H CIV USSF SSC 30 CES/CEIEA
Sent: Wednesday, June 22, 2022 11:21 AM
To: Bryant Chesney (Bryant.Chesney@noaa.gov) <Bryant.Chesney@noaa.gov>
Cc: KAISERSATT, SAMANTHA O CIV USSF SSC 30 CES/CEIEA <samantha.kaisersatt@spaceforce.mil>
Subject: Abbreviated Essential Fish Habitat Consultation for Vandenberg Harbor Maintenance Dredge

Good morning Bryant,

Vandenberg's Regional General Permit (RGP) 71 for boat harbor dredging will expire in December 2022. We are currently in the process of submitting a Harbor Maintenance Dredge Plan to the Army Corps to continue dredge operations beyond 2022. The same dredge methods and parameters as the existing RGP 71 will be outlined in the plan. Based on discussions with the Corps, the plan will support a 10-year Standard Individual Permit (SIP).

Based on discussions with Eric Chavez this year, he recommended that we coordinate an abbreviated consultation with NOAA for essential fish habitat (EFH) accompanied by an Eelgrass Monitoring Plan to support future dredge activities. Attached is an EFH Assessment to request and support our abbreviated consultation for EFH with you. The assessment includes an eegrass monitoring plan. If you have any comments or questions, please feel free to contact me.

Thank you, Luanne

Luanne Lum

Botanist & Biological Scientist

1028 Iceland Avenue, B11146

Vandenberg SFB, CA 93437

luanne.lum@spaceforce.mil

(805)606-5299

dsn: 276-5299

--

Bryant Chesney
Senior Marine Habitat Resource Specialist, West Coast Region
Protected Resources Division, Long Beach, California
NOAA Fisheries | U.S. Department of Commerce
Office: (562) 980-4037
www.westcoast.fisheries.noaa.gov

Appendix C
Vandenberg Harbor Maintenance Dredge Plan

Vandenberg Harbor Maintenance Dredge Plan

Vandenberg Space Force Base
California

United States Space Force
1028 Iceland Avenue, B11146
Vandenberg SFB, California 93437

October 11, 2022

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ACRONYMS AND ABBREVIATIONS

AF	Air Force
BO	biological opinion
CEMP	California Eelgrass Mitigation Policy
cy	cubic yard(s)
DOD	Department of Defense
DMMT	Southern California Dredged Material Management Team
EELV	Evolved Expendable Launch Vehicle
EFH	Essential Fish Habitat
ENSR	ENSR Consulting and Engineering
ER-L	effects range-low
ER-M	effects range-medium
IHA	Incidental Harassment Authorization
LOA	Letter of Authorization
MLLW	mean lower low water
mm	millimeter
NASA	National Aeronautics and Space Administration
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NS&T	National Status and Trends
Pi	Pi Environmental, LLC
RGP	Regional General Permit
SAP	Sampling and Analysis Plan
SF	Space Force
TOC	total organic carbon
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USSF	United States Space Force
VSFB	Vandenberg Space Force Base

1. INTRODUCTION

This boat harbor maintenance dredge plan (Dredge Plan) has been prepared to support the continued activities of harbor maintenance dredge activities at the boat harbor (harbor) located at Vandenberg Space Force Base (VSFB). Bordered to the west by the Pacific Ocean ,VSFB is approximately 65 miles north of Santa Barbara and extends north past Pt. Conception.

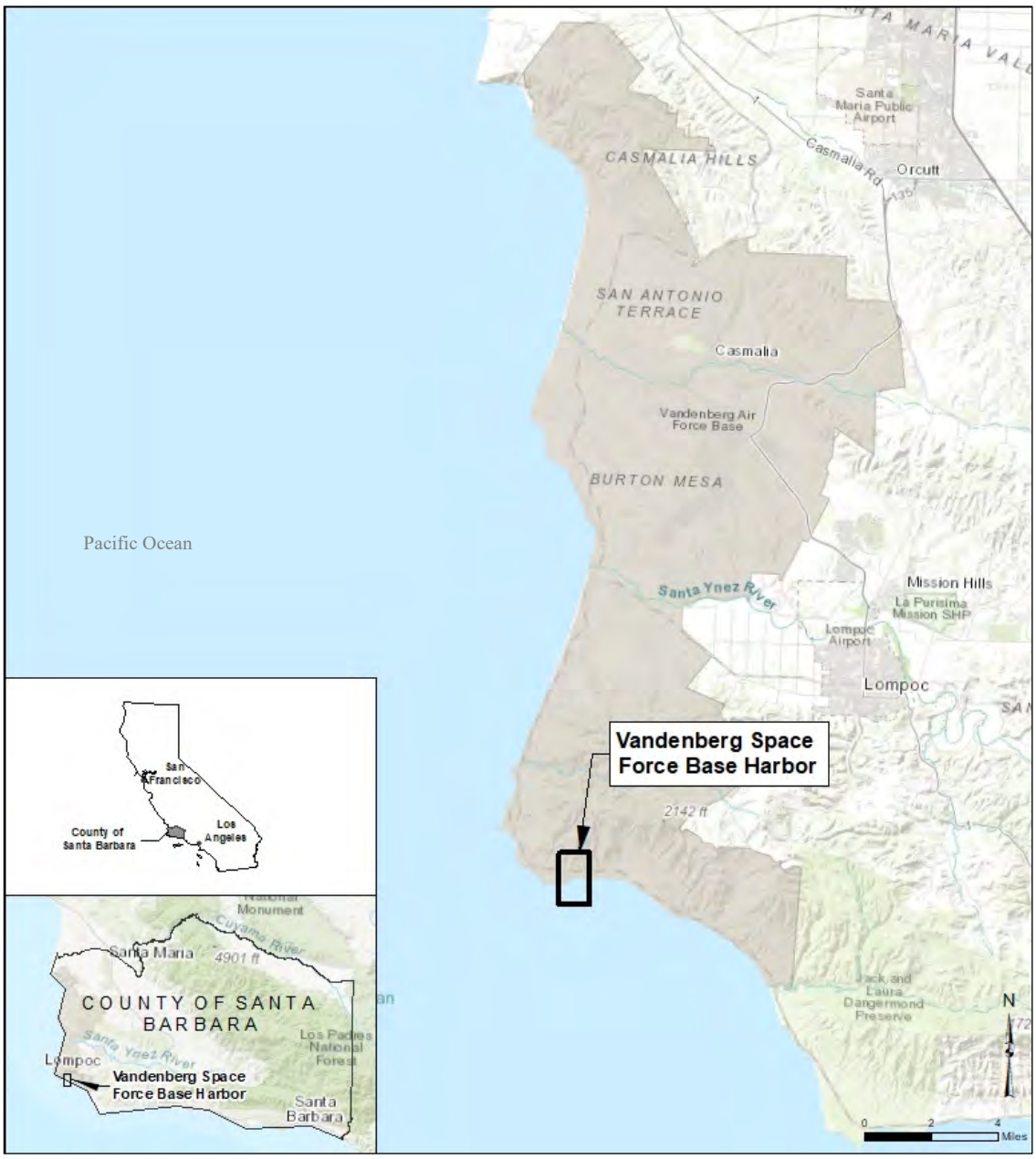

Figure 1. Site Location Map

VSFB occupies approximately 99,100 acres of Santa Barbara County, California. The primary mission of VSFB is to support space and missile launch operations. United States Space Force (USSF) Delta 30 at VSFB is responsible for Department of Defense (DOD) space and missile launch activities on the West Coast. Satellites destined for polar or near-polar orbit are launched from VSFB. VSFB supports West Coast launch activities for the AF, SF, the DOD, the Missile Defense Agency, the National Aeronautics and Space Administration (NASA), foreign nations, and various private industry contractors. The harbor is located on south VSFB, approximately 16.1 kilometers (10 miles) northeast of Point Conception and 4.8 kilometers (3 miles) southeast of Point Arguello. Previous dredge activities were necessary to support the Delta IV Evolved Expendable Launch Vehicle (EELV) program at VSFB, which includes the transport of booster rockets and other equipment via ocean-going ships to the harbor.

This 2022 Dredge Plan is an update to the 2017 Dredge Plan and has been prepared to support the issuance of a 10-year Standard Individual Permit for ongoing maintenance dredge activities within the harbor. The plan is required to facilitate dredge activities in the harbor to provide for the delivery of essential mission components to VSFB.

2. BACKGROUND

This section details previous bathymetric surveys and dredge activities that have been performed in the harbor, as well as the most recent sediment sampling and analysis results.

2.1 Previous Bathymetric Surveys and Dredging

Dredge activities were initially conducted in the harbor in October 2001 to provide marine vessel access to the harbor dock (**Figure 2**).

Figure 2. Vandenberg Harbor Maintenance Dredge Footprint

During the dredging, hardbottom conditions were encountered at the northern perimeter of the dredge footprint; these hardbottom conditions resulted in the planned dredge footprint being narrowed by 70 feet. Additionally, several locations in the reduced footprint also contained hardbottom at -10 mean lower low water (MLLW), which is the minimum draft required for safe vessel operations.

In early and mid-2002, two bathymetric surveys of the harbor were conducted: one in March 2002 and one in late July 2002. The surveys were conducted to develop an accurate prediction of the required frequency of maintenance dredge activities. The results of the surveys indicated the following:

- The greatest sediment deposition was occurring at the toe of the dock extending approximately 75 feet into the harbor.

- Sediment was accumulating at the toe of slopes on the northern and southern perimeters of the dredge footprint.
- Minimal sediment deposition was observed in other locations in the harbor.

The results indicated that although sediment deposition was highly variable over the area of the dredge footprint, dredge activities may be required once or twice a year rather than every 2 to 3 years as initially estimated. The increased dredging need (annually or semiannually) would still be dependent upon sediment deposition and material and equipment delivery schedule requirements.

As detailed in **Table 1**, the harbor has been dredged only eight times since 2001. Dredging in March 2017 was curtailed due to inclement weather, however, was completed in November 2017. **Table 1** provides a summary of the previous dredge activities.

Table 1. Dredge Summary

Year	Month(s)	Dredge Volume (cubic yards)
2001	October	16,000
2002	December	1,500
2009	July-August	5,055
2011	Not specified	5,000[1]
2014	August-September	4,229
2017	March	250
2017	November	263
2020	March	69.5
2021	July-August	585

2.2 Previous Sediment Sampling

Sediment samples were collected from the dredge footprint and analyzed in November 2019. The results were compared to the effects range-low (ER-L) and effects range-medium (ER-M) outlined in the National Oceanic and Atmospheric Administration (NOAA)'s Sediment Quality Guidelines developed for the National Status & Trends (NS&T) Program (NOAA 1999). Four samples were collected and analyzed for metals (arsenic, cadmium, chromium, copper, lead, nickel, selenium, silver, zinc, and mercury) as well as total organic carbon (TOC) and total oil and grease, and grain size. All sample results were below the ER-L and ER-M screening thresholds and averaged 98 percent (%) sand and 2% silt. More information on historical sampling results can be found in the Sampling and Analysis Plan, provided as Attachment B.

[1] The 2011 dredging volume was limited to the permit-stipulated maximum dredge volume of 5,000 cubic yards (cy), however a permit modification was requested in 2013 to increase the dredge volume to 10,000 cy.

Based on correspondence with the United States Army Corps of Engineers (USACE) (dated September 2020), no further sediment sampling would be required in September 2020 as all results were below the ER-L and ER-M and the upland disposal site would remain the same.

3. EXISTING CONDITIONS

This section details the current existing conditions and sensitive species within the project area. Due to the dynamic coastal environment, sand begins to migrate back into the harbor area as soon as dredge activities have been completed, resulting in the need for frequent maintenance dredging for access. The harbor substrate consists of migrated sand and a fairly shallow rocky substrate within the dredge footprint.

3.1 Black Abalone

Surveys for black abalone (*Haliotis cracherodii*) have occurred before and after dredge operations at VSFB for every action since 2009. The 2022 pre-dredge black abalone surveys were conducted from May 15 to 17, 2022 in anticipation of a July dredge that was canceled. Survey results in 2022 indicated a total of 9 black abalone and 3 red abalone in the breakwater. The sizes of the black abalone ranged from 35 millimeters (mm) to 190 mm. Most were the same black abalone that have been found in the past but there were also a couple of individuals that had not previously been observed.

3.2 Marine Wildlife

A summary of the incidental marine wildlife that were observed for pre- and post-dredge for mammals, invertebrates and birds performed in 2021 are presented below. A detailed description is provided in **Attachment A**.

Marine mammals are monitored monthly during low-tide conditions (less than +2 feet) in accordance with the 2001 EELV Biological Opinion (BO) (USFWS, 2001) and the 2019 AF Letter of Authorization (LOA; National Marine Fisheries Service [NMFS] 2019). The most commonly observed animals are pacific harbor seals (*Phoca vitulina*), California sea lions (*Zalophus californianus*), northern elephant seals (*Mirounga angustirostris*), and southern sea otters (*Enhydra lutris nereis*) (AECOM, 2021). In addition to marine mammals, invertebrates and birds are also observed. **Table 2** provides a list of marine wildlife that was observed during the 2021 pre- and post-dredge activities.

Table 2. Incidental Wildlife Observations for Mammals, Invertebrates and Birds

Scientific Name	Common Name
Mammals	
Phoca vitulina	Pacific harbor seal
Invertebrates	
Anthopleura sola	Sunburst anemone
Piaster ochraceus	Ochre star
Asterina miniate	Bat star
Doris/Peltodoris spp.	Sea lemon
Aplysia californica	California sea hare
Norrisia norrisi	Norris topsnail
Olivella biplicata	Olivella
Euspira lewisii	Moon snail
Thylacodes squamigerus	Scaled wormsnail
Mytolius californianus	California mussel
Haliotis rufescens	Red abalone
Chthamalus dalli	Little brown barnacle
Pugettia producta	Shield-backed kelp crab
Cancer gracilis	Slender crab
Pachygrapsus crassipes	Striped shore crab
Birds	
Arenaria melanocephala	Black turnstone
Sebastes atrovirens	California brown pelican
Larus heermanni	Heerman's gull
Larus occidentalis	Western gull
Phalacrocorax pelagicus	Pelagic cormorant
Pandion haliaetus	Osprey

Overall, marine mammals are infrequently observed within the dredge footprint. To date, there have been no observed impacts to marine mammals as a result of dredge activities in the harbor. Additionally, marine invertebrates and bird observations only indicates temporary displacement.

3.3 Essential Fish Habitat

The project occurs within essential fish habitat (EFH) of particular concern for federally managed fish species within the Pacific Groundfish Fisheries Management Plan (Pacific Fishery Management Council, 2020). NMFS also indicated in 2001 that the proposed project might adversely affect kelp and EFH prey species that forage on infaunal and bottom-dwelling organisms. **Table 3** provides a list of fish that were observed during the 2021 pre- and post-dredge activities.

Table 3. Incidental Wildlife Observations for Fish

Scientific Name	Common Name
Fish	
Sebastes atrovirens	Kelp rockfish
Sebastes serranoides	Olive rockfish
Rhacochilus vacca	Pile perch
Embiotica jacksoni	Black perch
Amphistichus argenteus	Barred surfperch
Brachyistius frenatus	Kelp surfperch
Heterostichus rostratus	Giant kelpfish
Paralichthys californicus	Halibut
Scorpeanichthys marmorata	Cabezon
Porichthys sp.	Midshipman
Myliobatis californica	Bat ray

Eelgrass surveys for the two most recent dredge events were conducted in accordance with the California Eelgrass Mitigation Policy (CEMP; NMFS, 2014) to determine the presence and impact of dredging operations on eelgrass.

For the 2020 dredge event, eelgrass was observed during the pre-dredge survey on February 3, 2020. Due to COVID-19 travel restrictions and with approval by NMFS, the post-dredge survey occurred during the optimal survey period on June 30, 2020. The extended time beyond 60-days post-dredge and during the optimal survey period may have contributed to the amount of eelgrass cover observed with no net loss. Due to turbidity and weather conditions, only 30% coverage was achieved. In coordination with NMFS, side scan sonar was recommended for the next dredge in 2021. Following the 2021 dredge event, the post-dredge survey occurred August 18-19, 2021. Although there was a loss of 129.64 m^2 eelgrass spatial distribution within the dredge extent area, there was an increase of 171.23 m^2 in the project survey area. Although minimal, this loss may reflect the close timeline to the dredged event. A full analysis and results are included in the 2022 Essential Fish Habitat (EFH) Assessment (**Attachment A)**.

Kelp mitigation efforts were completed in 2009 to minimize temporal losses associated with the 2001 kelp habitat impact. Details of the mitigation are provided in **Section 5.4.2**. Visual observation of kelp forest densities prior to 2018 indicated the kelp bed within the mitigation area had been flourishing. Aerial imagery collected in 2019 of the kelp canopy within the mitigation area are permanently established and had a surface canopy area of 0.37 acres as calculated using GIS.

Aerial imagery collected in 2019 resulted in an entire kelp canopy area of 0.64 acres while the mitigation area had a surface canopy area of 0.37 acres as shown in **Figure 3**.

Figure 3. 2019 Kelp Canopy Extent

Based on 2021 field survey of post-dredge kelp abundance, kelp canopy in the 0.89-acre mitigation area between the dolphins and breakwater was approximately 0.27 acres and increased 20 percent (%) in the overall survey area of 2.77 acres.

4. PROJECT DESCRIPTION

The project consists of maintenance dredging at the harbor to a minimum depth of -10 feet MLLW plus a 2-foot overdredge allowance for a maximum depth of -12 feet MLLW. The minimum depth will be necessary to accommodate vessel usage at the harbor throughout the next 10 years, beginning in 2023. The dredge footprint remains the same as previous dredge activities with predicted sediment volumes, up to 10,000 cubic yards (cy) annually. Bathymetric surveys will be conducted at the harbor to determine if dredge activities will need to occur. Sediment sampling and analysis will be performed in support of the dredge activities.

4.1 Turbidity Control

Dredging and dewatering can affect water quality in the harbor. These impacts can result from sediment being resuspended during dredging operations, dredged material falling back into the water (i.e., not fully contained in the dredge bucket), or fine-grained sediment reentering the harbor during dewatering. Additionally, unloading sediment from scows and misplacing material (i.e., sediment inadvertently falling into the water) could result in increased levels of turbidity.

Increased turbidity in the water column has the potential to impact the benthic invertebrates and vegetation. To help prevent the turbidity from extending away from the direct dredge area during dredging and dewatering, a turbidity curtain will be deployed that minimizes impacts to water quality. The turbidity curtain will be placed between the mooring dolphins and the kelp beds that are present in this area and kept in place throughout dredge operations. Turbidity in the harbor was not found to be detrimental to water quality during the 2001 or 2002 dredging, based on water and sediment sampling results and consultation with the Regional Water Quality Control Board.

4.2 Dredging

Maintenance dredging at the VSFB harbor will be conducted using the same dredging means and methods as previous events. Dredging operations in the harbor will include the use of a crane-mounted clamshell bucket operated from the dock and a barge-mounted operations from a barge, further detailed below. Kelp removed during dredge activities and prior to large vessel entry will be hauled off-base to a compost/green waste or reuse facility, or taken offshore nearby off of Vandenberg's shoreline.

4.2.1 Dredging from the Dock

A crane-mounted clamshell bucket would be positioned on the dock to dredge sediment up to 200 feet from the dock face. Dredged sediment will be unloaded on the dock in a contained sediment dewatering area and supernatant will be directed and conveyed back to the harbor using the appropriate infrastructure (e.g., k-rails). The dewatering containment area includes a non-woven polypropylene product or filter fabric that is specifically designed to allow water to flow while retaining soil and sediment. Water would drain from the excavated material and travel through the filter fabric before draining back into the harbor. Dewatering is expected to take several days prior to transporting the material to the former Point (Pt.) Pedernales quarry, as detailed in Section 4.3.

4.2.2 Dredging from a Barge

If dockside dredging is unable to remove sediment from the entire dredge footprint, a fixed boom crane with a clamshell bucket will be mounted on a barge and maneuvered (via the use of a tugboat) to the sediment removal locations. Dredged sediment will be loaded into a small scow, transported to the dock and unloaded into the sediment dewatering area located on the dock (**Figure 2**).

4.3 Transportation and Disposal

Once the dewatering is complete and the dredged sediment is sufficiently dewatered to avoid supernatant from spilling from the transport vehicles on the access roads, the dewatered sediment will be loaded into dump trucks and transported via existing access roads to the former Pt. Pedernales quarry. Pt. Pedernales is an abandoned quarry site on the VSFB designated to receive sediment from harbor dredging (**Figure 4**).

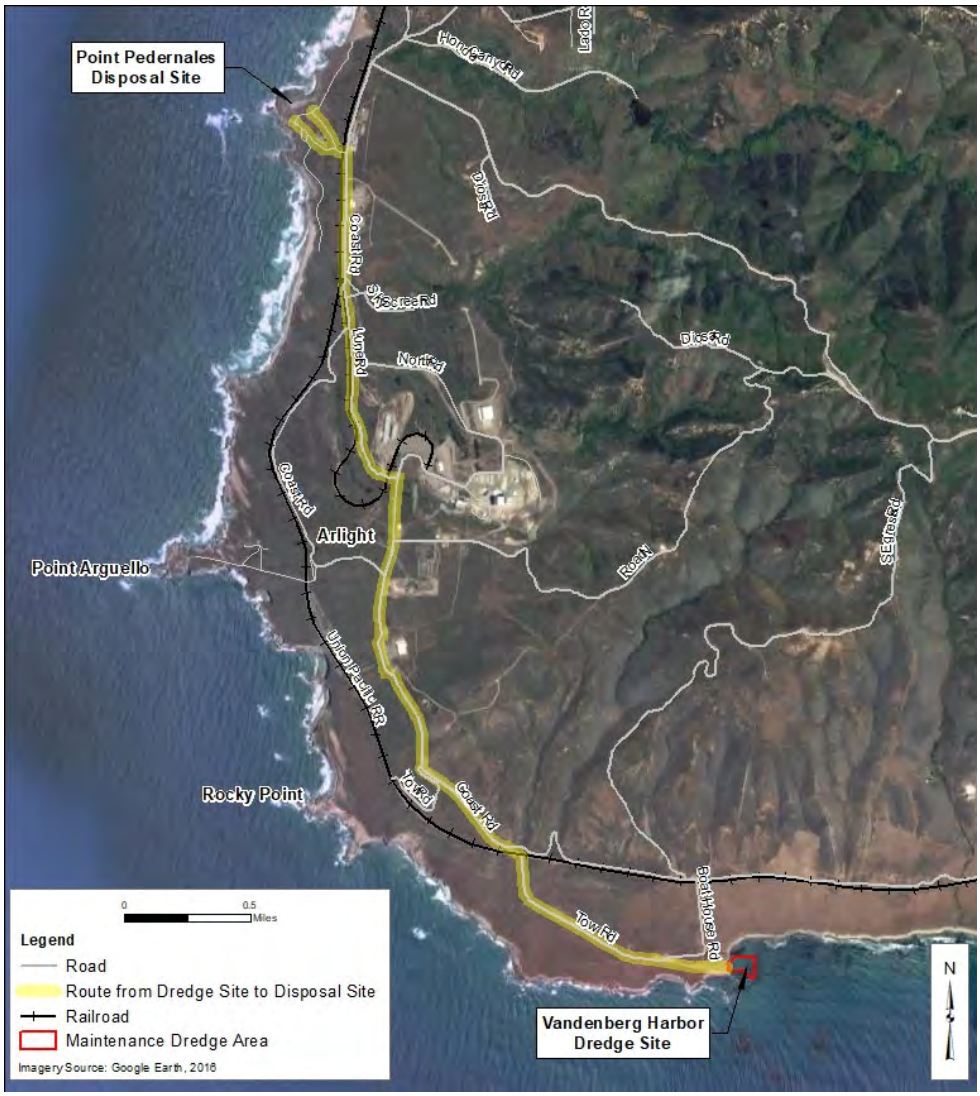

Figure 4. Transportation and Disposal Plan

4.4 Mooring Dolphin Cleaning

Before a vessel that requires use of the mooring dolphins enters the harbor, the harbor mooring dolphins may be cleaned. A boat will transport personnel and a power washer and/or bucket to each dolphin during mid to high tide. Sea water (no soap) and a minimal amount of potable water will be used to wash the mooring dolphins. Accessing the tops of each mooring dolphin (six total) may be required to achieve proper cleaning. Cleaning is expected to take approximately one day.

4.5 Project Schedule

The USACE and United States Environmental Protection Agency (USEPA) require that sediment be sampled before dredging begins. Sampling must be conducted in accordance with the sampling and analysis plan (SAP) that was approved the Southern California Dredged Material Management Team (DMMT) which permits sediment sampling and testing every five years. Once the sediment test results have been received, a sediment sampling and analysis report is submitted to the DMMT for review and approval. The approved SAP to support this harbor plan is provided in **Attachment B**. Following approval of the sediment sampling and analysis report, dredge activities may be scheduled and initiated.

Based on previous dredge activities and achieved production, dredge is anticipated to occur over 3 to 5 weeks, including mobilization and demobilization, but will depend on the total dredge volume. The weather at the harbor is variable and might cause downtime during dredging, which could impact the overall schedule. Regulatory monitoring will be conducted during dredge activities as detailed in **Section 5**.

5. REGULATORY COORDINATION

Dredging the harbor requires regulatory agency involvement and coordination to verify that dredging is being conducted in accordance with regulations and permits. This section details the previous and ongoing regulatory coordination.

5.1 Cultural Resources

The project will be conducted within a sub-tidal embayment that was excavated from native rock in 1984 to provide access for delivery of essential equipment to VSFB. The entirety of the Project area is a previously built environment of modern age. The proposed dredging is considered periodic maintenance and is limited to removing recently deposited sediment within the same footprint of the dock area. This maintenance dredging has no potential to affect paleontological or cultural resources. Therefore, no consultation is required with the State Historic Preservation Officer for Section 106 of the National Historic Properties Act.

5.2 U.S. Army Corps of Engineers

A revised dredge permit (No. SPL-2007-00689-JWM, RGP 71) was obtained from USACE in December 2017 (USACE, 2017). The USACE reviews and authorizes disposal of dredged sediments under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. This plan has been prepared to support USACE issuance of a 10-year Standard Individual Permit for ongoing maintenance dredge activities within the harbor.

5.3 U.S. Fish and Wildlife Service

In August 2001, the U.S. Fish and Wildlife Service (USFWS) issued a BO for the EELV Program, including harbor dredging and maintenance (USFWS, 2001). The following provides a summary of the monitoring requirements and past results.

- Biological monitoring of the southern sea otter will occur during the dredge activities.
- Otters will be monitored for presence and potential disturbance during all dredge activities. Otters have not been frequently observed during past dredging and other harbor activities, previous sea otter monitoring has indicated that they are not disturbed by these dredging activities, when present.
- In the event that dredge activities take place after dark, the lights at the wharf will be illuminated prior to dusk and turned off after dawn to minimize impacts to sea otters in the area.

In a letter dated October 25, 2002, the USFWS stated that the proposed increase in dredging frequency (to annually or semiannually) does not require reinitiating formal consultation. There have been no updates to the harbor-related BO since this letter was issued.

5.4 National Marine Fisheries Service

5.4.1 Letter of Authorization

Marine mammals are monitored during low-tide conditions (less than +2 feet) in accordance with the 2001 EELV BO and the 2014 and 2019 United States Air Force LOAs, which replaced the former Boeing IHA (**Attachment C**). The most commonly monitored animals are Pacific harbor seals (*Phoca vitulina*), California sea lions, and the Northern elephant seals. To date, there have been no significant impacts to these mammals as a result of VSFB deliveries or dredge activities in the harbor.

Dredge activities were incorporated into the VSFB LOA from NMFS that also supported launch and flight operations in 2019. Due to lack of documented disturbance to pinnipeds, VSFB determined there was very low potential for Level B harassment of marine mammals and harbor dredging is no longer included in the VSFB LOA.

5.4.2 Essential Fish Habitat

In 2001, an analysis of EFH was prepared in support of the Final Environmental Assessment for Harbor Activities Associated with the Delta IV Program (ENSR, 2001). NMFS indicated that the proposed action would adversely affect EFH for at least 18 federally managed fish species within the Coastal Pelagics, and Pacific Groundfish Fisheries Management Plans (FMP). The project also occurs in kelp canopy designated as a habitat area of particular concern for various federally managed fish species within the Pacific Groundfish FMP and EFH prey species foraging on infaunal and bottom-dwelling organisms. No eelgrass (Zostera sp.) or Caulerpa (Caulerpa sp.) were observed during this survey.

Pursuant to section 305 (b)(4)(A) of the Magnuson-Stevens Fishery Conservation and Management Act and in order to mitigate for lost habitat, the Mitigation Plan (ENSR, 2002) was implemented and completed in 2009 to minimize temporal losses associated with the 2001 kelp habitat impact. A total of 150 tons of boulders were placed in the harbor to provide substrate for kelp recruitment. Surveys conducted in March 2010 indicated there was 1.05 acres of kelp canopy in the project area, which is 0.34 acres more than found in the pre-project survey; therefore, in 2010, consistent with the Kelp Mitigation Plan (ENSR, 2002), the NMFS stated that no further mitigation is required. Ground-based visual observations of kelp, conducted in the mitigation area in 2021, indicate that the colony is still flourishing. No further aerial surveys or regulatory interactions are planned.

Surveys were conducted in 2020 and 2021, in accordance with the CEMP, and eelgrass was observed in both surveys; no mitigation was required and Caulerpa was not observed. An EFH Assessment for Abbreviated Consultation with NMFS is currently in progress. In accordance with the Eelgrass Monitoring Plan, the following surveys will be conducted:

- Pre- and post-dredge surveys
- Annual monitoring

The Eelgrass Monitoring Plan is included in **Attachment A**. If survey monitoring results indicate impacts to eelgrass and/or the presence of Caulerpa, VSFB will coordinate further with NMFS.

5.4.3 Black Abalone

VSFB consulted informally with NMFS regarding effects of dredge activities on black abalone in the harbor as the offshore waters of VSFB are designated Critical Habitat for the species. The 2021 assessment for Black Abalone determined that black abalone were not documented in the dredge footprint and there is little stable rock that is exposed within the dredge footprint that would provide suitable habitat. Therefore, direct mortality will not occur during dredge activities (30th Space Wing Installation Management Flight, 2021). NMFS concurred with VSFB's determination that harbor dredging may affect, but is not likely to adversely affect, black abalone or its habitat.

- Pre- and post-dredge surveys for black abalone will be conducted on the breakwater to determine effects from dredge activities.

5.5 Regional Water Quality Control Board

The Regional Water Quality Control Board reviews and authorizes water quality certifications under Section 401 of the Clean Water Act for any activity that may result in a discharge to the waters of the United States. This plan is prepared to support issuance of a 401 Certification for ongoing maintenance dredge activities. The 401 Certification will define requirements to document compliance with applicable water quality standards throughout the implementation of the dredge activities.

5.6 California Coastal Commission

In 2001, the California Coastal Commission concurred with consistency determination CD-035-01 for harbor dredging at VSFB, and in 2002 the Commission's Executive Director concurred with negative determination ND-082-02 for harbor maintenance dredging at VSFB. The Executive Director concurred with negative determinations ND-096-03, ND-048-08, and ND-0012-014 for 5-year harbor maintenance dredging programs in December 2003, September 2008, and May 2014, respectively. A Negative Determination to support this 10-year Dredge Plan has been submitted to the Commission and is currently in process.

6. BEST MANAGEMENT PRACTICES

Best management practices will be implemented to minimize the risk of fuel/oil spills. Spill cleanup materials will be maintained on-site for emergency cleanup and the contractor will have a spill response plan prepared and be in the immediate area at all times. Implementation of the project's SAP will further serve to protect marine habitat and water quality during maintenance dredge activities.

The dredge operator will comply with any conditions associated with the regulations and permits detailed in **Section 5**. A turbidity curtain will be installed between the dredge area and the breakwater kelp bed to minimize impacts to the kelp, eelgrass, and abalone. Return water from the placement area will be filtered through a geotextile fabric, to reduce turbidity from the return water from the cotnainment area. The dredge operator will maintain a spill response plan and spill control materials on-site and implement best management practices. If needed, harbor lights will be turned on at dusk, and left on until after dawn, to avoid impacts to animals.

7. REFERENCES

30th Space Wing Installation Management Flight, 2021, *Biological Assessment – Harbor Maintenance Dredging at Vandenberg Air Force Base. Santa Barbara County, California*.

AECOM, 2021, *Post- Construction Eelgrass Survey Report. V-33 Harbor Maintenance Dredging Project, South Base Harbor, Vandenberg Space Force Base, Santa Barbara County, California*. United Launch Alliance, LLC. December 16.

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NMFS, 2014, *California Eelgrass Mitigation Policy. National Marine Fisheries Service, West Coast Region, Long Beach, California*, 12th Revision.

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UCSC, 2017, Assessment of the *Vandenberg Air Force Base Harbor for Presence of the Federally Endangered Black Abalone (Haliotis cracherodii): Potential Effect of Dredging Activities, University of California, Santa Cruz*, March.

UCSC, 2018, *Assessment of the Vandenberg Air Force Base Harbor for Presence of the Federally Endangered Black Abalone (Haliotis cracherodii): Potential Effect of Dredging Activities University of California, Santa Cruz*, November.

USACE, 2017, Vandenberg Harbor Dredge Permit No. SPL-2007-00689-JWM, Issued by the United States Army Corps of Engineers.

ATTACHMENT A. 2022 Essential Fish Habitat Assessment with Eelgrass Monitoring Plan

Essential Fish Habitat Assessment
Vandenberg Harbor Maintenance Dredge
10 August 2022

INTRODUCTION

Vandenberg Space Force Base (VSFB) occupies approximately 99,100 acres of central Santa Barbara County, California. The primary mission of VSFB is to support space and missile launch operations. Space Force Delta 30 at VSFB is the AF Space Command organization responsible for Department of Defense (DOD) space and missile launch activities on the West Coast. Satellites destined for polar or near-polar orbit are launched from VSFB. Vandenberg SFB supports West Coast launch activities for the AF, SF, the DOD, the Missile Defense Agency, the National Aeronautics and Space Administration, foreign nations, and various private industry contractors.

The Vandenberg harbor is located on south VSFB, approximately 16.1 kilometers (10 miles) northeast of Point Conception and 4.8 kilometers (3 miles) southeast of Point Arguello (Figure 1). Through the last approximately 25 years, the primary military mission of the Vandenberg harbor has been to receive shipments, including Common Booster Cores (CBCs) from a specially designed ship, the *Delta Mariner*. The *Delta Mariner* has an absolute minimum draft of roughly 8 feet and a working minimum draft of roughly 9 feet. Other vessels entering the harbor may have similar draft specifications.

FEDERAL AUTHORITIES

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) section 305(b)(2) requires federal agencies to consult with NOAA Fisheries on any action or proposed action authorized, funded, or undertaken by such agency that may adversely affect essential fish habitat (EFH). This process is guided by the requirements of EFH regulation at 50 CFR 600.905, which mandates the preparation of EFH assessments and generally outlines each agency's obligations in the consultation process.

The Fish and Wildlife Coordination Act (FWCA) requires that all federal agencies consult with NOAA Fisheries when proposed actions might result in modifications to a natural stream or body of water. The FWCA also requires that federal agencies consider the effects that these projects would have on fish and wildlife.

Abbreviated EFH Consultations (50 CFR 600.920 (h)) serves to provide information on potential effects to resources considered under the FWCA. Abbreviated consultation procedures can be used when federal actions do not have the potential to cause substantial adverse effects on EFH and when adverse effects could be alleviated through minor modifications. This document is provided to support an abbreviated consultation to fully assess the effects of the proposed action on EFH. VSFB has utilized the best available science in the assessment of this project and the creation of this document.

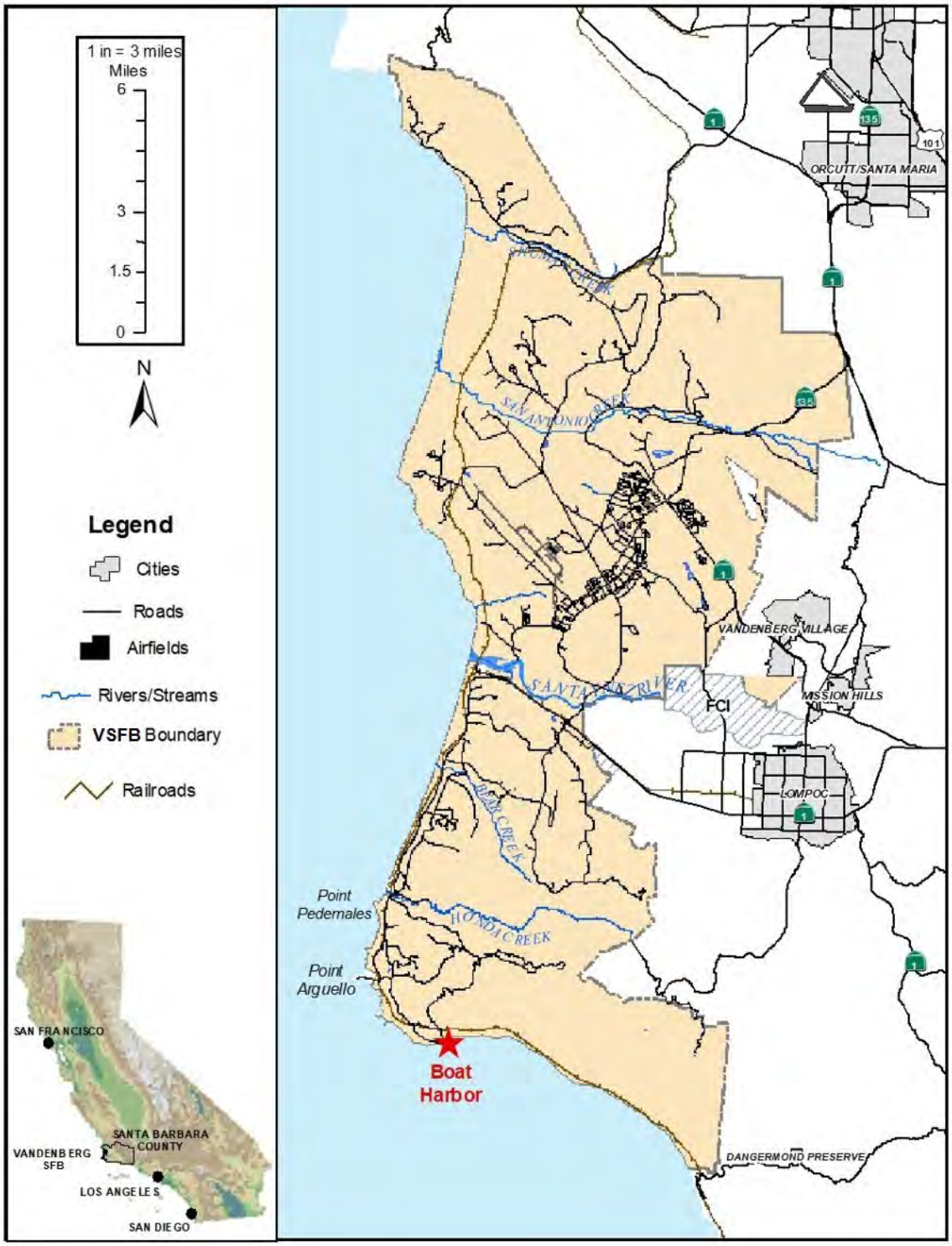

Figure 1. Regional location of VSFB and the harbor.

PURPOSE AND NEED

At VSFB, the 7-acre harbor with a dredge maintenance area of 3.5 acres must be maintained at an adequate depth to accommodate vessels entering the boat harbor (Figure 2). Dredging frequency is

expected to be similar, possibly once per year and occasionally three times per year. The amount of sediment dredged would not exceed a maximum of 10,000 cubic yards (cy) annually. Several new and in-development space launch programs have indicated interest and/or a pending requirement for using the harbor, which may result in the need for more frequent dredging. If dredging is not maintained as needed, several DoD, NASA and private space launch programs at VSFB would need to be modified or terminated. Historically, the harbor has been dredged only 9 times since 2001 (Table 1), with only one year (2017) having more than one dredge event.

Because the VSFB harbor is located along a very dynamic section of the California coast, sand movement causes sediments to accumulate in the boat harbor as soon as dredging is complete and the sedimentation rate in the harbor is highly variable. The harbor will need to be re-dredged to its original working depth of approximately 10 feet mean lower low water (MLLW) plus a 2-foot overdredge as necessary to accommodate vessel usage. Figure 2 shows the various physical features within the harbor and 3.5-acre dredge maintenance area which is the action area.

The 2017 dredge permit, Regional General Permit (RGP) 71 issued by the United States Army Corps of Engineers (USACE, Corps) expires in December 2022. The 10-year Boat Harbor Maintenance Dredging Plan is developed to support dredge events at the boat harbor starting in January 2023 with similar parameters and activities as RGP 71.

Table 1: Dredge history since 2001, one dredge event per year shown, except 2017.

Year	Month(s)	Cubic Yards dredged
2001	October	16,000
2002	December	1,500
2009	July-August	2,655
2011	July-August	5,055
2014	August-September	4,229
2017	March	250
2017	November	263
2020	March	69.5
2021	July-August	585

Figure 2. Map showing the 3.5-acre Vandenberg harbor maintenance dredge area.

PROJECT DESCRIPTION

The project includes dredging up to 10,000 cubic yards (cy) of sediment annually from an approximately 3.5 acre subtidal area in the Vandenberg harbor to -10 feet mean lower low water (MLLW) plus a maximum two-foot overdepth allowance (for a total depth of -12 feet MLLW**).** Similar to the previous maintenance dredging program, maintenance dredging would be performed in the same 3.5-acre dredge area with similar equipment and methods as used during prior dredge events. Each dredging event would include:

- Cutting kelp. Kelp is cut just above the root ball by hand with divers. If hauled off-base to a compost/green waste or reuse facility, kelp will be transported on a small skiff, bundled, and placed on the dock for dewatering. Alternatively, kelp may be transported offshore nearby off of Vandenberg's shoreline. Note: Kelp is also cut prior to vessel entry when no dredge is required.
- Install a turbidity curtain between the dredging area and the breakwater kelp bed to protect the kelp mitigation area.
- Use of a clamshell bucket on a dock-mounted crane to dredge an approximately 70-foot radius area adjacent to the dock face.
- If necessary, a longer boom would be added to the dock mounted crane, in combination with a smaller clamshell bucket to remove small amounts of sediment from an approximately 200-foot radius area.
- If necessary, a barge-mounted crane and clamshell bucket would be used to dredge areas that fall outside the reach of the dock-mounted crane. The barge would be powered by a tugboat or skiff and dredged sediment would be placed on a separate barge. The separate barge would be pushed to the dock by the tugboat and unloaded onto the dock using a dock-mounted crane and bucket to a designated dewatering site.
- Dredged sediment would be temporarily stockpiled (several days) in a designated area of the dock for dewatering.
- Return water from the stockpile would be directed back to the harbor using K-rail diversions.
- Dried sediment would be loaded and transported upland to the former Pt. Pedernales quarry via existing access roads. Disposal of sediment at this site would restore the site to its original topographic contours.

Prior to entrance of a vessel that requires use of the mooring dolphins, harbor mooring dolphins may be cleaned. A boat would transport personnel and a power washer and/or bucket to each dolphin during mid to high tide. Sea water (no soap) and a minimal amount of potable water would be used to wash dolphins. Accessing the top of each dolphin (6 total) may be required to achieve proper cleaning. Cleaning is expected to take approximately one day.

In addition to the installation of a turbidity curtain mentioned above, minimization measures for essential fish habitat (EFH) include:

- Pre- and post-construction eelgrass surveys in accordance with the attached Eelgrass Monitoring Plan (Appendix A) and concurrent observational determination of caulerpa presence or absence.
- Monitoring of eelgrass in accordance with the Eelgrass Monitoring Plan (Appendix A) in the maintenance dredge area.
- If impacts to eelgrass are found based on monitoring results, Vandenberg will coordinate further with NMFS.
- If presence of *Caulerpa* are found, further coordination with NMFS will occur.
- Best Management Practices will be implemented to minimize the risk of fuel/oil spills. Spill clean-up materials will be maintained on-site for emergency clean-up. Contractor will have a spill response plan prepared and be in the immediate area at all times.

ESSENTIAL FISH HABITAT DESCRIPTION

Background

In 2001, an analysis of EFH was prepared in support of the Final Environmental Assessment for Harbor Activities Associated with the Delta IV Program (ENSR 2001). NMFS indicated that the proposed action

would adversely affect EFH for at least 18 federally managed fish species within the Coastal Pelagics and Pacific Groundfish Fisheries Management Plans (FMP). The project also occurred in kelp canopy designated as a habitat area of particular concern for various federally managed fish species within the Pacific Groundfish FMP and EFH prey species foraging on infaunal and bottom-dwelling organisms. No eelgrass (*Zostera* sp.) or caulerpa (*Caulerpa* sp.) were observed during this survey.

Pursuant to section 305 (B)(4)(A) of the Magnuson-Stevens Fishery Conservation and Management Act, two conservation mitigations were implemented to avoid, mitigate or otherwise offset adverse effects to EFH:

1. The Kelp Mitigation Plan (ENSR 2002) was implemented and completed in 2009 to minimize temporal losses associated with the 2001 kelp habitat impact.
2. Pre- and post-project kelp surveys were conducted to determine whether impacts exceeded the previous 0.27-acre dredge impact area.

As specified in the 2002 Kelp Mitigation Plan, 150 tons of boulders were placed within an approximately 0.4-acre sandy mitigation area between the dolphins and breakwater to provide substrate for kelp recruitment. Surveys conducted in March 2010 indicated that 1.05 acres of kelp canopy established in the project area that is 0.34 acre greater than pre-project survey cover. Consistent with the Kelp Mitigation Plan, in 2010 NMFS concluded that no further mitigation is required. The colony was observed flourishing within the mitigation area based on ground-based visual observations prior to 2018.

Existing Conditions

Based on 2019 aerial imagery there was an estimated 0.64 acres of kelp cover in mid-September (Figure 3) within the maintenance dredge area and mitigation area. Kelp canopy with giant kelp (*Macrocystis pyrifera*) in these areas have flourished. RGP 71 issued in December 2017 required pre- and post-construction eelgrass surveys. Based on 2021 post-dredge surveys, kelp canopy in the 0.89-acre reference area between the dolphins and breakwater increased 0.27 acres (1,128 m^2) and increased 20% in the overall survey area of 2.77 acres.

Eelgrass observed during the surveys has been associated with openings in the kelp canopy (AECOM 2021a). The Eelgrass Surveys and Results section below describes results of the surveys. Formal surveys for *Caulerpa taxifolia* were not required but certified Caulerpa surveyors watchful during all eelgrass surveys found no individuals of Caulerpa species (AECOM 2021a). Substrates within the project site are primarily sandy, with rocky substrates in the areas immediately adjacent to the dock. Other marine vegetation observed during the 2021 survey included surf grass (*Phyllospadix* sp.), wire weed (*Sargassum muticum*), and tangle (*Laminaria* sp.) (AECOM 2021a). All seaweed species were found in sparse numbers and often associated with rocky substrates. Incidental wildlife observed in 2021 pre- and post-dredge surveys are listed in Table 2.

Figure 3. Aerial imagery taken mid-September 2019 showing the kelp canopy within the Maintenance Dredge Area and Mitigation Area.

Table 2. Incidental wildlife observations in 2021 within the study area (AECOM 2021a).

Scientific Name	Common Name	Pre-dredge *(June-July 2021)*	Post-dredge *(August 2021)*
Invertebrates			
Anthopleura sola	Sunburst anemone	X	X
Piaster ochraceus	Ochre star	X	X
Asterina miniate	Bat star	X	X
***Doris/Peltodoris* spp.**	Sea lemon	X	
Aplysia californica	California sea hare	X	
Norrisia norrisi	Norris topsnail	X	X
Olivella biplicata	Olivella	X	X
Euspira lewisii	Moon snail	X	X
Thylacodes squamigerus	Scaled wormsnail		X
Mytolius californianus	California mussel	X	X
Haliotis rufescens	Red abalone	X	
Chthamalus dalli	Little brown barnacle	X	X
Pugettia producta	Shield-backed kelp crab	X	
Cancer gracilis	Slender crab	X	X
Pachygrapsus crassipes	Striped shore crab	X	X
Fish			
Sebastes atrovirens	Kelp rockfish	X	X
Sebastes serranoides	Olive rockfish	X	
Rhacochilus vacca	Pile perch	X	
Embiotica jacksoni	Black perch	X	
Amphistichus argenteus	Barred surfperch	X	
Brachyistius frenatus	Kelp surfperch	X	
Heterostichus rostratus	Giant kelpfish	X	X
Paralichthys californicus	Halibut	X	X
Scorpeanichthys marmorata	Cabezon	X	X
***Porichthys* sp.**	Midshipman		X
Myliobatis californica	Bat ray	X	X
Birds			
Arenaria melanocephala	Black turnstone		X
Sebastes atrovirens	California brown pelican	X	X
Larus heermanni	Heerman's gull	X	X
Larus occidentalis	Western gull	X	X
Phalacrocorax pelagicus	Pelagic cormorant	X	X
Pandion haliaetus	Osprey		X
Mammals			
Phoca vitulina	Pacific harbor seal	X	X

Eelgrass Surveys and Results

Surveys for two dredge events under RGP 71, one dredge occurring February 21 through March 3, 2020 and the second from July 23 through August 2, 2021 were conducted in accordance with the California Eelgrass mitigation Policy (CEMP; NMFS 2014) to determine the presence and impact of dredging operations on eelgrass beds. The surveys consisted of a primary 1.25-acre dredge project site, plus 0.89-acre reference and 0.63-acre north buffer areas. The primary transect area of potential effect directly in

front of the boat dock is smaller than the 3.5-acre maintenance area. Figure 3 provides a comparison of the dredge areal extent in 2020 and 2021 where 69.5 cy of sediment covering 1820 square meters (m^2) (0.45 acres) were dredged in 2020 and 585 cy covering 825 m^2 (0.20 acres) were dredged in 2021. No eelgrass gets cut during kelp cutting and no turions were observed damaged during post-dredge surveys (AECOM a and b). Pre-dredge surveys were conducted on April 27-28, 2022 for an anticipated mid-June 2022 dredge, however, no dredge is needed based on recent bathymetric surveys; only kelp will be cut in mid-June.

Figure 3. Dredge areal extent for 2020 and 2021 (GIS data from AECOM 2021a & b).

For the 2020 dredge event, eelgrass was observed during the pre-dredge survey on February 3, 2020. Due to COVID-19 travel restrictions and with approval by NMFS, the post-dredge survey occurred during the optimal survey period on June 30, 2020. The extended time beyond 60-days post-dredge and during the optimal survey period may have contributed to the amount of eelgrass cover observed with no net loss (see Table 3). Due to turbidity and weather conditions only 30% coverage was achieved. In coordination with NMFS, side scan sonar was recommended for the next dredge in 2021. Following the 2021 dredge event, the post-dredge survey occurred August 18-19, 2021. Although there was a loss of 129.64 m^2 eelgrass spatial distribution within the dredge extent area, there was an increase of 171.23 m^2 in the project survey area (Figure 4). This loss may reflect the close timeline to the dredged event. It was noted that the close proximity of the reference area with eelgrass may provide source eelgrass for expansion into the project site. Table 3 provides results of the 2020 and 2021 eelgrass surveys. Figure 4 provides a comparison of the dredge areal extent in 2020 and 2021.

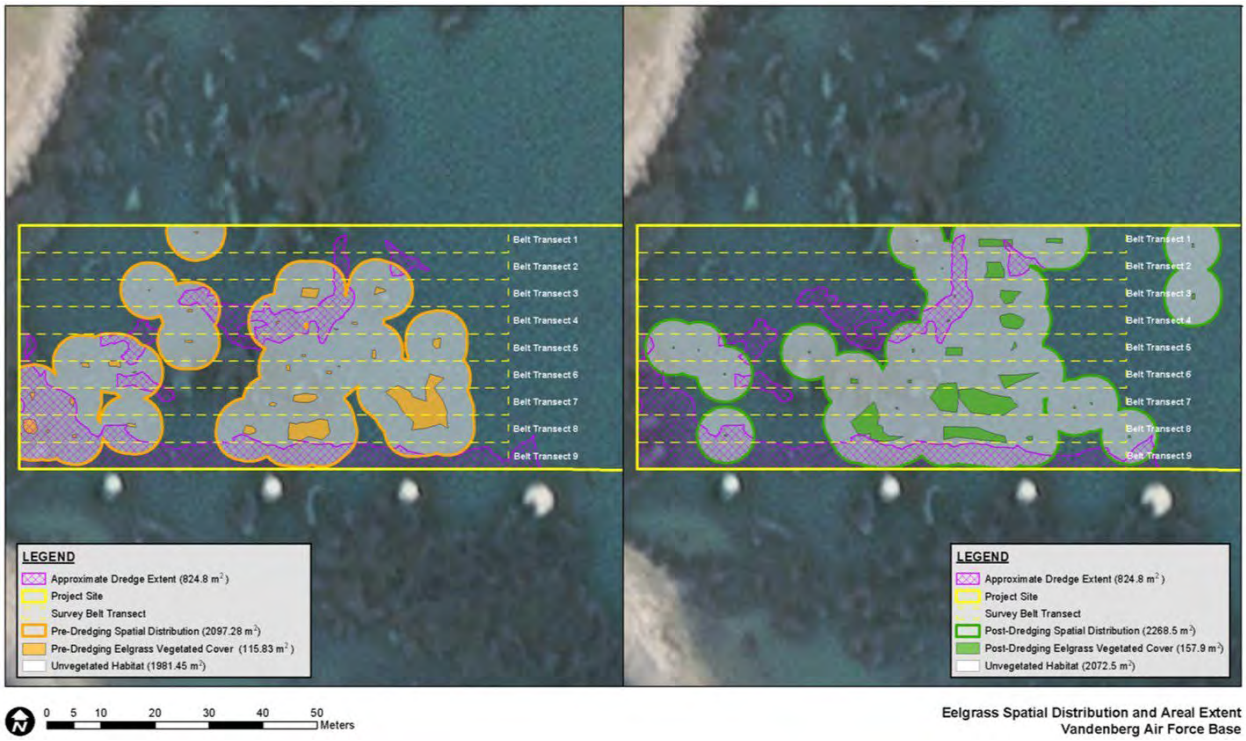

Figure 4. Eelgrass spatial distribution and dredge aereal extent, 2021 dredge (AECOM 2021a).

Table 3. Results of pre- and post-construction eelgrass surveys in 2020 and 2021 (AECOM 2021b, 2021a). The project survey area is 5,060 m^2 and the dredge extent area (footprint) is 824.5 m^2.

Eelgrass Survey Parameters	Change over time from Pre- to Post-Dredge Surveys		
		2020	**2021**
Eelgrass Spatial Distribution (m^2)	Project Survey Area	1,055.97	171.23
	Dredge Extent Area	514.35	-129.64
Eelgrass Aereal Extent			
Vegetated Cover (m^2)	Project Survey Area	-2.63	42.05
	Dredge Extent Area	-7.88	-7.17
Unvegetated Habitat (m^2)	Project Survey Area	1,058.60	94.05
	Dredge Extent Area	506.48	-122.47
Percent Vegetation Cover (%)	Project Survey Area	-0.96%	+1.44%
	Dredge Extent Area	-2.07%	-1.44%
Mean Turion Density (turions/m^2)	Project Survey Area	14.16	-31.46
	Dredge Extent Area	15.33	Not reported

* Mean turion density within eelgrass beds could not be measured for the project site buffer because no beds were of sufficient size to conduct density transects following the same methodology as utilized for the reference site and project site.

Results for the northern buffer area and reference site were provided in the 2021 post-construction eelgrass report along with additional survey details. Pre- and Post-construction eelgrass surveys within the project site did not have a significant adverse effect on eelgrass with increases in both vegetated cover (115.83 m^2 pre-dredge vs. 157.88 m^2 post-dredge) and spatial distribution (2,097.27 m^2 pre-dredge vs. 2,268.50 m^2 post-dredge). Overall, 2021 data suggests that the vegetated cover of eelgrass beds within the study area expanded between pre- and post-construction surveys, increasing their ecological function and value compared with smaller beds and isolated turions. Based on these observations, the recommendations indicated that it is not anticipated that compensatory mitigation is necessary for project-related impacts to eelgrass (AECOM 2021a).

EFFECTS ANALYSIS

Dredge maintenance activities of the 3.5-acre dredge maintenance area will result in a temporary reduction to essential fish habitat in the area. Within the 3.5-acre dredge maintenance area a smaller primary dredge area directly in front of the boat dock is typically dredged in part depending on bathymetric survey results. The kelp mitigation area continues to thrive and provides a source for kelp re-colonization into the active dredge area. Any kelp taken off shore along Vandenberg's coastline will provide ecological benefit for invertebrate and wildlife habitat on the ocean surface, surf zone, and along the shoreline, as well as provide detritus and carbon sequestration at the ocean bottom. Some marine invertebrates and wildlife would temporarily be displaced during kelp cutting and dredge operations. Eelgrass present in the mitigation reference area provides a source for eelgrass re-colonization into the dredge area and the northern buffer area is also thriving. Minimization measures will reduce dredge impacts and pre- and post-dredge eelgrass surveys with hull-mounted side scan and single beam sonar will provide trends on habitat stability to inform actions that could eliminate the impact over time. Because of the temporary nature of the effects on kelp, eelgrass, and marine wildlife with recolonization and minimization measures, effects of this project on EFH including eelgrass are expected to be minimal.

CONCLUSION

Direct adverse effects on EFH will be limited to temporary disturbance in the 3.5-acre dredge maintenance area. Dredge activities are expected to be similar to past dredge events and will not exceed 10,000 cy of sediment removed annually. With the minimization measures that include reducing turbidity and pre-and post-construction eelgrass surveys, there will be only minor adverse impacts to EFH and the annual monitoring surveys will contribute toward informed trends on habitat stability.

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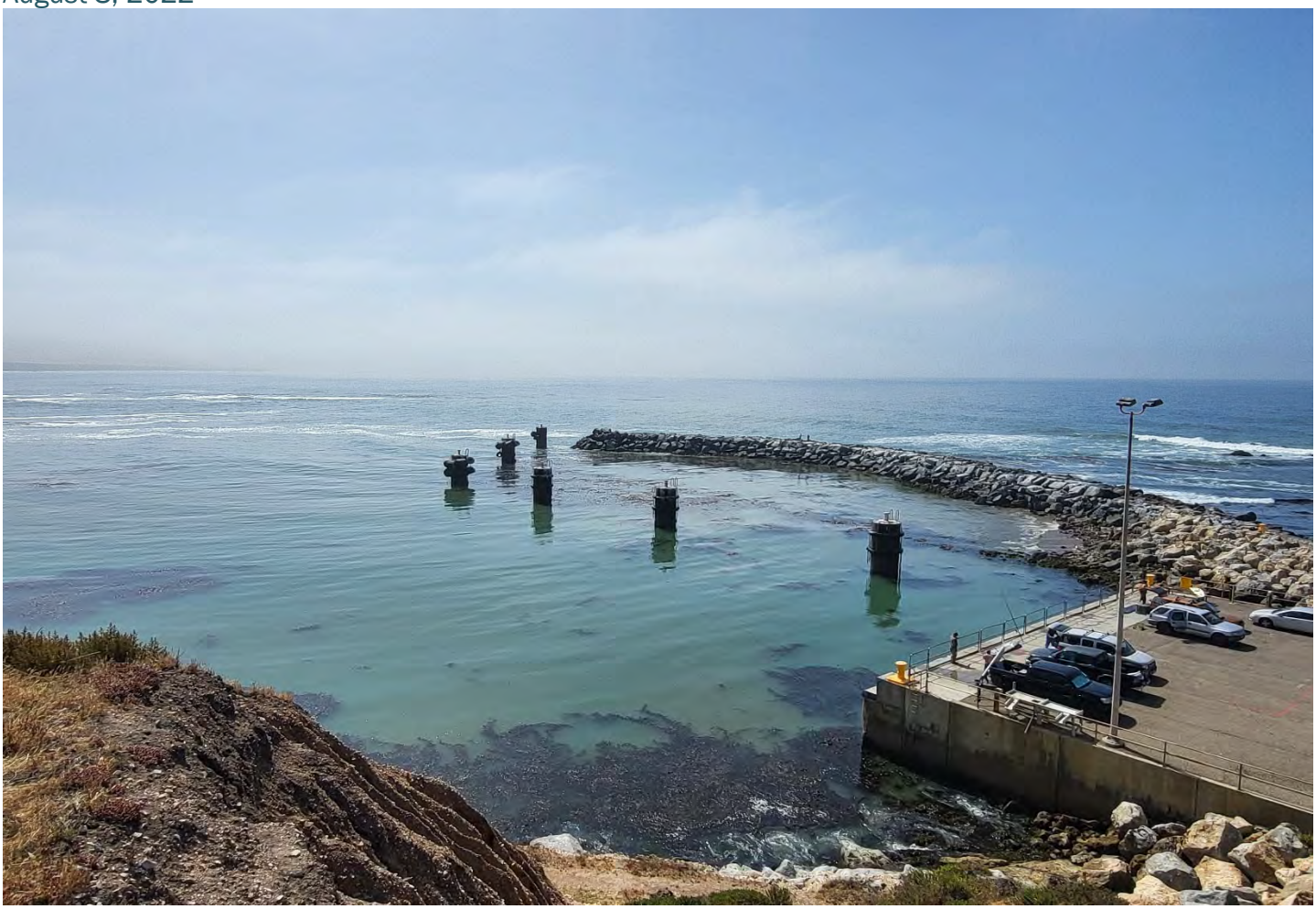
APPENDIX A

EELGRASS MONITORING PLAN

VANDENBERG HARBOR MAINTENANCE DREDGE
EELGRASS MONITORING PLAN

August 8, 2022



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1.0 INTRODUCTION

Vandenberg Space Force Base (VSFB) is located near Pt. Conception in central California. Since base inception in 1941 as Camp Cooke, Vandenberg has provided support to various Department of Defense (DOD) and civilian entities that has included training, logistics support, launch support, and testing. Vandenberg Harbor (site) was built in 1981 to provide waterside access for delivering supplies critical to the United States Space Force (USSF) mission (Figure 1). The Vandenberg Harbor dock facility is occasionally used to load and offload supplies, rockets, and other large equipment that necessitates water-based transportation.

To support the various loading and offloading activities at the harbor, maintenance dredging is necessary to maintain safe working depths and access to the dock structure (Figure 2). Due to natural processes around the Pt. Conception area, sediment transport is continually occurring. This natural process acts to infill the VSFB harbor dock area. Therefore, dredging of the harbor is needed about every 18-24 months. The permitted maintenance depth of the site is -10 feet (ft) mean lower low water (MLLW) and includes a -2 ft overdredge allowance.

Eelgrass beds are critical habitat for several fish species managed under the Magnuson-Stevens Fishery Conservation and Management Act (MSA) and have been found within the maintenance dredge depths associated with the project (AECOM, 2021). Due to the important ecological role eelgrass has in the lifecycles of juvenile and adult fish, it is designated as Essential Fish Habitat (EFH), and subsequently managed by the National Marine Fisheries Service (NMFS). As part of the ecological role eelgrass habitat provides, any maintenance activities that occur in the water that directly or indirectly impact eelgrass during dredging would necessitate a monitoring and mitigation program in accordance with the NMFS California Eelgrass Mitigation Policy (CEMP) adopted in 2014 (NMFS, 2014). The following plan describes a monitoring and mitigation strategy for Vandenberg Harbor, a CEMP-compliant approach to eelgrass monitoring to provide a pathway for assessment over the duration of the dredge permit.

1.1 Project Description

The Vandenberg Harbor maintenance dredge area encompasses a total area of approximately 3.5 acres; However, maintenance dredging only occurs in those areas necessitating removal, meaning much of the dredge area is not subject to bottom disturbance depending on infill. Sediment volumes and targeted dredge areas are estimated from bathymetry data collected to determine the existing conditions at the time. Since 2001, dredging of Vandenberg Harbor has removed a total of 25,552 cubic yards (CY) of sediment. Dredging is primarily accomplished from the dock, using a crane. However, if and when weather permits, dredging may also be conducted from a dredge barge in the harbor to the permitted depth of 10 ft MLLW. Currently, a regional general permit (RGP-71) is in place, but it expires in 2022.

In accordance with the CEMP monitoring requirements, pre- and post-dredge eelgrass surveys of the maintenance dredge area for the previous dredge cycle were conducted in 2021. The maintenance dredge area is defined as the maximum extent of the dredge project area, where equipment and dredging may happen. The area of potential effect (APE) is the anticipated area of sediment removal. Two CEMP-compliant methods were used, diver surveys and towed side scan sonar, which were completed independently of each other. Survey results found low densities of eelgrass within the dredge area.

2.0 POTENTIAL FOR IMPACTS

The project has the highest potential for *localized temporary impacts* to existing eelgrass communities from:

- Physical disturbance associated with mechanical clamshell dredging
- Increased turbidity in the water column during sediment removal
- Turbidity from prop wash
- Shading from work equipment
- Physical impacts from anchor and anchor chain (or spuds if used)
- Physical grounding of construction vessels in shallow waters, and prop scars

One measure of the degradation of existing eelgrass habitat is a *permanent* reduction of eelgrass turion density greater than 25 percent, and a turion density that is significantly statistically different from pre-impact density (CEMP, 2014). The monitoring methods proposed here are designed to identify status and trends of eelgrass around the harbor that may experience direct or indirect impacts when dredging is undertaken. Through a comprehensive approach that captures non-dredge status as well as the pre-dredge condition, both the USSF and NMFS will have the data necessary to effectively manage the marine resources of the harbor.

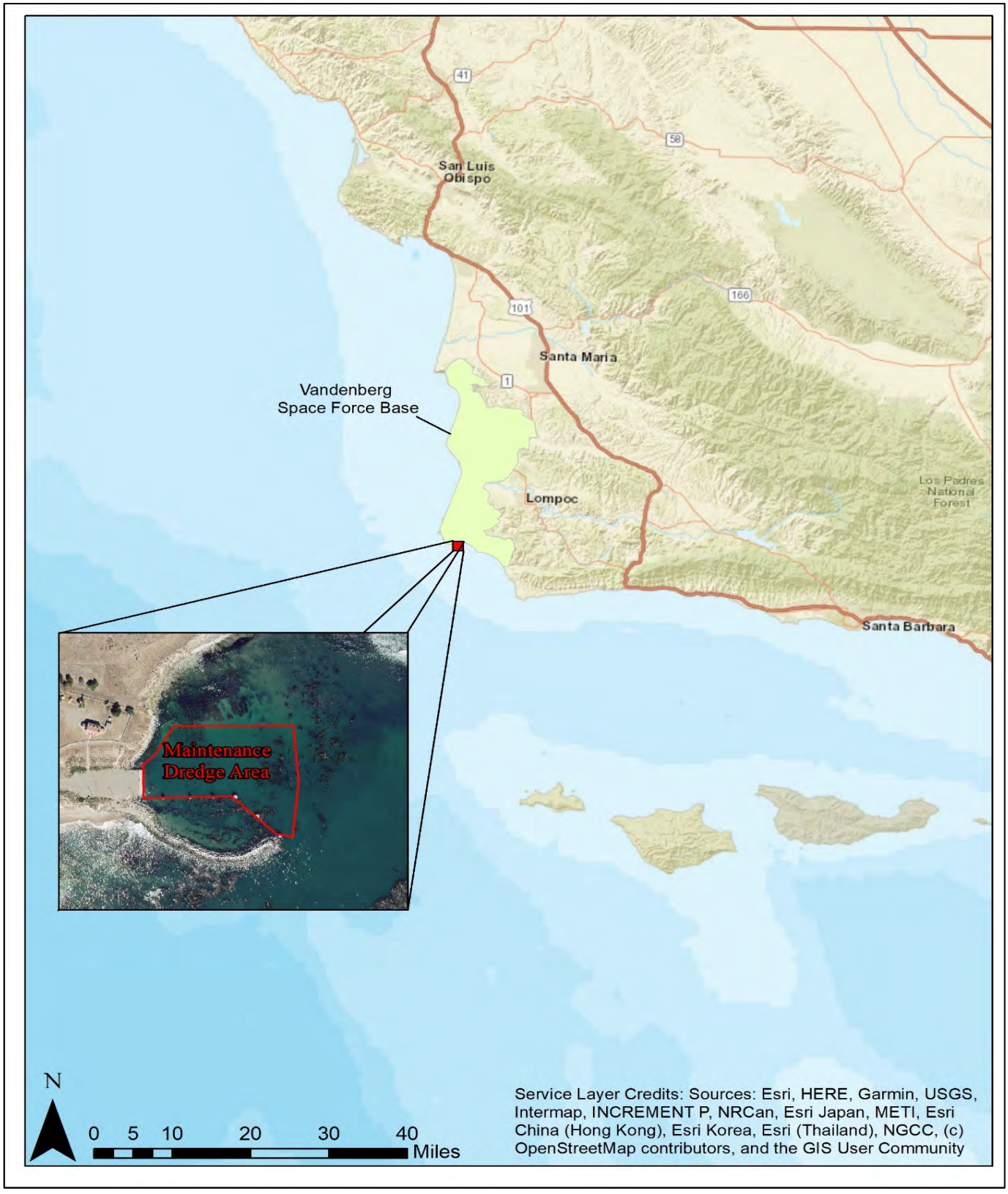

Figure 1. Overview Map of the Vandenberg Harbor Project Area

3.0 EELGRASS MONITORING APPROACH

Eelgrass and eelgrass habitat exist in various densities within the Vandenberg Harbor dredge APE and maintenance dredge area. Previous eelgrass surveys of the APE have documented the occurrence of both *Zostera marina* and *Zostera pacifica* in the harbor. The current monitoring approach described here has been tailored to the site and incorporates lessons learned from previous surveys to increase the quality of the acoustic data.

The monitoring approach described herein is specifically designed to monitor in and around the project area which has abundant kelp throughout the maintenance dredge area and can suffer from poor in-water visibility due to wave action and winds. The approach detailed provides necessary information on the status and trends of eelgrass at the site during non-dredge years, and includes standard CEMP pre- and post-dredge survey methods to meet agency survey requirements when dredging is expected to occur.

CEMP-required eelgrass monitoring metrics are defined by NMFS as:

- **Spatial Distribution -** Contiguous boundaries around all areas of eelgrass cover extending outward a distance of 5 meters (m), excluding gaps within the vegetated cover that have individual plants greater than 10 m [away] from neighboring plants
- **Areal Extent -** The quantitative area of the spatial distribution boundary polygon
- **Percent Cover -** Eelgrass vegetated cover exists when one or more turions per square meter are present. The percent bottom cover within eelgrass habitat should be determined by totaling the area of vegetated eelgrass cover and dividing this by the total eelgrass habitat area.
- **Turion Density -** Turion density is the mean number of eelgrass shoots or blades per square meter within mapped eelgrass vegetated cover.

To provide a standardized but flexible approach to monitoring eelgrass at the site, four (4) permanent monitoring transects will be established. Figure 3 provides an overview of the spatial distribution of transects at the site. Transect 1 (T1) is the northernmost transect and aimed to help quantify existing conditions outside the APE but within the maintenance dredge area. Transect 2 and Transect 3 (T2 and T3) are directly within the APE and will provide repeated measures within the area of anticipated disturbance. The Reference Transect (T-Ref) is located outside the APE, and for the purposes of eelgrass monitoring, will serve as the undisturbed reference condition to assess natural variability of eelgrass densities and distribution at the site.

3.1 Monitoring Methods

The monitoring methods described here are consistent with regionally accepted underwater survey protocols, and the eelgrass survey methodologies detailed in the CEMP. Table 1 summarizes the methods to be used for surveys during dredge and non-dredge periods.

3.1.1 Status and Trends

During non-dredge years, kayak-based acoustic surveys will be performed using a hull-mounted 455/800 kHz side scan sonar (or similar). As previous surveys have had difficulties towing a sonar through the kelp, hull-mounted sonars will help alleviate this concern and add greater utility to the side scan sonar data collected. Surveys will be performed parallel to the shore, along parallel survey transects T2 and T3. Side scan will allow for acoustic imaging throughout the APE and unblocked portions of the maintenance dredge area. However, the interpretable swath width of the survey track will be dependent on water depth and obstructions, The swath width of the side scan sonar

will range from 50-foot-wide to 100-foot-wide on either side of the kayak. Additional acoustic transects (T-Ref and T1) will be completed adjacent to the centerline of the channel to identify existing eelgrass beds that may be directly/indirectly affected by dredge activities either through increased turbidity and/or shading from boat or barge activity.

Side scan sonar survey data will be reviewed in real time and stored on non-volatile memory. Acoustic data will be post-processed for slant range and along track correction using Sonar Wiz by Chesapeake Technology and imported into ESRI ArcGIS for calculating spatial distribution and areal extent.

Acoustic surveys will be coupled with visual verification (i.e., ground-truthed) using a remotely operated vehicle (ROV) or drop camera with real-time viewing and recording capability. Visual confirmation will occur on each transect surveyed to ensure that acoustic data interpreted to be eelgrass is, in fact, eelgrass. Visual confirmation will document fish, invertebrates, submerged aquatic vegetation, and non-native algae at the site that are observed while confirming acoustic data. Non-native algae include but are not limited to *Undaria pinnatifida*, *Caulerpa* spp., and *Sargassum* spp. if observed at the site.

3.1.2 Pre- and Post-Dredge

During periods when dredging is anticipated to occur, pre- and post-dredge surveys of the entire dredge APE will be completed using a single beam sonar, and confirmed with visual verification turion counts when needed. Single beam data will be collected using a Biosonic MX scientific echosounder or similar single beam acoustic method that can detect eelgrass. The Biosonic MX is purposely designed to survey for submerged aquatic vegetation. Single beam sonar data will be analyzed using Biosonic Visual Habitat software. The Biosonic Visual Habitat software is programmed to parse out submerged aquatic vegetation (e.g., eelgrass) acoustic signatures contained in the survey files, and estimate vegetation metrics of percent cover, bottom type, and height above substrate.

Minute variations in the intensity of acoustic return and the time of flight of the acoustic signal are analyzed to estimate vegetative percent cover. Sequential pings are compared using rising edge processing to evaluate height above substrate for eelgrass where it was present. The Rising Edge Threshold (dB) method uses the first acoustic signal that is higher than the specified value as the bottom echo, and width is then tested against the Rising Edge Length Criterion (10 centimeter [cm]) and the Rising Edge Search Window (100 cm) values. Percent cover (and height above substrate) will be averaged and imported into ESRI ArcGIS for spatial analysis.

3.1.2.1 Turion Counts

Turions (e.g., eelgrass blades or shoots) will be counted by divers during dredge years, when impacts to existing eelgrass communities are possible. Divers will survey along transects that are within the APE, and previously identified using the acoustic survey methods. Using the acoustic data to guide divers will aid in plant detection and reduce dive time. Eelgrass densities will be counted using a 0.25m^2 PVC quadrat. The quadrat will be placed along the survey transect at even intervals along the transect. Depth will be determined using the diver's depth gauge and observations of visibility, flora, or fauna will be noted. Divers conducting turion counts will document fish, invertebrates, submerged aquatic vegetation, and non-native algae that are observed during the turion counts. Non-native algae include but are not limited to *Undaria pinnatifida*, *Caulerpa* spp., and *Sargassum* spp. if observed at the site.

Table 1. Monitoring Methods and Data Type Collected

Survey Type	Survey Methods	Spatial Distribution	Areal Coverage	% Cover	Turion Counts
Status and Trends (Non-Dredge)	Side Scan Sonar + Visual Verification	X	X	X	
Pre-/Post-Dredge	Single Beam + Visual Verification + Turion Density	X	X	X	X

3.2 Monitoring Frequency

Eelgrass monitoring will be conducted annually. All annual surveys will collect the core monitoring metrics of areal extent, spatial distribution, and percent cover using both the single beam and side scan sonar methods, coupled with visual verification. Turions counts will only be conducted in those years when dredging is expected to occur.

3.2.1 Status and Trends

Status and trend surveys of Vandenberg Harbor will be conducted annually during the high growth period of the year, preferably between June and September. Annual monitoring will consist of acoustic surveys along three (3) established transects within the maintenance dredge area (T1, T2, and T3) and 1 transect within the reference area (T-Ref), as depicted in Figure 3. Using the side scan sonar and single beam acoustic survey methods, coupled with visual confirmation in seasons when no dredging is planned, annual surveys will quantify spatial distribution, areal extent, and percent cover as part of an annual status and trends-type approach.

3.2.2 Pre- and Post-Dredge

Pre- and post-impact surveys will be conducted in periods when dredging is expected to happen. Pre- and post-dredge surveys will utilize the same methods as non-dredge annual surveys and incorporate turion counts. Turion density will be reported as a mean ± the standard deviation of replicate measurements. Transect locations will be based on the established transects at the site. These may be shifted slightly if/when vegetated areas have been identified using the side scan and/or single beam sonars.

3.3 Reference Area

As part of the status and trends and pre-/post-dredge monitoring, a reference transect (T-Ref) within the reference area will be included and surveyed concurrently with surveys within the maintenance dredge area. The reference area serves as an indicator of natural conditions. Inclusion of the reference area into the surveys helps parse out natural processes which may be influencing either the abundance or distribution of eelgrass at the site. Eelgrass attenuation (or growth) attributed to variations in natural processes can be identified and qualified as non-project-related fluctuations in eelgrass community structure.

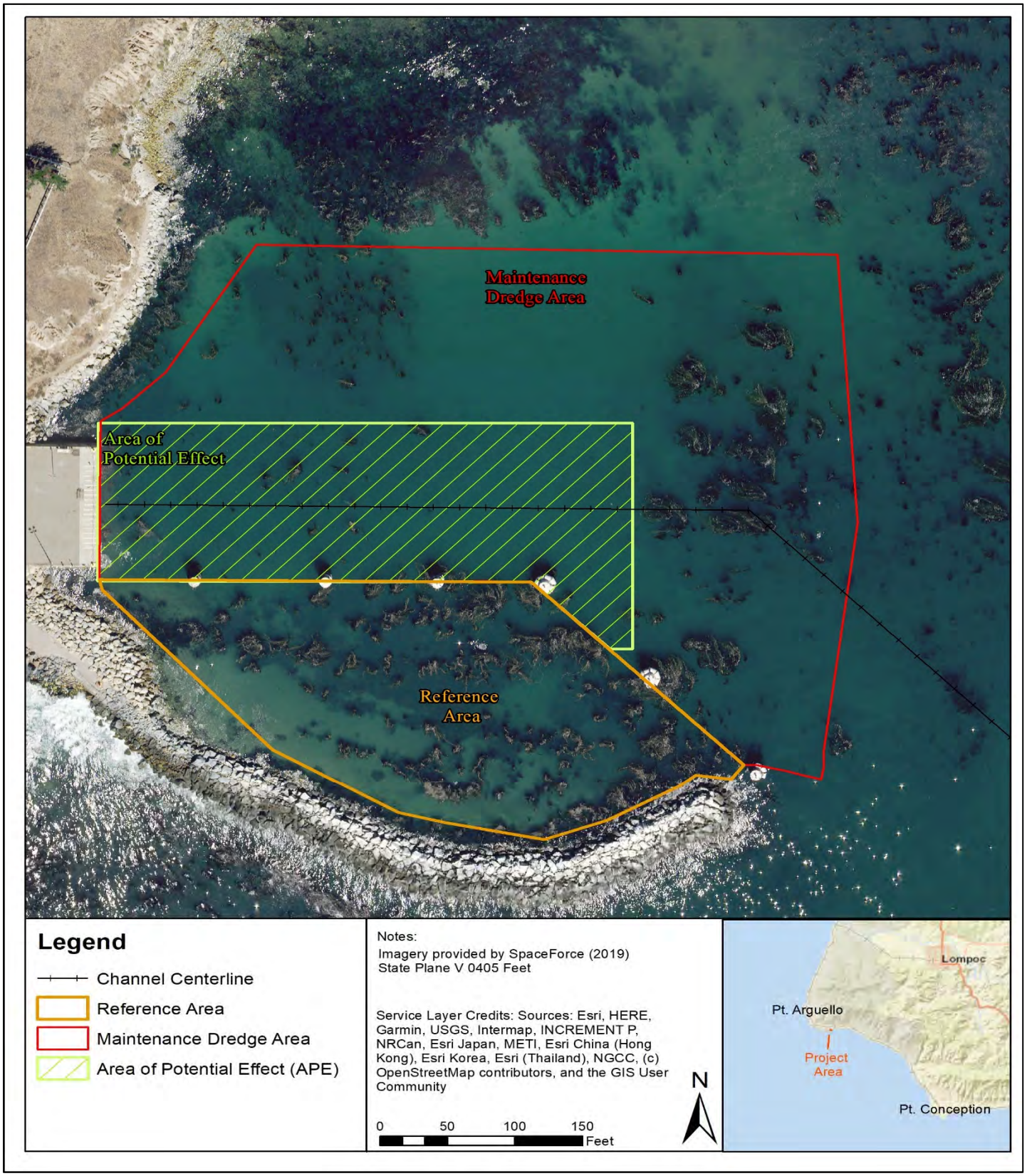

Figure 2. Vandenberg Harbor Eelgrass Area of Potential Effect

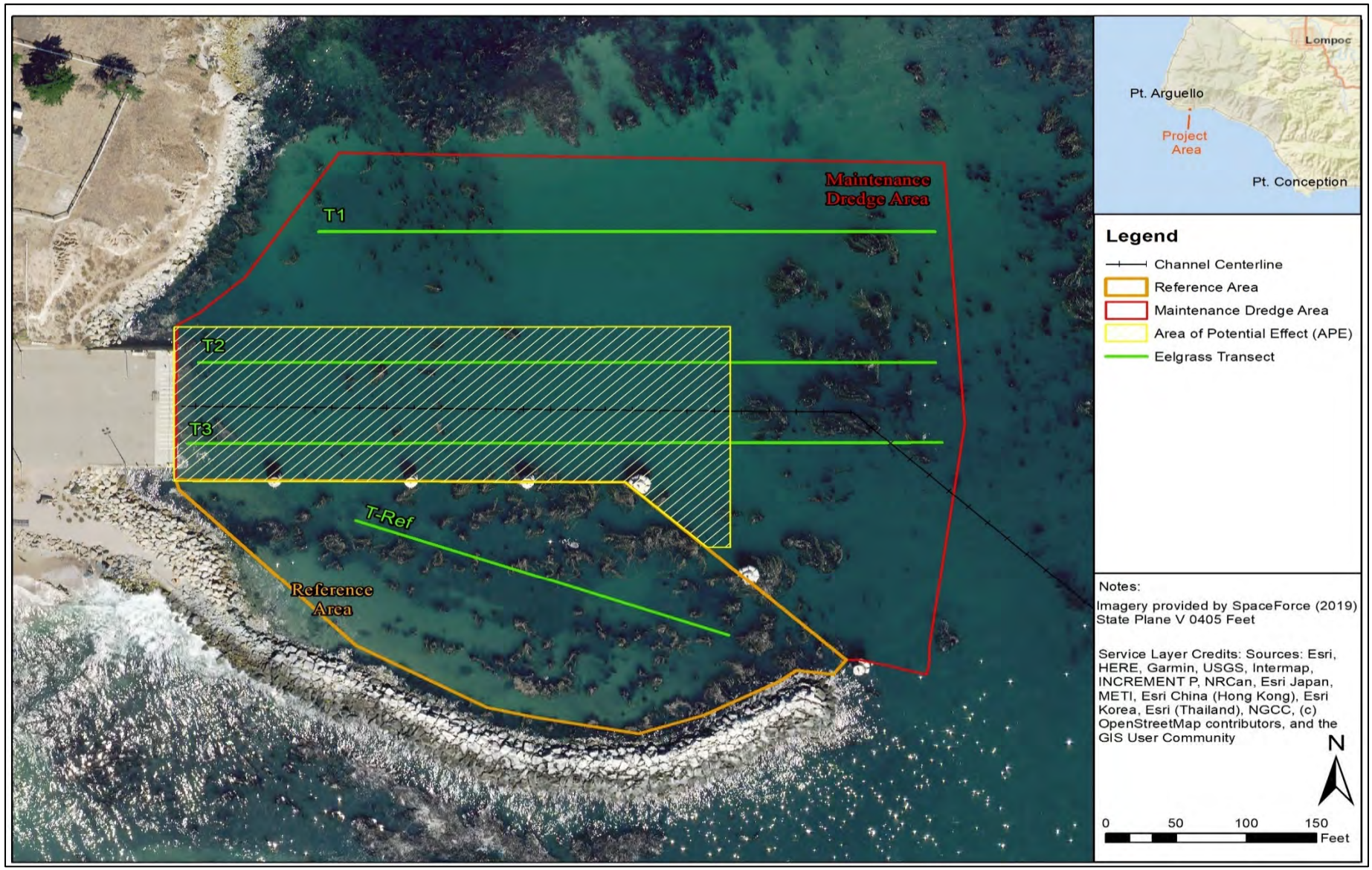

Figure 3. Vandenberg Harbor Eelgrass Monitoring Transects

4.0 REPORTING

Results of eelgrass monitoring will be compiled into a comprehensive monitoring report that details the completed surveys including CEMP-required monitoring metrics and includes maps and figures relevant to the evaluation of eelgrass communities at the site.

Status and trends monitoring reports will provide a detailed narrative of survey methods and current survey results, as well as provide a comparison with previous data, and emphasize the CEMP monitoring metrics of spatial distribution, areal extent, and percent cover.

Pre- and post-dredge surveys will similarly focus on reporting the CEMP metrics and will additionally provide a comparison of pre-dredge and post-dredge turion densities and associated ranges and standard deviations. Monitoring reports will be submitted to NMFS and will provide an overall assessment of the eelgrass communities at the site, relative to natural variability.

5.0 DREDGE BEST MANAGEMENT PRACTICES

The harbor maintenance dredge project is a short-duration, low-volume dredging event. Some short-term and localized impacts are expected within the APE, however, if appropriate best management practices (BMPs) are utilized during the construction process, both direct and indirect effects from physical disturbance and turbidity within the larger maintenance dredge area caused by dredging will also be lessened.

Proposed BMPs include use of turbidity booms around the reference area, to minimize the potential for impacts to more permanent and established eelgrass habitat, and could further include marking the perimeters of eelgrass beds with buoys prior to construction. The barge will only operate directly over eelgrass beds in tides that decrease the likelihood of damage from grounding or propwash occurring when eelgrass has been determined to be present within the maintenance dredge area.

6.0 POTENTIAL MITIGATION

If results of pre- and post-dredge surveys suggest there have been impacts to eelgrass at the site necessitating some type of mitigation, VSFB will consult with NMFS directly. It is possible that a full mitigation plan would need to be developed, which would include but not be limited to these items detailed in the CEMP:

- Description of the project area
- Results of preliminary eelgrass survey and pre-/post-project eelgrass surveys if available
- Description of projected and/or documented eelgrass impacts
- Description of proposed mitigation site and reference site(s)
- Description of proposed mitigation methods
- Construction schedule, including specific starting and ending dates for all work including mitigation activities
- Schedule and description of proposed post-project monitoring and when results will be provided to NMFS
- Schedule and description of process for coordination with NMFS through mitigation implementation
- Description of alternative contingent mitigation or adaptive management should mitigation effort fail to achieve performance measures

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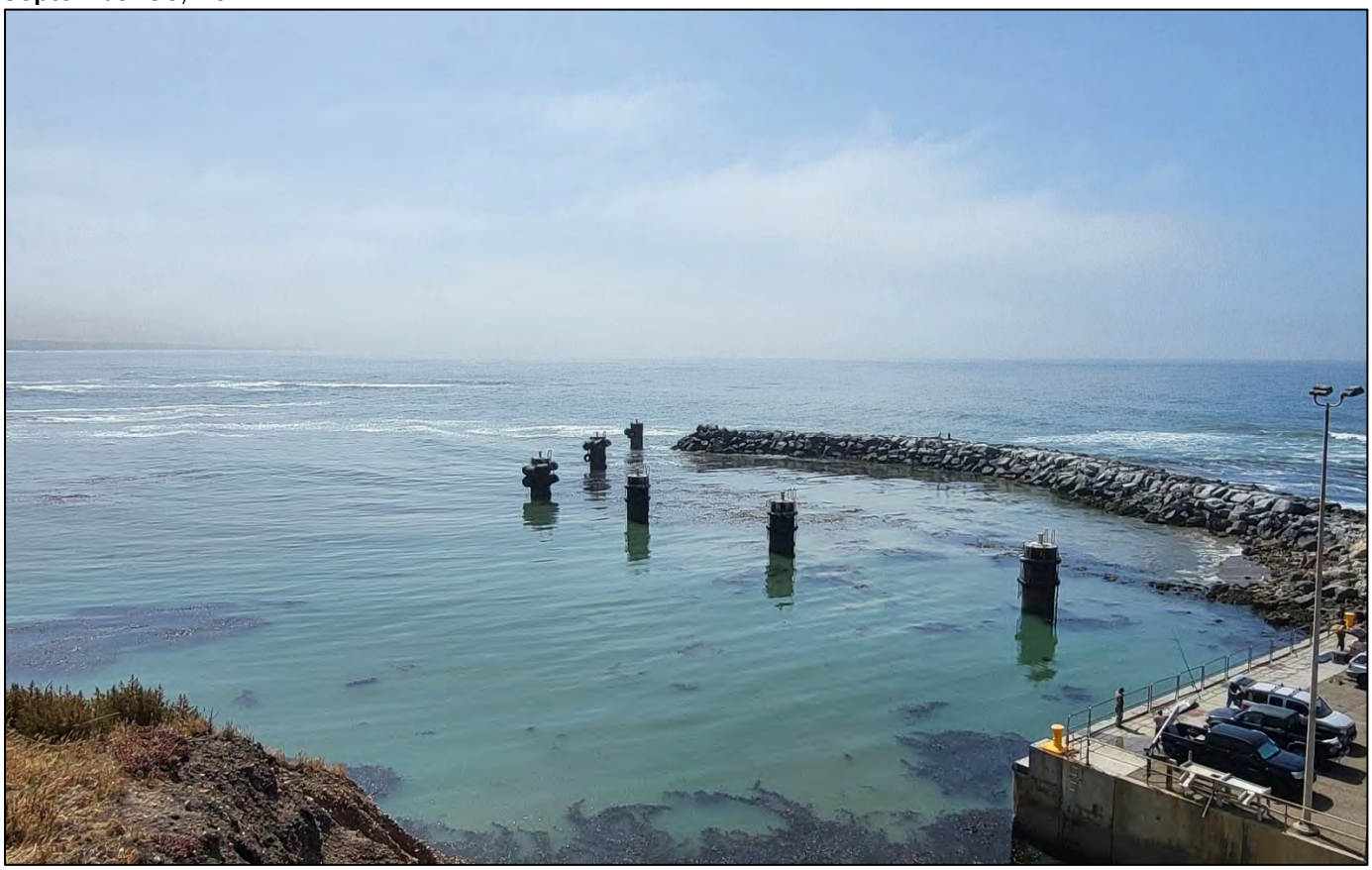
ATTACHMENT B. 2022 Sediment Sampling and Analysis Plan

US Space Force

VANDENBERG HARBOR MAINTENANCE DREDGE SAMPLING AND ANALYSIS PLAN

September 30, 2022



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1.0 INTRODUCTION

The Vandenberg Space Force Base is located near Point (Pt.) Conception in central California. Since base inception in 1941 as Camp Cooke, Vandenberg has provided support to various Department of Defense (DOD) and civilian entities that has included training, logistics support, launch support, and testing. The Vandenberg boat harbor (harbor) was built in 1981 to provide waterside access for delivering supplies critical to the United States Space Force (USSF) mission (Figure 1). The harbor dock facility is routinely used to load and offload supplies, rockets, and other large equipment that necessitates water-based transportation.

To support the various loading and offloading activities at the docks, semi-routine maintenance dredging is necessary to maintain safe working depths and access to the dock structure. However, natural processes transport sediment into the docking area of the harbor, which can impede vessel loading and offloading operations at the site. Therefore, periodic maintenance dredging is needed prior to vessel entry. The permitted maintenance depth of the site is 10 feet (ft) mean lower low water (MLLW) and includes a 2 ft overdredge allowance. Dredged material will be taken upland to Pt. Pedernales for disposal.

This sampling and analysis plan (SAP) describes the methods of collections and analysis to characterize sediments within the harbor near Pt. Conception. It has been prepared consistent with guidance provided in a joint special notice for regionally developed sampling and analysis plan/results promulgated by the United States Army Corps of Engineers (USACE) Los Angeles (LA) District, and EPA Region 9 (USACE 2021), and with consultations with the agencies. The SAP presented here is intended to support a 10-year permit cycle, to allow for greater flexibility if/when there are modifications to the existing plan.

1.1 Project Summary

Since 2017, maintenance dredging of the harbor has been permitted under the USACE LA District Regional General Permit No. 71 (RGP-71), which expires in 2022. The need for dredging the harbor is based on bathymetric survey data, and the need to accommodate vessel entry. If vessel entry is required, and dredging is necessary, it can occur at any time of the year.

Dredging is accomplished in in one of two ways: a dock-mounted crane can remove sediments close to the docks, and within 200 feet of the bulkhead, or, when weather permits, a barge-mounted crane and clamshell can also be used as part of the maintenance dredge program (Figure 2). Given the proximity to Pt. Conception, if/when barge-mounted cranes are used, the optimal time for transporting barges and scows to the site would be between June and September. Dredged material will be beneficially reused at Pt. Pedernales.

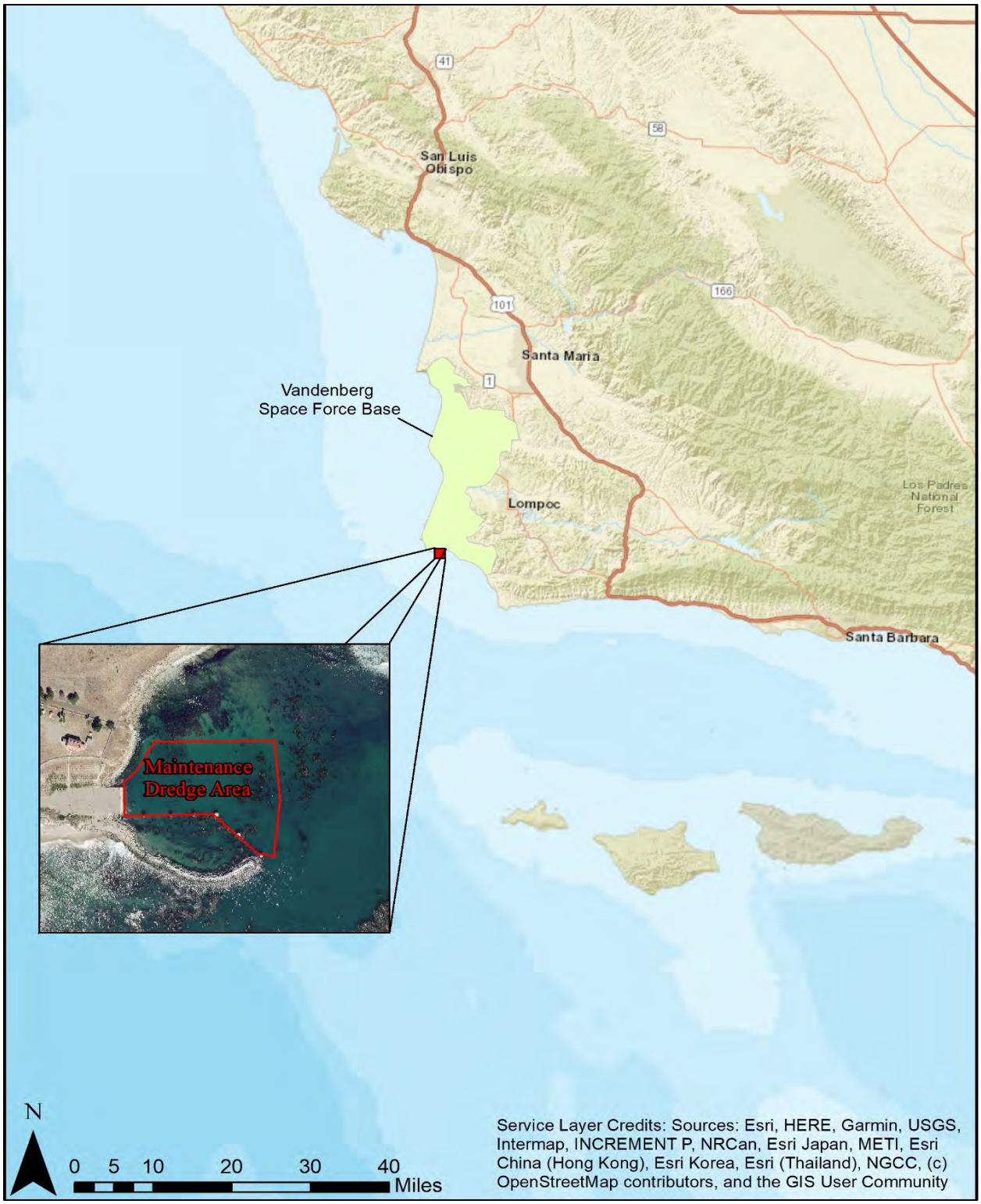

Figure 1. Harbor Project Area Overview Map

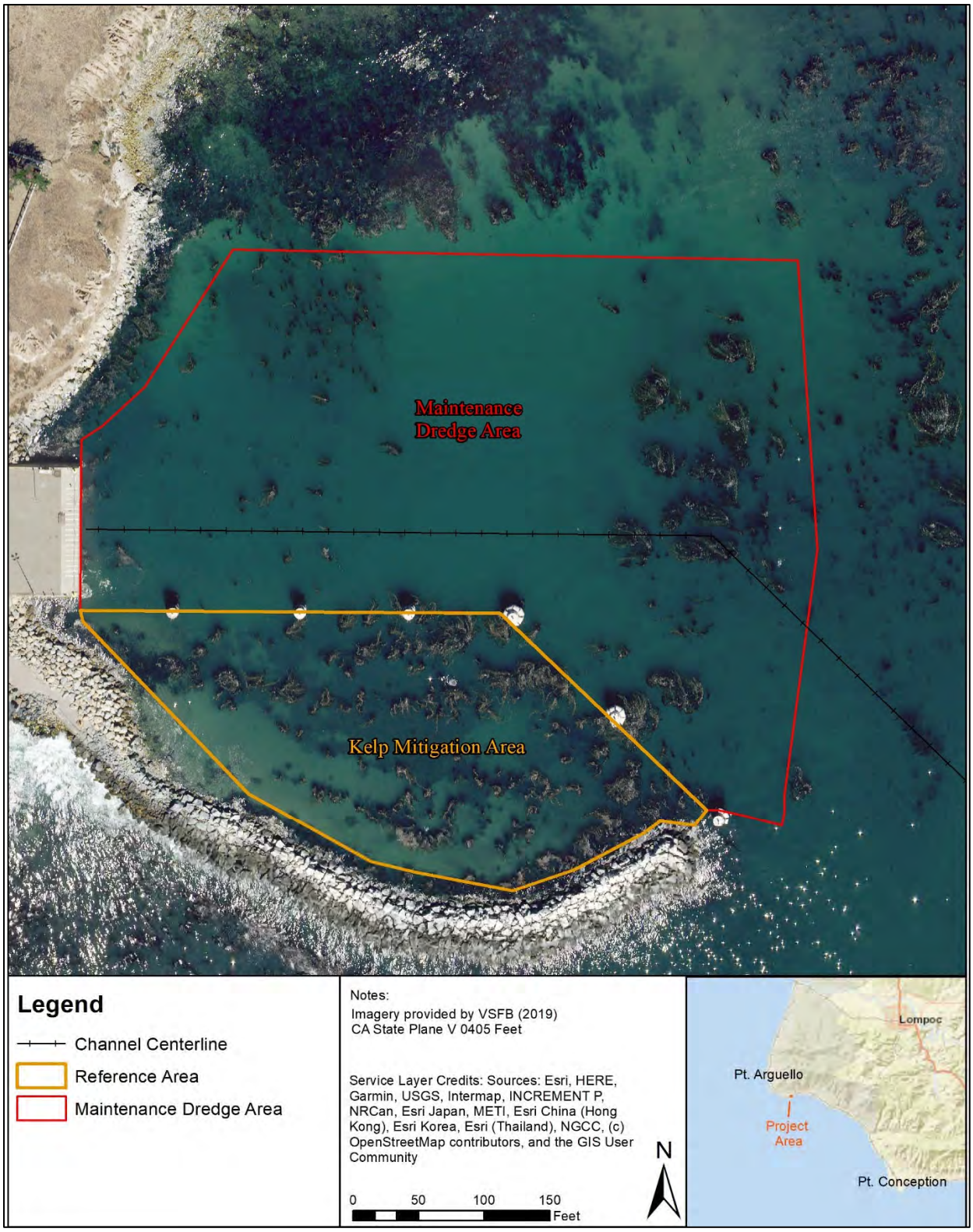

Figure 2. Harbor Maintenance Dredge Area

1.2 Roles and Responsibilities

To provide data for Southern California Dredged Material Management Team (SC-DMMT) suitability determination, with the support of consultants, USSF has prepared a SAP to detail a sediment characterization study of appropriate size and scale to evaluate the chemical and physical characteristics of sediment to be dredged as part of the proposed maintenance dredging, when needed. To facilitate coordination, relevant project personnel are listed in Table 1.

Table 1. Harbor Sediment Characterization Project Contact List

Organization	Name, Title	Responsibility	Contact Information
USSF	Mr. Darryl York	Chief, Environmental	Email: darryl.york@spaceforce.mil Office: 805.605.2015
USSF	Ms. Luanne Lum	Botanist & Biological Scientist	Email: luanne.lum@spaceforce.mil Office: 805.606.5399

1.3 Notifications and Site Access

The field collection activities performed as part of the harbor dredge material characterization effort will require the project team to notify the appropriate parties prior to the start of the sampling event. The following procedures will be followed to provide ample notification of marine sampling activities to base security, and to facilitate uninterrupted sampling while the project area is unoccupied:

1. Prior to sampling, the designated field manager will coordinate with USSF personnel when the harbor will be unoccupied.
2. The field manager will provide the USSF with a detailed schedule and notification of sampling activities.
3. The USSF project representative will provide notification to base security of sampling activities, preferably at a minimum 48 hours prior to sampling activities.
4. Before sampling begins, field crews will notify base Security Forces Squadron by phone of the daily sampling schedule.

2.0 SITE HISTORY/EXISITNG DATA

Since 2001, there have been multiple sediment characterization projects completed at the site. As part of the consultation with the USACE in 2019, a review of all sediment sampling data collected from the site was provided in 2020 and is included as Attachment A.

In summary, the review provided by USSF stated that in 2019, grain size analysis showed that the material at the site is 98 percent (%) sand and 2% silt. Bulk sediment chemistry results from 1999

sediment core testing indicated high levels of metals, often exceeding the corresponding Effects-Range Low (ERL) concentration. This was true for arsenic, cadmium, chromium, copper, nickel, and zinc. However, none of the metals analyzed exceeded Effects-Range Median (ERM) screening concentrations.

However, since 2001, metals concentrations have steadily decreased based on individual core and composite sample analysis. Sediment collected in 1999, 2001, 2007, 2009, 2014, and 2019 are suggestive of an overall metal concentration reduction at the site. Table 2 provides the total volumes of material dredged to date from the site. A map of previously sampled locations completed by USSF and consultants within the maintenance dredge footprint is provided as Figure 3.

Table 2. Harbor Maintenance Dredge Total Volumes Since 2001

Year	Month of Dredging	Cubic Yards (CY) Dredged
2001	October	16,000
2002	December	1,500
2009	July-August	2,655
2011	July-August	5,055
2014	August-September	4,229
2017	March	250
2017	November	263
2020	March	69.5
2021	July-August	585

From 2001 to the last sampling event in 2019, sediment collections have been performed using a variety of collection methods, including both core and grab sampling. Within this time, there have been no introduced activities at the site, or adjacent to the site, which could act as a source of contaminants to the site sediments. Further, there are no documented reports of large spills within the harbor. Adjacent site activities are limited to grazing on the hillsides by cattle.

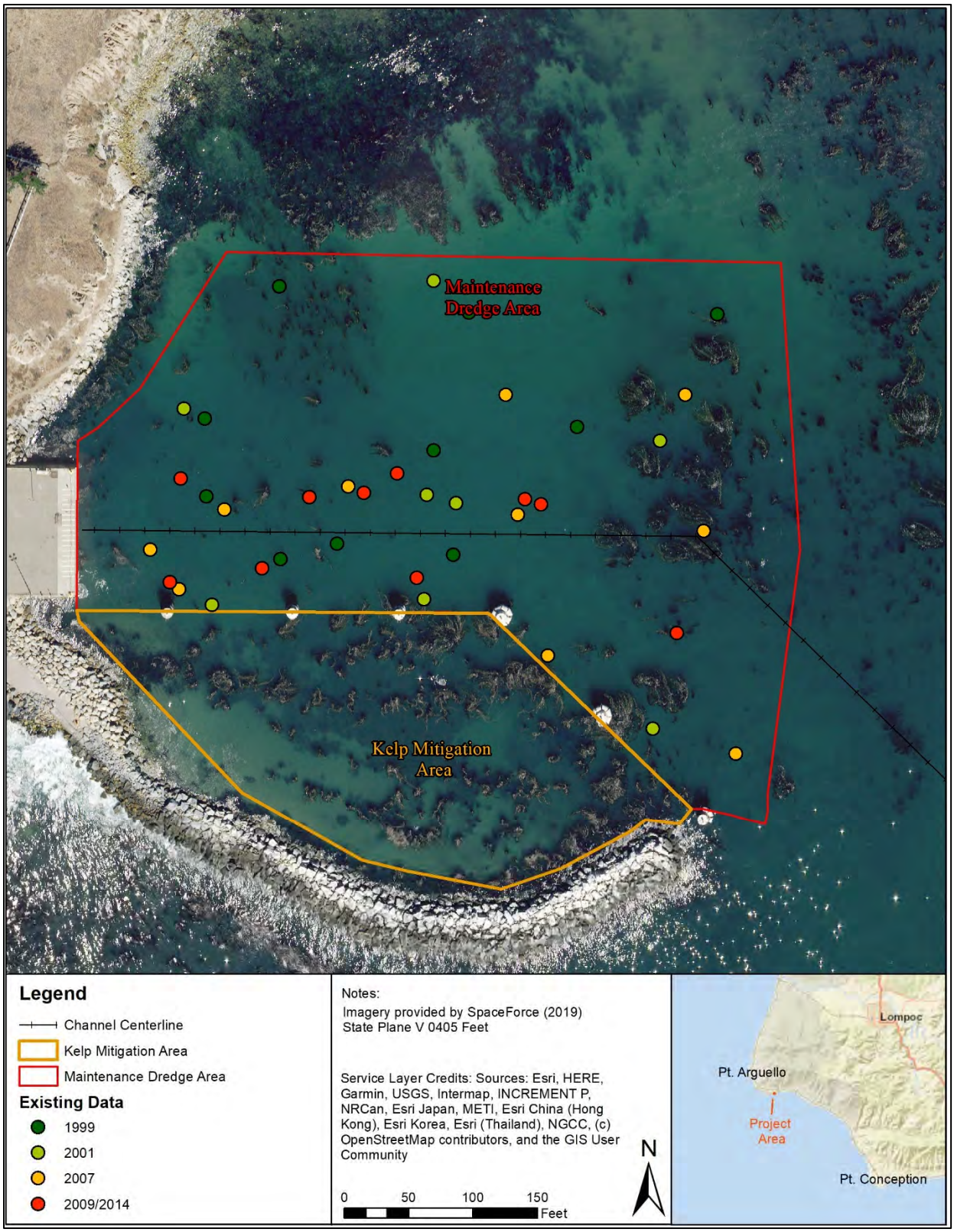

Figure 3. 1999 to 2014 Sediment Sampling Locations (2019 not shown)

3.0 METHODS

The data collected in support of this project will provide the SC-DMMT the necessary information to make a suitability determination based on established testing methodologies and analysis, promulgated by the United States Environmental Protection Agency (USEPA) and USACE, in accordance with regional guidance and local standards where they exist. The methods and approach proposed here are consistent with other sampling programs used at the site previously, and SAP preparation guidelines promulgated by the USACE LA District and the EPA Region 9.

3.1 Dredge Design

Harbor maintenance dredging is expected to generate less than 10,000 cubic yards (CY) of material annually. As detailed previously in Table 2, from 2002 to 2020 approximately 30,607 CY have been dredged from the site. During each of the 2002, 2009, 2011, 2014, 2017, and 2020 events, the dredged material was placed upland at nearby Pt. Pedernales (Figure 4).

3.2 Sample Design

The sampling design and methods to be used to collect, composite, and archive sediment samples from the harbor was based on existing data and previous approaches approved by the SC-DMMT for the site. Details on the proposed dredge volumes and target sample collection depths will be estimated from the most recent site bathymetry and will be provided to the contractor prior to sampling. USSF will provide the information when the data is available, or the site is updated. Sediment collection will follow guidance provided in *Methods for Collection, Storage and Manipulation of Sediments for Chemical and Toxicological Analyses: Technical Manual* (USEPA, 2001).

3.3 Sediment Sample Collection

The need for dredging is based on the most recent bathymetric surveys for the site and need for vessel entry. To provide a spatially representative approach, and taking into account previous survey results, six (6) sampling stations will be positioned throughout the maintenance dredge area. At the time of the SAP preparation, if the most recent bathymetric surveys have not been completed, the sampling locations are subject to change based on the updated bathymetric information for the site. Sampling stations will be placed within the area that are likely to be dredged (i.e., dredge footprint), as depicted in Figure 5, to provide the most representative samples for analysis as possible.

A single composite of the six stations sampled will be prepared and sent to a certified analytical laboratory for physical and chemical analysis. The composite sediment sample will be subjected to metals analysis and grain size.

Figure 4. Point Pedernales Upland Placement Site

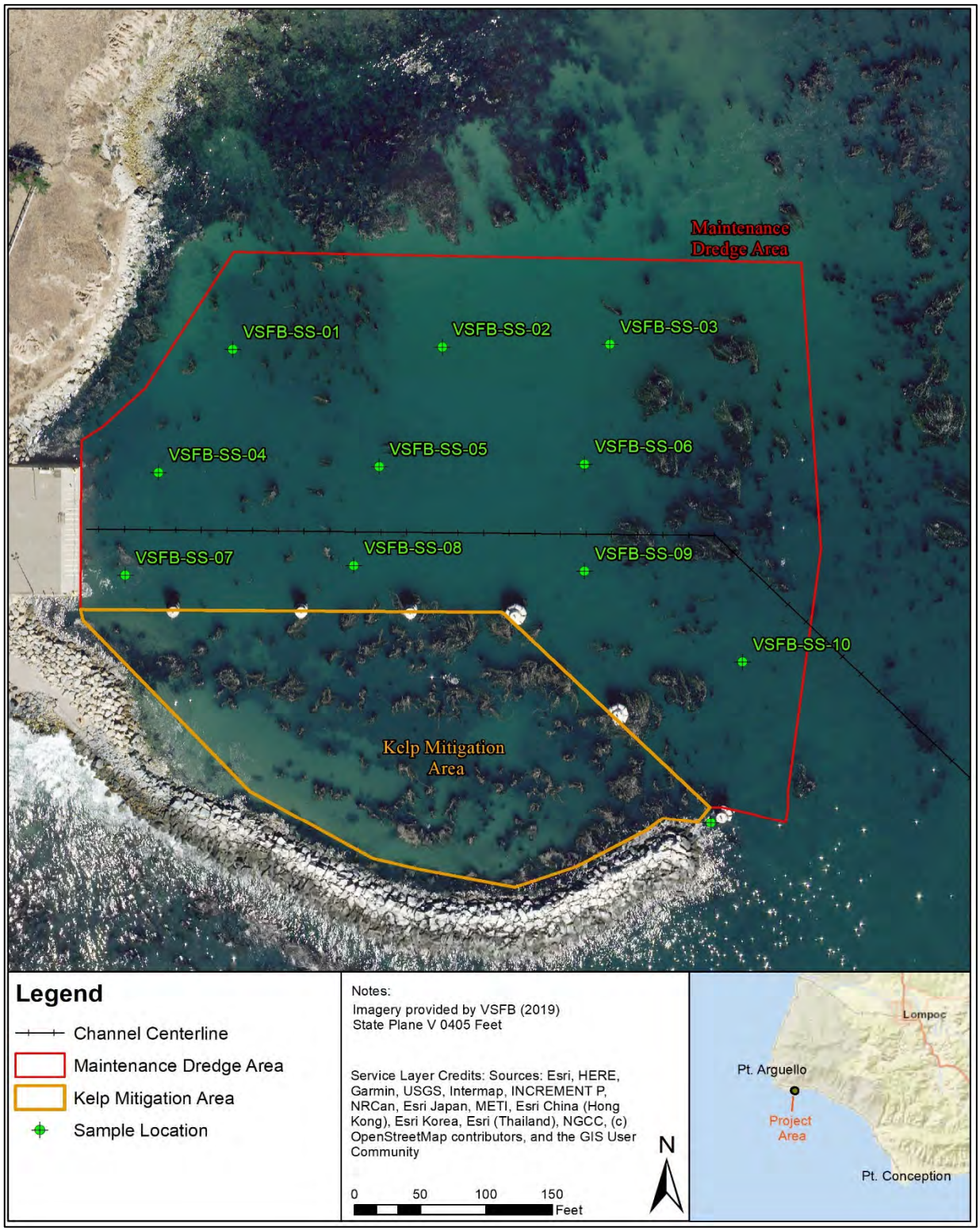

Figure 5. Harbor Sediment Sampling Locations

3.3.1 Sampling Vessel

Based on bathymetric data from the maintenance dredge area, the areas that are anticipated to undergo sediment removal (i.e., dredging) will have sediment samples collected. Field collections will be conducted from a vessel, or barge constructed onsite. The sampling platform will include a lifting davit and winch or A-frame to lift the sampler in and out of the water. Further, the sampling platform will include both a fresh and saltwater wash down, Global Positioning System (GPS), Automated Information System receiver, radar, and all United States Coast Guard required safety items.

3.3.2 Grab Sampler

Sediment will be collected using a stainless-steel Van Veen type grab sampler or equivalent. The grab sampler should have the ability to be deployed from the sampling vessels. The grab sampler should be kept in the jaws open position until contact is made with the bottom. A spring release or weighted pelican hook should release the jaws as the grab is pulled back to the surface, collecting the sediment inside the grab sampler. Multiple attempts with the grab sampler may be needed to provide a sufficient volume of material for chemical and physical analysis.

3.4 Composite Chemistry Analysis

In total, ten stations will be sampled within the maintenance dredge area. Target locations for the sampling locations are provided in Table 3. The sediment collected by the grab sampler will be logged, photographically archived, and individually processed. A homogenized sediment sample from an individual station will be composited with homogenized sediment from other individual stations to form a single composite sediment sample (e.g., VSFB-SS-C), for submission to the analytical laboratory. Proposed sample collection method, processing, and analysis for each station and the composite sample is provided in Table 4.

The single composite sample submitted to the analytical laboratory for the chemical and physical testing components of the sampling and analysis program, as proposed, will use an analytical laboratory that is approved by the state of California Environmental Laboratory Accreditation Program to perform chemical analysis on marine water and sediment samples.

3.4.1 Grain Size

In addition to the chemical sample, a grain size sample will be collected in a 1-gallon freezer bag. The grain size sample will be provided as a separate sample for physical analysis. The sample for grain size will be prepared from the homogenized composite sample. The grain size sample will be double bagged and labeled with the project name, date, time of preparation, and sample ID.

3.5 Field Log

To memorialize any information pertinent to the collection and/or interpretation of the results, a detailed field log describing the daily operations will be maintained by field scientists. The daily log will include information relevant to daily field operations including start and stop times, problems encountered, station relocation justifications, and other project relevant information. In addition to the daily log, detailed logs and notes specific to the sediment and water samples will be logged.

These logs and notes will include sample descriptions, sample photographs, sample GPS locations, and water depth. An example log has been provided in Attachment B.

Table 3. Proposed Sampling Locations, Dredge Depths, and Collection Volumes

Station ID	Latitude (WGS84)	Longitude (WGS84)	Existing Mudline Depth (ft MLLW) [1]	Maximum Dredge Depth (ft MLLW) [2]	Volume Needed for Chemical and Physical Testing
VSFB-SS-01	34° 33.326'	-120° 36.563'	-	-12.0	2.0 L Testing and Archive
VSFB-SS-02	34° 33.327'	-120° 36.531'	-	-12.0	
VSFB-SS-03	34° 33.327'	-120° 36.506'	-	-12.0	
VSFB-SS-04	34° 33.309'	-120° 36.573'	-	-12.0	
VSFB-SS-05	34° 33.311'	-120° 36.540'	-	-12.0	
VSFB-SS-06	34° 33.312'	-120° 36.509'	-	-12.0	
VSFB-SS-07	34° 33.296'	-120° 36.578'	-	-12.0	
VSFB-SS-08	34° 33.298'	-120° 36.544'	-	-12.0	
VSFB-SS-09	34° 33.298'	-120° 36.509'	-	-12.0	
VSFB-SS-10	34° 33.287	120° 36.484'	-	-12.0	

1. Mudline depth (bathymetry) estimated from USSF
2. Includes overdredge allowance

Table 4. Proposed Sampling, Collection Methods, and Analysis

Sample Matrix	Station ID	Sample Collection Method	Physical Analysis[1]	Chemical Analysis[1]	Archive
Sediment	VSFB-SS-01	Grab			X
Sediment	VSFB-SS-02				X
Sediment	VSFB-SS-03				X
Sediment	VSFB-SS-04				X
Sediment	VSFB-SS-05				X
Sediment	VSFB-SS-06				X
Sediment	VSFB-SS-07				X
Sediment	VSFB-SS-08				X
Sediment	VSFB-SS-09				X
Sediment	VSFB-SS-10				X
Sediment	VSFB-SS-C	Prepared	X	X	X

1. All chemical and physical testing to be performed by a certified laboratory

3.6 Water Depth and Geographic Location

To document collection within the potential dredge area, field crews will record both geographic position and water depth while onsite and prior to sample collection.

3.6.1 Water Depth

A weighted line will be used to measure the exact water depth at the time of sampling. The water depth will be recorded in the station field log. The tides will be subtracted from the water depth to calculate the tide-corrected depth of the existing mudline. The tide-corrected depth value determined in the field will be recorded as feet mean lower low water (ft MLLW).

3.6.2 Geographic Location

After the survey vessel has been properly secured on the target position, the latitude and longitude of the attempted grab will be recorded. Using the survey vessel GPS or a handheld unit, field crews will document the location of each station, or alternate stations if the target location is inaccessible. When possible, the accuracy of the GPS will also be recorded.

3.7 Sample Processing

During sediment or water quality sample processing, only clean, non-contaminating equipment will be used to collect, homogenize, and/or transfer or transport test samples. Samples collected from each station will be photographically archived and described by field staff, including the specifics of grab sampler penetration depth, grab acceptability, sediment type, color, and noticeable odors when applicable.

3.7.1 Sediment

Recovered sediment from each station will be added to a pre-cleaned mixing bowl and homogenized. A small amount of the homogenized sample will be removed and placed into a pre-labeled laboratory provided 8-ounce (oz) jar as an archive for the station. The remainder of the sediment will be transferred to a separate larger mixing bowl, and then mixed with additional stations from the site to generate the single composite sample (VSFB-SS-C).

After all stations have been added to the composite, the composite sediment sample will be transferred from the composite mixing bowl into one 16-oz glass jar and one grain size sample in a gallon-sized Ziploc plastic bag. An additional 8-oz jar will be filled and provided to the laboratory as an archive of the composite sample for potential future testing, if needed. The grain size bag and 16-oz jar will be delivered to a certified laboratory for the chemical and physical analyses described in Section 4.0.

3.8 Equipment Decontamination

After sample processing is complete, the grab sampler (Van Veen or similar) will be sprayed with site water and scrubbed with a clean brush and Citranox®-water solution. All cleaning will be done after sampling, and prior to moving to the next sampling location. Stainless steel mixing bowls and scoops, plastic extraction trays, and other reusable items (e.g., measuring tapes, binder clips, etc.) that are used to process the sediment (or water) samples, will be thoroughly decontaminated prior to reuse.

3.9 Sample Storage, Transfer, and Documentation

All samples will be kept on ice and in the dark after collection. If wet ice is used, the ice will be double-bagged to reduce the potential for leakage and cross contamination. Chain of custody (COC) forms will be used to document the transfer of sediment and water samples from field scientists to the laboratory or laboratory couriers. The COC forms will be included in the final laboratory report and can be used to establish sample custody at a given time during the project. The COC forms will include date and time of transfer, sample numbers and quantities, and responsible party signatures for all sample transfers.

4.0 SAMPLE ANALYSIS

To facilitate a suitability determination by the SC-DMMT, the project sediments will be subjected to physical and metals analysis. Table 5 provides the chemical analytes, testing methods, and reporting limits proposed for sediment chemical and physical testing. Collectively, sediment chemistry and grain size will be used to evaluate sediment suitability for placement at Pt. Pedernales.

4.1 Physical and Chemical Analysis

A state certified laboratory will conduct all physical and analytical chemical analyses on sediment and site water samples according to USEPA and USACE accepted methods for the chemicals of concern. Table 5 provides the analytical methods and reporting limits of chemical analysis to be performed as part of this project.

4.1.1 Physical Analysis

Grain size analysis will be performed on the composite sediment sample prepared from individual stations. Physical analyses will be performed using a laser particle sorter (ASTM D4464) to quantify percentages of gravel, sands, silt, and clays to 0.1 percent (%) resolution. Laboratory analysis includes the reporting of millimeter and phi sizes, and a cumulative grain-size distribution diagram.

4.1.2 Chemical Analysis

Chemical analysis will be focused on characterizing the concentrations of a selected list of analytes that are consistent with SC-DMMT recommendations in the 1 July 2021 USACE LA special notice for suitability determinations, and consistent with previous harbor dredge sediment characterizations seeking a confined disposal facility (CDF) placement suitability determination.

Analytes for the current program will include general physical parameters like total solids, total organic carbon (TOC), and ammonia, and will also incorporate metals analysis and mercury. Table 6 provides information on container type, necessary volumes, and holding times for the included analysis.

Table 5. Harbor Analytical Methods and Reporting Limits for Sediment Samples

Analytical Method	Analytical Constituent[1]	Target Sediment Reporting Limits[2]	Units[3]
ASTM D4464 (M)	Grain Size	0.1	%
SM 4500 NH3 B/C (M)	Ammonia	0.5	mg/kg
USEPA 9060A	Carbon, Total Organic	500	mg/kg
SM 2540 B (M)	Solids, Total	0.1	%
USEPA 7471A	Metals (Mercury)	0.02	mg/kg
USEPA 6020	Metals	0.1 - 1.0	mg/kg

1. Consistent with previous studies at the site
2. Sediment reporting limits are on a dry-weight basis
3. mg/kg is Milligram per Kilogram, Parts per Million

Table 6. Physical and Chemical Analytical Methods, Holding Times, and Preservation Methods

Parameter	Container Type	Sample Size[1]	Analytical Method	Preservation Temperature[2]	Holding Time[3]
Grain Size	Plastic Bag	250 g	ASTM D4464	4°C	6 months
Ammonia	16-oz Glass jar with Teflon lid	200 g	SM 4500 NH3 B/C (M)	4°C	28 days
Metals		20 g	USEPA 6020/USEPA 7471A for mercury	4°C / -18°C	6 months, 28 days for mercury/ 2 years, 28 days for mercury
TOC		10 g	USEPA 9060A	4°C / -18°C	28 days/ 6 months
Total Solids		10 g	SM 2540B	-18°C	6 months

1. Sample size estimated, and will be pulled from primary sampling container
2. Preservation temperature is for kept cold/frozen samples
3. Holding times are for cold/frozen samples

TOC-total organic carbon
ASTM- ASTM International (formerly the American Society for Testing and Materials)
°C- Degrees Celsius
g- grams
oz- ounce

5.0 DATA ANALYSES

The chemical and physical methods presented in the SAP will provide data to evaluate the suitability of sediment at the harbor for upland placement. Analysis will use SC-DMMT established methods and current thresholds for evaluation.

5.1 Physical and Chemical

Analytical results for metals and mercury in the composite sediment sample for this project will be compared to appropriate sediment quality guidelines to determine the potential for chemical contaminants in the sediment to cause adverse environmental effects. ERL and ERM screening concentrations promulgated by the National Oceanic and Atmospheric Administration (NOAA) in Screening Quick Reference Tables (SQuiRTs) will be used to provide the SC-DMMT context about the quality of the sediment at the site relative to regionally accepted bulk sediment screening concentrations.

Further, Soluble Threshold Limit Concentration (STLC) and Total Threshold Limit Concentration (TTLC) regulatory limits will be compared to wet weight concentrations of selected parameters to assess hazardous waste levels relative to California State regulations, as outlined in Title 22 of the California Code of Regulations (CCR).

6.0 DATA QUALITY ASSURANCE & QUALITY CONTROL

Laboratory analytical Quality Assurance and Quality Control (QA/QC) for bulk sediment chemistry results will generally follow QA/QC *Guidance for Sampling and Analysis of Sediments, Water, and Tissues for Dredged Material Evaluations* (Chemical Evaluations) EPA 832-B-95-001 (EPA 1995). Project QA/QC procedures will be maintained by using duplicate sample analyses, reagent blanks, and spiked samples as specified in the EPA methods for individual chemicals. All QA/QC information will be included within a laboratory provided sediment testing report.

6.1 Sample Acceptability

A stainless-steel grab sampler will be used for sediment collections. The samples will be evaluated for acceptance prior to processing. Acceptability criteria will be consistent with those established by the Southern California Coastal Water Research Project (SCCWRP) Southern California Bight Regional Monitoring Program. Grab sample acceptability criteria includes:

- Even sediment surface with minimal disturbance
- Little or no leakage of overlying water
- Penetration depth of at least 8 centimeters (cm)

6.2 Chemical and Physical Data Processing

All laboratory-provided data will be processed using SAS© software for error checking and transformation of laboratory-provided Electronic Data Deliverable (EDD) chemistry formats. Post-processed data will be manually checked against a hard copy of the EDD and verified for accuracy. Final verified data will be merged with STLC/TTLC and ERL/ERM criteria and formatted into tables for inclusion in the final testing report.

6.3 Chemical Laboratory QA/QC

Replicate analyses for each analysis are performed on each type of sample matrix. QA/QC methods implemented during analysis will be consistent with EPA testing requirements. Instrumental calibration and verification will be performed using EPA and/or National Institute of Standards and Technology (NIST) traceable reference materials. QA/QC methods, as prescribed by the EPA as standard analytical procedures, will be used to estimate precisions and recoveries including but not limited to:

- Matrix Spike/Matrix Spike Duplicate (MS/MSD) - The matrix spike is an aliquot of the sample spiked with known concentrations of the analyte of interest. It is analyzed to determine the matrix interferences and if the procedure is working within established control limits.
- Surrogates - Standard analytes, similar to those being extracted, added to a sample at a known concentration to determine extraction efficiency.
- Duplicates - A duplicate is a separate subsample of the primary sample carried through the complete analytical procedure. Comparison of the primary sample to the duplicate provides a precision measurement.
- Method Blanks - To determine if there was contamination during the preparation step.

7.0 REPORT PREPARATION

The harbor sediment characterization final report will provide a detailed narrative of collection, analysis, and evaluation of sediment quality from the project area within the context of the preferred upland disposal site. The final report will follow USACE LA special notice reporting guidelines, and contain the following information:

- Project Overview—Review of project intent and other relevant project-specific information.
- Collection Maps—Detailed maps and coordinates of the final sediment collection locations.
- Details on Sampling—Sediment collection coordinates, descriptions of the sediment (e.g., strata, color, odor), and photographic documentation of grab samples from each station.
- Methods and Materials—Pertinent information relevant to sediment collection, handling, and analyses.

- Results—Physical and chemical analyses of the sediment. Appropriate tables and graphs will summarize data findings;
- Laboratory-Provided QA/QC Information—All raw data sheets, spike and recovery information, and internal QC audits; and
- Detailed Discussion—Thorough review and interpretation of chemical and physical testing data.

8.0 REFERENCES

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USACE and USEPA, 2021. Special Notice: Regionally Developed Sampling and Analysis Plan/Results Guidelines. July 1, 2021. https://www.spl.usace.army.mil/Portals/17/docs/regulatory/2021_Corps-EPA_SAPR-G_FINAL-with-figures.pdf

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9.0 ACRONYMS & ABBREVIATIONS

Character, Abbreviation, or Acronym	Definition
~	approximately
>	greater than
≥	greater than or equal to
≤	less than or equal to
±	plus or minus
°C	degrees Celsius
%	percent
ASTM	ASTM International (formerly the American Society for Testing and Materials)
CA	California
CCR	California Code of Regulations
CDF	Confined Disposal Facility
COC	Chain-of-custody
cm	centimeter
CY	cubic yard(s)
dd/-ddd°mm.mmm	degrees decimal minutes
DOD	Department of Defense
EDD	Electronically Data Deliverable
ERL	Effects-Range Low
ERM	Effects-Range Median
ft	foot/feet
g	grams
GPS	Global Positioning System
ID	Identification
ITM (Inland Testing Manual)	Evaluation of Dredged Material Proposed Discharge in Waters of the U.S. EPA
m	meters
MB	method blank
mg	milligram
mg/kg	milligrams per kilogram
MLLW	mean lower low water
mm	millimeters
MS	matrix spike
MSD	matrix spike duplicate
N/A	not applicable
NIST	National Institute of Standards and Technology
NOAA	National Oceanic and Atmospheric Administration

oz	ounce(s)
PPB	parts per billion
PPM	parts per million
PPT	parts per thousand
Pt.	Point
QA	quality assurance
QC	quality control
QA/QC	Quality Assurance/Quality Control
RGP	Regional General Permit
SAP	Sampling and Analysis Plan
SCCWRP	Southern California Coastal Water Research Project
SC-DMMT	Southern California Dredged Material Management Team
SQuiRTs	Screening Quick Reference Tables
STLC	Soluble Threshold Limit Concentration
TOC	total organic carbon
TTLC	Total Threshold Limit Concentration
US	United States
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USSF	U.S Space Force
UTM	Upland Testing Manual
WGS84	Worlds Geodetic System 1984

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Attachment **A** –Sediment Testing Summary, 2020

DEPARTMENT OF THE AIR FORCE
UNITED STATES SPACE FORCE
30TH SPACE WING

03 September 2020

Darryl York
30 CES/CEIE
1028 Iceland Avenue, B11146
Vandenberg AFB CA 93437-6010

Theresa Stevens
U.S. Army Corps of Engineers
Los Angeles District – Regulatory Division
60 South California Street, Suite 201
Ventura CA 93001-2598

Dear Ms. Stevens

On July 26, 2017, the April 2017 Sediment Sampling Plan (SAP)for Vandenberg Air Force Base Harbor Dredging (under RGP 71) was approved by the Southern California Dredged Mateiral and Management Team (SC-DMMT). In our conversation in May 2019, you had mentioned that in lieu of submitting a new SAP, you would like to review a summary of recent results and sediment sampling result tables since the beginning of sample testing. A summary of sediment sampling results are provided below with attached data tables since sediment sampling began in 1998.

Prior to the last dredge activity from February 21 through March 3, 2020, sediment samples were taken from the dredge area on November 20, 2019. Four samples were taken and analyzed for metals (arsenic, cadmium, chromium, copper, lead, nickel, selenium, silver, zinc, and mercury) as well as Total Organic Carbon (TOC) and Total Oil and Grease. The dredged material was approximately 98% sand, 2% silt, and little to no clay was identified. Samples were submitted to and analyzed by Oilfield Environmental & Compliance, Inc. (OEC) in Santa Maria, California. Sample metal results were compared to the Effects Range – Low (ER-L) and Effects Range – Medium (ER-M) outlined in the National Oceanic and Atmospheric Administration (NOAA)'s Sediment Quality Guidelines (SQG) Developed for the National Status & Trends (NS&T) Program (Revised June 1999.)

Historically, metals concentrations have decreased since 1998 when the first sample data was recorded. In 1999, core samples were taken from varying depths, with the highest recorded concentrations for five of the analytes at 8 feet deep. All metals exceeded the ER-L except cadmium, lead, selenium, and silver. Beginning in 2001, those metals concentrations have decreased to below the ER-L or below laboratory reporting levels. Though mercury has been detected above the laboratory reporting limits, it has never exceed the ER-L or ER-M standards since routine sampling began.

Nickel concentrations were consistently above the ER-L from 1999 until 2014, when no ER-L exceedances occurred. In 2017, only two of the four samples had nickel exceedances above the ER-L. With the most recent samples, no metals exceeded the guidelines for either ER-L or ER-M and only nickel was detected above laboratory reporting limits.

At this time, no further dredging activities are planned for the remainder of 2020. I would like to request your concurrence that based on the summary results and tables provided, sediment sampling and boat harbor dredging may proceed under the existing SAP.

Thank you for your assistance with this request. Please contact me at (805) 605-2015 or Luanne Lum at (805) 606-5299 if you have any questions.

Sincerely

DARRYL YORK
Chief, Environmental

Attachment:
1998-2019 Sediment Sampling Results

cc: Katarine Nagle, ULA

Sediment Sample Reults - VAFB Harbor

Sample ID																	
Laboratory ID																	
Date					March 1998	March 1998	3/18/1999	3/18/1999	3/18/1999	3/18/1999	3/18/1999	3/18/1999	12/21/1999	12/21/1999	12/21/1999	12/21/1999	12/21/1999	12/21/1999
Work Order							Core 1	Core 2	Core 3	Core 4	Core 4	Core 5	Core 6	Core 7	Core 8	Core 9	Core 10	Core 10 (retest)
Analyte	Analyte Screen Levels			Units														
	ER-L*	ER-M*	Method				Depth: 3.5 ft	Depth 3.5 ft	Depth 3.5 ft	Depth 4 ft	Depth 8 ft	Depth 5 ft	Depth 3.5 ft	Depth 2 ft	Depth 1.5 ft	Depth 3 ft	Depth 3 ft	Depth 3 ft
Aluminum	-	-	EPA 6020	mg/kg[4]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony	-	-	EPA 6020	mg/kg[4]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	8.2	70	EPA 6020	mg/kg	**2.4**	**2.1**	**2.6**	**1.8**	**1.2**	**2**	**16**	**2.8**	**4.1**	**2.9**	**3**	**4.1**	**12.2**	**13.5**
Barium	-	-	EPA 6020	mg/kg[4]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium	-	-	EPA 6020	mg/kg[4]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	1.2	9.6	EPA 6020	mg/kg	**0.2**	**0.22**	**0.26**	**0.57**	**0.42**	**0.36**	**4.5**	**2.2**	**0.82**	**0.35**	**0.91**	**1.04**	**9.60**	**9.99**
Chromium	81	370	EPA 6020	mg/kg	**25.5**	**25**	**22**	**19**	**26**	**23**	**140**	**25**	**29.6**	**22.5**	**26.1**	**28.6**	**90.8**	**118**
Cobalt	-	-	EPA 6020	mg/kg[4]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	34	270	EPA 6020	mg/kg	**2.62**	**2.74**	**2.9**	**3.8**	**4.3**	**4.2**	**36**	**4.1**	**8.2**	**3.9**	**6.3**	**14**	**69.7**	**72.3**
Iron	-	-	EPA 6020	mg/kg[4]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	218	8.0	EPA 6020	mg/kg	**1.92**	**4.1**	**2.7**	**2.9**	**3**	**3.5**	**8.4**	**3.3**	**3.91**	**3.33**	**3.44**	**4.81**	**7**	**10.6**
Manganese	-	-	EPA 6020	mg/kg[4]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	-	-	EPA 6020	mg/kg[4]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	20.9	51.6	EPA 6020	mg/kg	**18.5**	**20.1**	**22**	**21**	**30**	**28**	**180**	**31**	**30.5**	**24**	**25.3**	**28.7**	**95.20**	**101**
Selenium	-	-	EPA 6020	mg/kg	ND	**0.1 b**	**0.15**	ND	**0.13**	ND	**1.1**	ND	ND	ND	ND	ND	**4.00**	**5.50**
Silver	1.0	3.7	EPA 6020	mg/kg	**0.04**	**0.1 b**	**0.01**	**0.029**	**0.33**	**0.031**	**0.99**	**0.071**	**0.09**	**0.03**	**0.16**	**0.25**	**1.64**	**2.07**
Strontium	-	-	EPA 6020	mg/kg[4]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	-	-	EPA 6020	mg/kg[4]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	-	-	EPA 6020	mg/kg[4]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium	-	-	EPA 6020	mg/kg[4]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	-	-	EPA 6020	mg/kg[4]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	150	410	EPA 6020	mg/kg	-	**12.2**	**23**	**22**	**32**	**28**	**260**	**28**	**33**	**19.5**	**28**	**33.4**	**166**	**182**
Ammonia	-	-	SM 4500-NH3	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	0.15	0.71	EPA 7471A	mg/kg	ND	**0.02 b**	**0.031**	**0.024**	**0.032**	**0.02**	**0.12**	**0.031**	ND	ND	ND	ND	ND	0.3
Moisture	-	-	D-2216	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Sulfide	-	-	EPA 376.2	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOC	-	-	EPA 9060A	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Oil & Grease	-	-	EPA 1664	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-
% Solids	-	-	SM 2540B	% by weight	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sediment Sample Reults - VAFB Harbor

Sample ID					01-0767-2 (#2)	01-0767-3 (#3)	01-0767-4 (#4)	01-0767-9 (#9)	01-0782-1 (#10)	01-0782-X (#12)[5]	01-0782-X (#12)[5]	01-0782-3 (#14)	01-0782-5 (#16)	01-0782-6 (#17)	01-0782-7 (#18)	01-0782-8 (#19)	VAFB-1	VAFB-1 R2	VAFB-2	VAFB-2 R2	VAFB-3
Laboratory ID					5464	5465	5466	5467	5468			5469	5470	5471	5472	5473	6147	6147	6148	6148	6149
Date					10/25/2001[3]	10/25/2001[3]	10/25/2001[3]	10/25/2001[3]	10/25/2001[3]	2001	2001	10/25/2001[3]	10/25/2001[3]	10/25/2001[3]	10/25/2001[3]	10/25/2001[3]	1/26/2002	1/26/2002	1/26/2002	1/26/2002	1/26/2002
Work Order					2187	2187	2187	2187	2187			2187	2187	2187	2187	2187	2213	2213	2213	2213	2213
Analyte	Analyte Screen Levels			Units						R1	R2										
	ER-L*	ER-M*	Method																		
Aluminum	-	-	EPA 6020	mg/kg[4]	**5000**	**3720**	**5040**	**4000**	**5050**	**6170**	**5840**	**5750**	**4940**	**4950**	**6250**	**6170**	**2790**	**2850**	**3420**	**2950**	**1660**
Antimony	-	-	EPA 6020	mg/kg[4]	**0.26**	**0.2**	**0.27**	**0.26**	**0.38**	**0.39**	**0.46**	**0.52**	**0.28**	**0.22**	**0.22**	**0.39**	**0.07**	**0.14**	**0.09**	**0.07**	**0.06**
Arsenic	8.2	70	EPA 6020	mg/kg	**2.87**	**3.04**	**2.59**	**2.68**	**3.51**	**3.3**	**3.44**	**3.49**	**3.31**	**3.38**	**3.43**	**3.3**	**2.81**	**3.22**	**3.31**	**3.24**	**3.26**
Barium	-	-	EPA 6020	mg/kg[4]	**47.3**	**47.4**	**86.8**	**20.47**	**47.5**	**52.2**	**37.00**	**41.7**	**33.8**	**39.5**	**48.3**	**52.2**	**18.1**	**14.9**	**11.7**	**9.46**	**14.9**
Beryllium	-	-	EPA 6020	mg/kg[4]	ND (<0.05)	ND (<0.05)	ND (<0.05)	ND (<0.05)	ND (<0.05)	ND	ND	ND (<0.05)	ND (<0.05)	ND (<0.05)	ND (<0.05)	ND (<0.05)	**0.06**	**0.12**	**0.09**	**0.07**	ND (<0.01)
Cadmium	1.2	9.6	EPA 6020	mg/kg	**0.3**	**0.33**	**0.26**	**0.31**	**0.69**	**0.72**	**0.84**	**1.61**	**0.52**	**0.47**	**0.48**	**0.72**	**0.15**	**0.21**	**0.15**	**0.12**	**0.09**
Chromium	81	370	EPA 6020	mg/kg	**33.8**	**23.3**	**37.3**	**24.8**	**35.8**	**38.7**	**36.6**	**39.9**	**30.8**	**34.9**	**34.5**	**38.7**	**21.6**	**22.1**	**21.8**	**19.7**	**13.6**
Cobalt	-	-	EPA 6020	mg/kg[4]	**2.7**	**1.99**	**2.06**	**2.62**	**3.04**	**2.87**	**2.64**	**2.87**	**2.83**	**2.78**	**2.85**	**2.87**	**1.59**	**1.85**	**2.13**	**2.02**	**0.99**
Copper	34	270	EPA 6020	mg/kg	**2.78**	**2.41**	**4.48**	**2.84**	**6.23**	**6.05**	**7.88**	**8.94**	**4.74**	**5.54**	**5.29**	**6.05**	**1.82**	**1.77**	**1.89**	**1.98**	**1.24**
Iron	-	-	EPA 6020	mg/kg[4]	**7270**	**5880**	**6250**	**7170**	**8730**	**8170**	**7630**	**8190**	**8080**	**8370**	**7940**	**8170**	**5240**	**5320**	**6110**	**6180**	**3760**
Lead	218	8.0	EPA 6020	mg/kg	**1.98**	**1.78**	**1.94**	**2.05**	**2.78**	**2.59**	**2.46**	**2.54**	**2.69**	**2.64**	**2.83**	**2.59**	**1.52**	**1.8**	**1.92**	**1.79**	**1.2**
Manganese	-	-	EPA 6020	mg/kg[4]	**109**	**79.7**	**82.7**	**101**	**105**	**106**	**91.1**	**98.5**	**103**	**108**	**102**	**106**	**71.9**	**76.7**	**88.4**	**88**	**42.3**
Molybdenum	-	-	EPA 6020	mg/kg[4]	**0.35**	**0.3**	**1.11**	**0.47**	**1.41**	**2.02**	**2.54**	**2.44**	**1.09**	**1.43**	**1.27**	**2.02**	**0.26**	**0.28**	**0.21**	**0.19**	**0.2**
Nickel	20.9	51.6	EPA 6020	mg/kg	**21.4**	**14.3**	**18.2**	**20.2**	**25.4**	**25.5**	**26.3**	**30.9**	**24.1**	**24.2**	**23.7**	**25.5**	**14.3**	**13.6**	**18.4**	**17.1**	**8.31**
Selenium	-	-	EPA 6020	mg/kg	**0.29**	**0.18**	**0.24**	**0.31**	**0.54**	**1.13**	**1.28**	**3.14**	**0.41**	**0.42**	**0.41**	**1.13**	**0.93**	**1.07**	**1.11**	**1.01**	**0.83**
Silver	1.0	3.7	EPA 6020	mg/kg	**0.158**	**0.115**	**0.12**	**0.153**	**0.184**	**0.22**	**0.22**	**0.274**	**0.163**	**0.12**	**0.136**	**0.215**	**0.34**	**0.38**	**0.39**	**0.35**	**0.31**
Strontium	-	-	EPA 6020	mg/kg[4]	**41.5**	**51.2**	**42.2**	**39**	**56.6**	**55.8**	**60.5**	**61.2**	**50**	**52.5**	**53.5**	**55.8**	**54.6**	**51.6**	**38.6**	**37**	**39.2**
Thallium	-	-	EPA 6020	mg/kg[4]	ND (<0.05)	ND (<0.05)	ND (<0.05)	ND (<0.05)	ND (<0.05)	**0.05**	ND	ND (<0.05)	ND (<0.05)	ND (<0.05)	**0.06**	**0.05**	ND (<0.1)	**0.07**	ND (<0.1)	ND (<0.1)	ND (<0.1)
Tin	-	-	EPA 6020	mg/kg[4]	**0.51**	**0.42**	**0.42**	**0.55**	**0.67**	**0.66**	**0.64**	**0.68**	**0.57**	**0.67**	**0.61**	**0.66**	**0.23**	**0.3**	**0.22**	**0.17**	**0.12**
Titanium	-	-	EPA 6020	mg/kg[4]	**305**	**235**	**239**	**245**	**350**	**346**	**326**	**323**	**305**	**325**	**313**	**346**	**167**	**176**	**203**	**168**	**98**
Vanadium	-	-	EPA 6020	mg/kg[4]	**21**	**18**	**34.6**	**18.9**	**46.5**	**46.8**	**56.1**	**63.14**	**35.5**	**41**	**41.2**	**46.8**	**11**	**11**	**11.7**	**11**	**7.27**
Zinc	150	410	EPA 6020	mg/kg	**15.1**	**12.4**	**14.3**	**14.8**	**25.9**	**25**	**26.1**	**33.1**	**21.1**	**21.4**	**21**	**25**	**8.24**	**7.95**	**10.2**	**9.88**	**5.37**
Ammonia	-	-	SM 4500-NH3	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	**0.06**	-	-	-
Mercury	0.15	0.71	EPA 7471A	mg/kg	ND (<0.01)	0.019	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND	ND	ND (<0.01)	ND (<0.01)	**0.024**	ND (<0.01)	ND (<0.01)	**0.06**	ND	**0.09**	**0.06**	**0.05**
Moisture	-	-	D-2216	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Sulfide	-	-	EPA 376.2	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOC	-	-	EPA 9060A	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Oil & Grease	-	-	EPA 1664	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
% Solids	-	-	SM 2540B	% by weight	74.8	77.5	78.9	77.3	71.9	-	-	70.5	73.1	73.1	72.5	71.8	-	-	-	-	-

Sediment Sample Reults - VAFB Harbor

Sample ID					#4[5]	#5[5]	#6[5]	#7[5]	#8[5]	#9[5]	Composite S- 1,2,3,4,5,10		Composite S- 6,7,8,9	Composite Harbor #6,7,8,&9	Composite Harbor #1,2,3,4,5,&10	Composite (1A, 2A, 3A, 4A, 5A, 10A)	Composite (6A, 7A, 8A, 9A)
Laboratory ID											59315		59316	0901278-11	0901278-12	1402658-12	1402658-13
Date					12/11/2002	12/11/2002	12/11/2002	12/11/2002	12/11/2002	12/11/2002	9/5/2007	9/5/2007	9/5/2007	5/14/2009	5/14/2009	6/4/2014	6/4/2014
Work Order											07-2127-11	07-2127-11[5]	07-2127-11	0901287	0901287	1402658	1402658
Analyte	Analyte Screen Levels			Units							R1	R2					
	ER-L*	ER-M*	Method														
Aluminum	-	-	EPA 6020	mg/kg[4]	**2800**	**4000**	**3200**	**4600**	**3100**	**4300**	-	-	-	-	-	-	-
Antimony	-	-	EPA 6020	mg/kg[4]	ND	ND	ND	ND	ND	ND	-	-	-	-	-	-	-
Arsenic	8.2	70	EPA 6020	mg/kg	**1.70**	**2.30**	**2.90**	**3.00**	**2.50**	**1.60**	**3.438** µg/dry g	**3.39**	**4.245** µg/dry g	-	-	**2.34**	**4.22**
Barium	-	-	EPA 6020	mg/kg[4]	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium	-	-	EPA 6020	mg/kg[4]	ND	ND	ND	ND	ND	ND	-	-	-	-	-	-	-
Cadmium	1.2	9.6	EPA 6020	mg/kg	**0.40**	**0.70**	**0.50**	**0.40**	**0.80**	**0.70**	**0.996** µg/dry g	**1.3**	**0.393** µg/dry g	-	-	**0.946**	**0.622**
Chromium	81	370	EPA 6020	mg/kg	**18.00**	**21**	**18**	**20**	**20**	**18**	**36.65** µg/dry g	**35.71**	**30.59** µg/dry g	-	-	**25.3**	**27.4**
Cobalt	-	-	EPA 6020	mg/kg[4]	**1.80**	**2.70**	**2.30**	**3.20**	**2.20**	**2.80**	-	-	-	-	-	-	
Copper	34	270	EPA 6020	mg/kg	**7.30**	**8.60**	**5.40**	**5.50**	**7.30**	**8**	**7.202** µg/dry g	**7.16**	**4.988** µg/dry g	-	-	**6.32**	**7.18**
Iron	-	-	EPA 6020	mg/kg[4]	**4800**	**7100**	**6000**	**8300**	**5800**	**7100**	-	-	-	-	-	-	
Lead	218	8.0	EPA 6020	mg/kg	**2.20**	**3.20**	**2.60**	**2.90**	**2.70**	**4.10**	**4.62** µg/dry g	**4.48**	**3.784** µg/dry g	-	-	**3.6**	**4.3**
Manganese	-	-	EPA 6020	mg/kg[4]	**53**	**79**	**81**	**97**	**69**	**79**	-	-	-	-	-	-	
Molybdenum	-	-	EPA 6020	mg/kg[4]	**1.10**	**1.10**	ND	ND	**1.20**	**1.30**	-	-	-	-	-	-	
Nickel	20.9	51.6	EPA 6020	mg/kg	**19**	**23**	**19**	**25**	**23**	**23**	**34.02** µg/dry g	**33.89**	**28.19** µg/dry g	-	-	**27.7**	**32.1**
Selenium	-	-	EPA 6020	mg/kg	**0.70**	**0.70**	**0.60**	**0.60**	**0.60**	**0.70**	-	-	-	-	-	**0.36**	**0.454**
Silver	1.0	3.7	EPA 6020	mg/kg[4]	**0.20**	ND	ND	ND	ND	ND	-	-	-	-	-	ND (<0.155)	ND (<0.157)
Strontium	-	-	EPA 6020	mg/kg[4]	**24**	**31**	**64**	**53**	**30**	**32**	-	-	-	-	-	-	-
Thallium	-	-	EPA 6020	mg/kg[4]	ND	ND	ND	ND	ND	ND	-	-	-	-	-	-	-
Tin	-	-	EPA 6020	mg/kg[4]	ND	ND	**1**	ND	ND	ND	-	-	-	-	-	-	-
Titanium	-	-	EPA 6020	mg/kg[4]	**170**	**220**	**190**	**280**	**180**	**230**	-	-	-	-	-	-	-
Vanadium	-	-	EPA 6020	mg/kg[4]	**24**	**23**	**20**	**19**	**26**	**19**	-	-	-	-	-	-	-
Zinc	150	410	EPA 6020	mg/kg	**22**	**32**	**24**	**28**	**27**	**28**	**35.6** µg/dry g	**35.95**	**27.92** µg/dry g	-	-	**35.6**	**39.7**
Ammonia	-	-	SM 4500-NH3	mg/kg	-	-	-	-	-	-	-	-	-	**67.87**	**24.32**	-	-
Mercury	0.15	0.71	EPA 7471A	mg/kg	**0.02**	**0.02**	ND	ND	ND	ND	**0.082** µg/dry g	0.03	**0.024** µg/dry g	**0.02**	**0.03**	**0.0861**	**0.0358**
Moisture	-	-	D-2216	%	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Sulfide	-	-	EPA 376.2	mg/kg	-	-	-	-	-	-	-	-	-	**260.1**	**67.8**	-	-
TOC	-	-	EPA 9060A	mg/kg	-	-	-	-	-	-	-	-	-	**2.52**	**0.46**	**1.3**	**1.4**
Total Oil & Grease	-	-	EPA 1664	mg/kg	-	-	-	-	-	-	-	-	-	**0.07**	**0.01**	**150**	**130**
% Solids	-	-	SM 2540B	% by weight	-	-	-	-	-	-	-	-	-	-	-	-	-

Sediment Sample Reults - VAFB Harbor

Sample ID					Harbor Sample #1 & #2 (Composite)	Harbor Samples #3 & #4 (Composite)	Harbor Samples #5 & #6 (Composite)	Harbor Sample #8	Harbor Samples #9 & #10 (Composite)	Sample 3	Composite Sample 1,2,10	Composite Sample 4,5,6	Composite Sample 7,8,9
Laboratory ID					1703476-11	1703476-12	1703476-13	1703476-08	1703476-14	1905837-03	1905837-11	1905837-12	1905837-13
Date					9/19/2017	9/19/2017	9/19/2017	9/19/2017	9/19/2017	11/20/2019	11/20/2019	11/20/2019	11/20/2019
Work Order					1703476	1703476	1703476	1703476	1703476	1905837	1905837	1905837	1905837
Analyte	Analyte Screen Levels			Units									
	ER-L*	ER-M*	Method										
Aluminum	-	-	EPA 6020	mg/kg	-	-	-	-	-	-	-	-	-
Antimony	-	-	EPA 6020	mg/kg	-	-	-	-	-	-	-	-	-
Arsenic	8.2	70	EPA 6020	mg/kg	**2.4**	**2.1**	**1.4**	**2.5**	**0.78**	ND (<5.08)	ND (<4.88)	ND (<5.26)	ND (<4.81)
Barium	-	-	EPA 6020	mg/kg	-	-	-	-	-	-	-	-	-
Beryllium	-	-	EPA 6020	mg/kg	-	-	-	-	-	-	-	-	-
Cadmium	1.2	9.6	EPA 6020	mg/kg	ND (<0.49)	ND (<0.49)	ND (<0.47)	ND (<0.47)	ND (<0.48)	ND (<5.08)	ND (<4.88)	ND (<5.26)	ND (<4.81)
Chromium	81	370	EPA 6020	mg/kg	**17**	**16**	**13**	**19**	**7.3**	**16.9**	**16.3**	**18.7**	**17.1**
Cobalt	-	-	EPA 6020	mg/kg	-	-	-	-	-	-	-	-	-
Copper	34	270	EPA 6020	mg/kg	**4.4**	**2.9**	**4.3**	**4.2**	**1.6**	ND (<5.08)	**5.79**	ND (<5.26)	ND (<4.81)
Iron	-	-	EPA 6020	mg/kg	-	-	-	-	-	-	-	-	-
Lead	218	8.0	EPA 6020	mg/kg	**5.2**	**2**	**2.5**	**2.8**	**1.0**	ND (<5.08)	ND (<4.88)	ND (<5.26)	ND (<4.81)
Manganese	-	-	EPA 6020	mg/kg	-	-	-	-	-	-	-	-	-
Molybdenum	-	-	EPA 6020	mg/kg	-	-	-	-	-	-	-	-	-
Nickel	20.9	51.6	EPA 6020	mg/kg	**20**	**18**	**16**	**22**	**7.8**	**16.6**	**19**	**19**	**16.3**
Selenium	-	-	EPA 6020	mg/kg	ND (<1.0)	ND (<1.0)	ND (<1.0)	ND (<1.0)	ND (<1.0)	ND (<5.08)	ND (<4.88)	ND (<5.26)	ND (<4.81)
Silver	1.0	3.7	EPA 6020	mg/kg	ND (<1.0)	ND (<1.0)	ND (<1.0)	ND (<1.0)	ND (<1.0)	ND (<5.08)	ND (<4.88)	ND (<5.26)	ND (<4.81)
Strontium	-	-	EPA 6020	mg/kg	-	-	-	-	-	-	-	-	-
Thallium	-	-	EPA 6020	mg/kg	-	-	-	-	-	-	-	-	-
Tin	-	-	EPA 6020	mg/kg	-	-	-	-	-	-	-	-	-
Titanium	-	-	EPA 6020	mg/kg	-	-	-	-	-	-	-	-	-
Vanadium	-	-	EPA 6020	mg/kg	-	-	-	-	-	-	-	-	-
Zinc	150	410	EPA 6020	mg/kg	**22**	**17**	**21**	**22**	**8.5**	ND (<25.4)	ND (<24.4)	ND (<26.3)	ND (<24.0)
Ammonia	-	-	SM 4500-NH3	mg/kg	-	-	-	-	-	-	-	-	-
Mercury	0.15	0.71	EPA 7471A	mg/kg	ND (<0.088)	ND (<0.080)	ND (<0.085)	ND (<0.096)	ND (<0.093)	ND (<0.0847)	ND (<0.0794)	ND (<0.0877)	ND (<0.0794)
Moisture	-	-	D-2216	%	**34**	**32**	**40**	**32**	**33**	-	-	-	-
Total Sulfide	-	-	EPA 376.2	mg/kg	**160 BV, BU**	**65 BV, BU**	**450 BV, BU**	**150 BV, BU**	**130**	-	-	-	-
TOC	-	-	EPA 9060A	mg/kg	**6500**	**3700**	**19000**	**4700**	**3400**	**3620**	**14700**	**3750**	**5840**
Total Oil & Grease	-	-	EPA 1664	mg/kg	**169**	ND (<100)	**327**	**290**	**119**	**16.7**	**543**	**63.5**	**399**
% Solids	-	-	SM 2540B	% by weight	**69**	**71**	**61**	**67**	**68**	-	-	-	-

Notes:

BOLD indicates a detection above laboratory screening limits.
BOLD indicates a detection above the ER-L

ER-L: Effects Range - Low
ER-M: Effects Range - Medium
TOC: Total Organic Carbon
BV: Sample received after holding time expired.
BU: Sample analyzed after holding time expired.
ND: Non-Detect (Laboratory Reporting Limit)
b: less than value listed (*See note 5)*
ft: feet

**Sediment Quality Guidelines (SQG) Developed for the National Status & Trends (NS&T) Program* . NOAA, Revised June 1999.
www.coastalscience.noaa.gov

[1]US EPA Regional Screening Levels (RSLs) Summary Table, Industrial Soil
[2]US EPA Regional Screening Levels (RSLs) Summary Table, Protection of Ground Water (Risk-Based)
[3]Date listed is Date Received. No Date Sampled provided on laboratory reports.
[4]mg/dry kg
[5]Unable to locate original sample data. Data included in this chart taken directly from 2017 data summary.

Attachment **B** – Example Field Log

Grab Sample Sediment Collection Log

Sample Location:_____

Sample Date: ____/____/_____

Weather Conditions: _____ **Tide (ft):** ____ **Rising** **Falling** **Water Depth (ft):** _____ **MLLW ft:** _____ **Wind Speed:** _____ **Direction:** ___ **Latitude:** _____ **Longitude:** _____	**Sample Photo:**

Grab		Sample Accepted (Y/N)	Photo (Y/N)	Recovery Depth (cm)	Sediment Type	Odor (Y/N)	Color	Comments: (sheen, benthics, etc)
Attempt #	Time							

Composite Sediment Description	**Sample ID:**
Moisture:	Density:
Minor/Major Constituent %:	
Odor/ Sheen: Yes	No
Redox Potential Discontinuity (RPD):	cm
Other:	

QA/QC Report			
QA/QC Type	**QA/QC Sample ID**	**Time**	**Parent**

Sampling Jar Check List:

		Sampled?

Additional Comments:

Appendix D
Air Quality Emissions Calculations

Appendix D-1
Criteria Pollutants and Greenhouse Gas Emissions
Summary Tables

Table D-1. Proposed Emissions (Tons/Year) – Total, within Regulated California Waters, 24 Nautical Miles from the Shore

Emissions	Total Emissions, Ton/yr						
	CO	NOx	VOC	SO_x	PM_{10}	$PM_{2.5}$	CO2, MT/year
Implementation of the Dredge Plan	0.87	2.19	0.22	0.02	4.40	0.11	613
Continued use of the harbor for vessel entry and off-loading	36.22	238.93	3.36	7.93	10.79	3.97	12,201
Total	**37.09**	**241.12**	**3.58**	**7.95**	**15.18**	**4.09**	**12,814**

Table D-2. Proposed Emissions (Tons/Year) Total, within 12 Nautical Miles

Emissions	Total Emissions, Ton/yr						
	CO	NOx	VOC	SO_x	PM_{10}	$PM_{2.5}$	CO2, MT/year
Implementation of the Dredge Plan	0.87	2.19	0.22	0.02	4.40	0.11	613
Continued use of the harbor for vessel entry and off-loading	19.19	124.43	1.75	4.12	8.82	2.07	6,429
Total	**20.05**	**126.62**	**1.96**	**4.14**	**13.22**	**2.18**	**7,042**
Significance Threshold	250	250	250	250	250	250	75,000
Exceeds Threshold?	No	No	No	No	No	No	No

Table D-3. Proposed Emissions (Tons/Year) Total, within 12-24 Nautical Miles

Emissions	Total Emissions, Ton/yr						
	CO	NOx	VOC	SO_x	PM_{10}	$PM_{2.5}$	CO2, MT/year
Implementation of the Dredge Plan	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Continued use of the harbor for vessel entry and off-loading	17.04	114.50	1.62	3.81	1.97	1.91	5771.87
Total	**17.04**	**114.50**	**1.62**	**3.81**	**1.97**	**1.91**	**5,772**
Significance Threshold	250	250	250	250	250	250	75,000
Exceeds Threshold?	No	No	No	No	No	No	No

Appendix D-2
Operational Assumptions, Emission Factors and Total Emissions for Harbor Dredging

Table D-4. Operational Assumptions for Harbor Dredging

Construction Activity	Example Equipment/Vehicles	Horsepower Estimated	Source	Fuel	Number of Equipment	Days of Use	Hours Per Day	Total Hours
Harbor Dredging								
Excavator	Caterpillar 352F	417	MOVES 2014	Diesel	1	70	8	560
Tractors/Loaders/Backhoes	Caterpillar 420XE	92	MOVES 2014	Diesel	1	70	8	560
Crane	Grove GMK3060	410	MOVES 2014	Diesel	1	70	8	560
Dump truck	Komatsu HM400-2	438	MOVES 2014	Diesel	2	70	8	1120
Pump		60	MOVES 2014	Diesel	2	70	8	1120

Table D-5. Emission Factors, grams per hour

Construction Activity	VOC	CO	NOx	SO2	PM10	PM2.5	CO2
Harbor Dredging							
Excavator	58.48	191.59	488.27	1.16	28.17	27.32	220236.39
Tractors/Loaders/Backhoes	55.34	369.47	289.82	0.36	51.19	49.65	60493.74
Crane	67.55	222.96	848.79	1.24	33.60	32.59	218574.18
Dump truck	56.55	94.34	277.80	1.11	11.05	10.72	225234.79
Pump	24.47	127.38	273.82	0.22	21.08	20.44	36749.19

Table D-6. Estimated Emissions, tons per year

Construction Activity	VOC	CO	NOx	SO2	PM10	PM2.5	CO2	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2 (MT)
Harbor Dredging														
Excavator	0.13	0.42	1.08	0.00	0.06	0.06	485.64	3.61E-02	1.18E-01	3.01E-01	7.19E-04	1.74E-02	1.69E-02	1.23E+02
Tractors/Loaders/Backhoes	0.12	0.81	0.64	0.00	0.11	0.11	133.39	3.42E-02	2.28E-01	1.79E-01	2.20E-04	3.16E-02	3.07E-02	3.39E+01
Crane	0.15	0.49	1.87	0.00	0.07	0.07	481.97	4.17E-02	1.38E-01	5.24E-01	7.67E-04	2.07E-02	2.01E-02	1.22E+02
Dump truck	0.12	0.21	0.61	0.00	0.02	0.02	496.66	6.98E-02	1.16E-01	3.43E-01	1.38E-03	1.36E-02	1.32E-02	2.52E+02
Pump	0.05	0.28	0.60	0.00	0.05	0.05	81.03	3.02E-02	1.57E-01	3.38E-01	2.77E-04	2.60E-02	2.52E-02	4.12E+01
								0.21	0.76	1.69	0.00	0.11	0.11	573.15
Worst case senario														
1								**Annual Emissions**						
10								**CO**	**NOx**	**VOC**	**SOx**	**PM10**	**PM2.5**	**CO2**
7								**(tons)**	**(tons)**	**(tons)**	**(tons)**	**(tons)**	**(tons)**	**(metric tons)**
								0.76	1.69	0.21	0.00	0.11	0.11	573.15

Appendix D-3
Vessel Operational Assumptions, Emission Factors and Estimated Emissions

Table D-7. Operational Assumptions for Vessels

Vessel	Notes	Approximate Total Mileage (miles)	Average Speed (miles/hr)	Single Roundtrip Distance (miles)			Single Trip Duration			
				Total Miles Within 3nm (RT)	Total Miles Between 3 - 12 nm	Total Miles Between 12 - 24 nm	Total Duration (hour)	Total Hours (0-3 nm)	Total Hours (3-12 nm)	Total Hours (12-24 nm)
Tugboat -used in support of Dredging	Assume two tugboats are used for each dredging action	6	5.75	6	0	0	1.0	1.0	0.0	0.0
Rocketship (Delta Mariner)	Used for transporting Common Core Boosters (CCBs)	48	5.75	6	18	24	8.3	1.0	3.1	4.2
Tugboat -used in support of CCB Offloading	Assume two tugboats are used for each offload operation	6	5.75	6	0	0	1.0	1.0	0.0	0.0

Rocketship (Delta Mariner) Emissions are estimated up to 24 Nautical Miles, which is within the California Regulated Waters (https://ww2.arb.ca.gov/sites/default/files/2020-07/complianceguidelines021017.pdf)

Table D-8. Vessel Emission Factors

Vessel	Notes	Emissions Factors (lb/hr) Propulsion Engines + Generators							
		CO	NO_x	VOC	SO_x	PM_{10}	$PM_{2.5}$	CO_2	CH_4 (as CO_2e)
Tugboat -used in support of Dredging	Assume two tugboats are used for each dredging action	8.65	47.22	0.56	1.51	0.77	0.74	2516.20	0.27
Rocketship (Delta Mariner)	Used for transporting Common Core Boosters (CCBs)	40.82	274.32	3.87	9.12	4.71	4.57	15241.60	1.63
Tugboat -used in support of CCB Offloading	Assume two tugboats are used for each offload operation	8.65	47.22	0.56	1.51	0.77	0.74	2516.20	0.27

Table D-9. Vessel Emissions, 0-3 and 3-12 Nautical Miles

Vessel	Notes	Vessel Emissions 0-3 nm (tons per year)					Vessel Emissions 3-12 nm (tons per year)						
		VOC	SO_x	PM_{10}	$PM_{2.5}$	CO_2 (Metric tons/year)	CO	NO_x	VOC	SO_x	PM_{10}	$PM_{2.5}$	CO_2 (Metric tons/year)
Tugboat -used in support of Dredging	Assume two tugboats are used for each dredging action	0.01	0.016	0.01	0.008	23.82	0.00	0.00	0.00	0.000	0.00	0.00	0.00
Rocketship (Delta Mariner)	Used for transporting Common Core Boosters (CCBs)	0.40	0.95	0.49	0.48	1442.97	12.78	85.88	1.21	2.86	1.47	1.43	4328.90
Tugboat -used in support of CCB Offloading	Assume two tugboats are used for each offload operation	0.12	0.31	0.16	0.16	476.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table D-10. Vessel Emissions, 12-24 and 0-24 Nautical Miles

Vessel	Notes	Vessel Emissions 12-24 nm (tons per year)							Vessel Emissions, total (tons per year)						
		CO	NO_x	VOC	SO_x	PM_{10}	$PM_{2.5}$	CO_2 (Metric tons/year)	CO	NO_x	VOC	SO_x	PM_{10}	$PM_{2.5}$	CO_2 (Metric tons/year)
Tugboat -used in support of Dredging	Assume two tugboats are used for each dredging action	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.49	0.01	0.02	0.01	0.01	23.82
Rocketship (Delta Mariner)	Used for transporting Common Core Boosters (CCBs)	17.04	114.50	1.62	3.81	1.97	1.91	5771.87	34.08	229.00	3.23	7.62	3.93	3.81	11543.74
Tugboat -used in support of CCB Offloading	Assume two tugboats are used for each offload operation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.80	9.85	0.12	0.31	0.16	0.16	476.43

Table D-11. Vessel Emission Factor Calculations

					Underway							
					Emissions Factors (g/kW-hr) Propulsion and Auxiliary Engines							
Vessel	Engine Group	OGV Ship Types	Make/Model	Model	CO	NO_x	VOC	SO_x	PM_{10}	$PM_{2.5}$	CO_2	CH_4
Rocketship (Delta Mariner)	Propulsion	C2	General Motors	16-710-G7A	2.48	13.36	0.14	0.42	0.21	0.20	695.70	0.003
Rocketship (Delta Mariner)	Auxiliary	C1	Caterpillar	3412C	1.50	10.00	0.28	0.42	0.23	0.22	695.70	0.005
Rocketship (Delta Mariner)	Emergency	C1	Caterpillar	3406C	1.50	10.00	0.28	0.42	0.23	0.22	695.70	0.005
Tugboat	Propulsion	C2	Varies	Varies	2.48	13.36	0.14	0.42	0.21	0.20	695.70	0.00
Tugboat	Auxiliary	C1	Varies	Varies	1.50	10.00	0.28	0.42	0.23	0.22	695.70	0.01

					Emissions Factors (g/hr) Propulsion and Auxiliary Engines							
Vessel	Number of Engines	kW Rating	Total kW		CO	NO_x	VOC	SO_x	PM_{10}	$PM_{2.5}$	CO_2	CH_4
Rocketship (Delta Mariner) - Propulsion	2	2,983	5,966		14,796	79,706	842	2,484	1,253	1,215	4,150,558	16
Rocketship (Delta Mariner) - Auxiliary	4	620	2,480		3,720	24,800	705	1,033	570	553	1,725,341	13
Tugboat - Propulsion	2	746	1,491		3,699	19,925	210	621	313	304	1,037,570	4
Tugboat - Auxiliary	2	75	149		224	1,491	42	62	34	33	103,757	1

	Emissions Factors (lb/hr) Propulsion and Auxiliary Engines							
Vessel	CO	NO_x	VOC	SO_x	PM_{10}	$PM_{2.5}$	CO_2	CH_4
Rocketship (Delta Mariner) - Propulsion	32.62	175.72	1.86	5.48	2.76	2.68	9,150	0.04
Rocketship (Delta Mariner) - Auxiliary	8.20	54.67	1.55	2.28	1.26	1.22	3,804	0.03
Tugboat - Propulsion	8.15	43.93	0.46	1.37	0.69	0.67	2,287	0.01
Tugboat - Auxiliary	0.49	3.29	0.09	0.14	0.08	0.07	229	0.00

Rocketship Emissions Factors (lb/hr) Propulsion and Auxiliary Engines							
CO	NO_x	VOC	SO_x	PM_{10}	$PM_{2.5}$	CO_2	CH_4 (as CO_2e)
40.82	274.32	3.87	9.12	4.71	4.57	15,242	1.63

Tugboat Emissions Factors (lb/hr) Propulsion and Auxiliary Engines							
CO	NO_x	VOC	SO_x	PM_{10}	$PM_{2.5}$	CO_2	CH_4 (as CO_2e)
8.65	47.22	0.56	1.51	0.77	0.74	2,516.20	0.27

Notes:

1. Rocketship (Delta Mariner) assumed to be representative of a Category 2 (C2) Ocean-going Vessel based on guidance in Section 3.1 of EPA Methodologies for Estimating Port-Related and Goods Movement
2. Engine type for both propulsion and auxiliary engines are based on guidance provided in Section 3.3.2.2 of EPA Methodologies for Estimating Port-Related and Goods Movement Mobile Source Emission Inventories. Since data is unavailable to determine engine type the assumption is SSD for propulsion engines and MSD for auxiliary engines per guidance.

Table D-12. Reference for Vessel Emission Factors

Table H.2. Category 1 and 2 PM ULSD Emission Factors (g/kWh)

Engine Category	Engine Group	Cylinder Displacement Range (L/cyl)	Power Range	Model Year Range	PM_{10} & DPM_{10} (g/kWh)	$PM_{2.5}$ & $DPM_{2.5}$ (g/kWh)	BC (g/kWh)
Uncontrolled							
C1	All	All	0 < kW ≤ 8	Pre-2000	1.213	1.1764	0.9058
			8 < kW ≤ 19	Pre-2000	1.079	1.0463	0.8057
			19 < kW ≤ 37	Pre-1999	0.945	0.9162	0.7055
	Propulsion	Disp < 0.9	kW > 37	Pre-2004	0.430	0.4170	0.3211
		0.9 ≤ Disp < 1.2	kW > 37	Pre-2004	0.360	0.3491	0.2688
		1.2 ≤ Disp < 2.5	kW > 37	Pre-2004	0.230	0.2230	0.1717
		2.5 ≤ Disp < 3.5	kW > 37	Pre-2004	0.190	0.1842	0.1419
		3.5 ≤ Disp < 5	kW > 37	Pre-2004	0.190	0.1842	0.1419
	Auxiliary	Disp < 0.9	kW > 37	Pre-2004	0.730	0.7080	0.5452
		0.9 ≤ Disp < 1.2	kW > 37	Pre-2004	0.420	0.4073	0.3137
		1.2 ≤ Disp < 2.5	kW > 37	Pre-2004	0.230	0.2230	0.1717
		2.5 ≤ Disp < 3.5	kW > 37	Pre-2004	0.210	0.2036	0.1568
		3.5 ≤ Disp < 5	kW > 37	Pre-2004	0.190	0.1842	0.1419
C2	All	5 ≤ Disp < 30	All	Pre-2004	0.210	0.2036	0.1568

Note: Highlights present the engine category and emission factors used for the analysis.

Source: EPA Methodologies for Estimating Port-Related and Goods Movement Mobile Source Emission Inventories, April 2022, https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P1014J1S.pdf

Appendix D-4
On-Road Vehicle Emissions

Table D-13. Operational Assumptions for On-road Vehicles

Distances									
Dredging/operational Crew Commute	25	miles	one way	Assumed					
Dredge Site to abandoned borrow pit at Point Pedernales	5	miles	one way	Estimated					

ALT	Activity		Transport						
	Activity	Frequency	Vehicle	Category	Fuel	Number of Vehicles	Number of Miles, Roundtrip	Number of Trips per year	Total Miles
1	Dredging Crew Commute	One round trip per event per POV	Passenger Car	LDA	Gasoline	20	50	10	10000
1	Dredging Crew Commute	One round trip per event per POV	Light-Heavy-Duty Trucks (GVWR ,6,000 lbs) - LHD1	LHD1	Gasoline	10	50	10	5000
1	Vessel Offloading	One round trip per event per POV	Light-Heavy-Duty Trucks (GVWR ,6,000 lbs) - LHD1	LHD1	Gasoline	12	50	400	240000
1	Transportation and Disposal	One round trip per event per dump truck	Heavy-Duty Single Unit Dump Truck	T7 Single Dump Class 8	Diesel	1	10	500	5000

Table D-14. On-road Vehicles Emission Factors, grams per mile

Activity	Emissions Factors, grams per mile (g/mile)								
Activity	CO	NO_x	VOC	SO_x	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
Dredging Crew Commute	1.07	0.07	0.02	0.00	0.01	0.01	286.53	0.00	0.01
Dredging Crew Commute	1.30	0.28	0.05	0.01	0.08	0.03	748.93	0.01	0.02
Vessel Offloading	1.30	0.28	0.05	0.01	0.08	0.03	748.93	0.01	0.02
Transportation and Disposal	0.20	2.08	0.02	0.02	0.13	0.05	1773.42	0.00	0.28

Table D-15. Estimated Emissions from On-road Vehicles, tons/year

Activity	Emissions, ton/year						Emissions, MT/year
Activity	CO	NO_x	VOC	SO_x	PM_{10}	$PM_{2.5}$	CO_2e
Dredging Crew Commute	0.0117	0.0007	0.0002	0.0000	0.0002	0.0001	2.884
Dredging Crew Commute	0.0071	0.0015	0.0003	0.0000	0.0004	0.0002	3.766
Vessel Offloading	0.3429	0.0743	0.0129	0.0020	0.0210	0.0076	180.792
Transportation and Disposal	0.0011	0.0114	0.0001	0.0001	0.0007	0.0003	9.248

Appendix D-5
Vehicle Dust Emissions Paved

Table D-16. Estimated Dust Emissions from On-road Vehicle Operations, tons/year

Assumed no control efficiency (water spray or other controls).

Ea = (VMT)[(k)(sL/2)0.65(W/3)1.5](Ci)(1 - e)

Pollutant	Transportation and Disposal		Crew Commute - Dredging		Crew Commute -Vessel Offloading	
	PM10	TSP	PM10	TSP	PM10	TSP
VMT	5,000	5,000	15,000	15,000	240,000	240,000
k	0.016	0.082	0.016	0.082	0.016	0.082
sL	13.6	13.6	13.6	13.6	13.6	13.6
W-full, tons	40	40	3	3	3	3
W-empty, tons	15	15	3	3	3	3
e						
Emissions (lbs/year)	7,718.6	39,557.8	834.3	4,276.0	13,349.4	68,415.7
Emissions (tons/yr)	3.86	19.78	0.42	2.14	6.67	34.21

Reference: https://www.sdapcd.org/content/dam/sdapcd/documents/permits/emissions-calculation/haul-road-emissions/R01-HAUL-ROADS-GENERAL-PAVED-&-UNPAVED-DEFAULT-TRACE-METAL-COMPOSITION-POST-Rev.pdf

R01 - HAUL ROADS, GENERAL, PAVED & UNPAVED, WITH DEFAULT TRACE METAL COMPOSITION

Variables were obtained from SDAPCD HAUL ROAD EMISSIONS, October 5, 1998

Appendix D-6
GHG Emissions and Social Cost of Carbon

Table D-17. Estimated Greenhouse Emissions from the Proposed Action, MT/year

12,814	CO2, MT/year	Total GHG Emissions - Proposed Action	
YEAR	**CO_2 Emissions, Metric Ton/year**		
2025	12,814		
2026	12,814		
2027	12,814		
2028	12,814		
2029	12,814		
2030	12,814		
2031	12,814		
2032	12,814		
2033	12,814		
2034	12,814		
2035	12,814		
2036	12,814		
2037	12,814		
2038	12,814		
2039	12,814		
2040	12,814		
2041	12,814		
2042	12,814		
2043	12,814		
2044	12,814		
2045	12,814		
Total	269,091		

Table D-18. Social Cost of Greenhouse Gases, in Dollars, for the Proposed Action (2025-2045)

IWG SC GHG Discount Factor: 2.5%				
IWG Annual SC GHG Cost per Metric Ton ($/Metric Ton [In 2020 $])				**Annual SC GHG ($K/yr [In 2020 $])**
YEAR	**CO2**	**CH4**	**N2O**	
2025	$83.00	$2,200.00	$30,000.00	$1,063.55
2026	$84.00	$2,300.00	$30,000.00	$1,076.36
2027	$86.00	$2,300.00	$31,000.00	$1,101.99
2028	$87.00	$2,400.00	$32,000.00	$1,114.80
2029	$88.00	$2,500.00	$32,000.00	$1,127.62
2030	$89.00	$2,500.00	$33,000.00	$1,140.43
2031	$91.00	$2,600.00	$33,000.00	$1,166.06
2032	$92.00	$2,600.00	$34,000.00	$1,178.87
2033	$94.00	$2,700.00	$35,000.00	$1,204.50
2034	$95.00	$2,800.00	$35,000.00	$1,217.31
2035	$96.00	$2,800.00	$36,000.00	$1,230.13
2036	$98.00	$2,900.00	$36,000.00	$1,255.76
2037	$99.00	$3,000.00	$37,000.00	$1,268.57
2038	$100.00	$3,000.00	$38,000.00	$1,281.38
2039	$102.00	$3,100.00	$38,000.00	$1,307.01
2040	$103.00	$3,100.00	$39,000.00	$1,319.83
2041	$104.00	$3,200.00	$39,000.00	$1,332.64
2042	$106.00	$3,300.00	$40,000.00	$1,358.27
2043	$107.00	$3,300.00	$41,000.00	$1,371.08
2044	$108.00	$3,400.00	$41,000.00	$1,383.89
2045	$110.00	$3,500.00	$42,000.00	$1,409.52
				$25,909.58
Reference: Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates				
Table A-1: Annual SC-CO2, 2020 – 2050 (in 2020 dollars per metric ton of CO2)				
Table A-2: Annual SC-CH4, 2020 – 2050 (in 2020 dollars per metric ton of CH4)				
Table A-3: Annual SC-N2O, 2020 – 2050 (in 2020 dollars per metric ton of N2O)				

Table D-19. Social Cost of Greenhouse Gases, in Dollars, United States (2025-2045)

U.S. Annual GHG Emissions (Metric Ton/yr)					Annual SC GHG ($K/yr [In 2020 $])
YEAR	CO_2	CH_4	N_2O	CO_2e	
2025	5,136,454,179	25,626,912	1,500,708	5,163,581,798	$527,726,143.26
2026	5,136,454,179	25,626,912	1,500,708	5,163,581,798	$535,425,288.64
2027	5,136,454,179	25,626,912	1,500,708	5,163,581,798	$547,198,904.99
2028	5,136,454,179	25,626,912	1,500,708	5,163,581,798	$556,398,758.37
2029	5,136,454,179	25,626,912	1,500,708	5,163,581,798	$564,097,903.75
2030	5,136,454,179	25,626,912	1,500,708	5,163,581,798	$570,735,065.93
2031	5,136,454,179	25,626,912	1,500,708	5,163,581,798	$583,570,665.49
2032	5,136,454,179	25,626,912	1,500,708	5,163,581,798	$590,207,827.67
2033	5,136,454,179	25,626,912	1,500,708	5,163,581,798	$604,544,135.23
2034	5,136,454,179	25,626,912	1,500,708	5,163,581,798	$612,243,280.61
2035	5,136,454,179	25,626,912	1,500,708	5,163,581,798	$618,880,442.78
2036	5,136,454,179	25,626,912	1,500,708	5,163,581,798	$631,716,042.34
2037	5,136,454,179	25,626,912	1,500,708	5,163,581,798	$640,915,895.72
2038	5,136,454,179	25,626,912	1,500,708	5,163,581,798	$647,553,057.90
2039	5,136,454,179	25,626,912	1,500,708	5,163,581,798	$660,388,657.46
2040	5,136,454,179	25,626,912	1,500,708	5,163,581,798	$667,025,819.64
2041	5,136,454,179	25,626,912	1,500,708	5,163,581,798	$674,724,965.02
2042	5,136,454,179	25,626,912	1,500,708	5,163,581,798	$689,061,272.57
2043	5,136,454,179	25,626,912	1,500,708	5,163,581,798	$695,698,434.75
2044	5,136,454,179	25,626,912	1,500,708	5,163,581,798	$703,397,580.13
2045	5,136,454,179	25,626,912	1,500,708	5,163,581,798	$717,733,887.69
Total	**107,865,537,759**	**538,165,152**	**31,514,868**	**108,435,217,758**	**$13,039,244,030**

Table D-20. Social Cost of Greenhouse Gases, in Dollars, California (2025-2045)

California Annual GHG Emissions (Metric Ton/yr)					Annual SC GHG ($K/yr
YEAR	CO_2	CH_4	N_2O	CO_2e	[In 2020 $])
2025	336,950,322	1,567,526	55,459	338,573,307	$33,079,203.93
2026	336,950,322	1,567,526	55,459	338,573,307	$33,572,906.85
2027	336,950,322	1,567,526	55,459	338,573,307	$34,302,266.49
2028	336,950,322	1,567,526	55,459	338,573,307	$34,851,428.41
2029	336,950,322	1,567,526	55,459	338,573,307	$35,345,131.34
2030	336,950,322	1,567,526	55,459	338,573,307	$35,737,540.66
2031	336,950,322	1,567,526	55,459	338,573,307	$36,568,193.90
2032	336,950,322	1,567,526	55,459	338,573,307	$36,960,603.22
2033	336,950,322	1,567,526	55,459	338,573,307	$37,846,715.47
2034	336,950,322	1,567,526	55,459	338,573,307	$38,340,418.39
2035	336,950,322	1,567,526	55,459	338,573,307	$38,732,827.71
2036	336,950,322	1,567,526	55,459	338,573,307	$39,563,480.96
2037	336,950,322	1,567,526	55,459	338,573,307	$40,112,642.88
2038	336,950,322	1,567,526	55,459	338,573,307	$40,505,052.20
2039	336,950,322	1,567,526	55,459	338,573,307	$41,335,705.44
2040	336,950,322	1,567,526	55,459	338,573,307	$41,728,114.77
2041	336,950,322	1,567,526	55,459	338,573,307	$42,221,817.69
2042	336,950,322	1,567,526	55,459	338,573,307	$43,107,929.93
2043	336,950,322	1,567,526	55,459	338,573,307	$43,500,339.25
2044	336,950,322	1,567,526	55,459	338,573,307	$43,994,042.18
2045	336,950,322	1,567,526	55,459	338,573,307	$44,880,154.42
Total	**7,075,956,762**	**32,918,046**	**1,164,639**	**7,110,039,447**	**$816,286,516**

Table D-21. Comparison of Greenhouse Gas Emissions and Social Cost of Greenhouse Gases, in Dollars, Proposed Action, California, and United States (2025-2045)

Years	Location	CO_2e Emissions (MT)
2025-2045	California Total	7,110,039,447
2025-2045	U.S. Total	108,435,217,758
2025-2045	Proposed Action	269,091
Percent of California Totals		0.0038%
Percent of U.S. Totals		0.00025%

Years	Location	Total SC-GHG ($1,000, In 2020 Dollars)
2025-2045	California Total	$816,286,516
2025-2045	U.S. Total	$13,039,244,030
2025-2045	Proposed Action	$25,910
Percent of California Totals		0.0032%
Percent of U.S. Totals		0.00020%

Reference for CA and US GHG emissions - ACAM Output, 22 October 2024 - see below excerpt

The following U.S. and State's GHG emissions estimates (next two tables) are based on a five-year average (2016 through 2020) of individual state-reported GHG emissions (Reference: State Climate Summaries 2022, NOAA National Centers for Environmental Information, National Oceanic and Atmospheric Administration. https://statesummaries.ncics.org/downloads/).

State's Annual GHG Emissions (mton/yr)				
YEAR	CO2	CH4	N2O	CO2e
2025	336,950,322	1,567,526	55,459	338,573,307
2026 [SS Year]	0	0	0	0

U.S. Annual GHG Emissions (mton/yr)				
YEAR	CO2	CH4	N2O	CO2e
2025	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2026 [SS Year]	0	0	0	0

Appendix D-7
ACAM Output for Dredging Operations

1. General Information

- Action Location
Base: VANDENBERG AFB
State: California
County(s): Santa Barbara
Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: Harbor Activities at Vandenberg Air Force Base

- Project Number/s (if applicable):

- Projected Action Start Date: 1 / 2025

- Action Purpose and Need:
The purpose of the Proposed Action is to maintain federally authorized channel configurations, assure safe navigability within the harbor for vessel traffic, facilitate space launch programs requiring usage of the harbor, and allow for continuation of vessel usage of the harbor. Further, the purpose of the Proposed Action is to implement a dredging maintenance plan and allow continued vessel operations in the most efficient, economical, and least environmentally damaging manner.

The need for the Proposed Action is to prevent shoaling at Vandenberg SFB's harbor that would result in unsafe navigation conditions, close the harbor to vessel traffic, or prevent maintenance to other structures in or around the harbor.

- Action Description:
Alternative 1 – Implementation of Dredge Plan and Continued Use of Harbor
Alternative 1 includes two distinct actions: 1) implementation of the Dredge Plan and 2) continued use of the harbor for vessel entry and off-loading during implementation of the Dredge Plan. Implementation of the Dredge Plan would consist of maintenance dredging at the harbor to a minimum depth of -10 feet mean lower low water (MLLW), plus a 2-foot overdredge allowance for a maximum depth of -12 feet MLLW. Vessel Usage of the Harbor would allow authorized ships to enter the harbor to offload Common Core Boosters (CCBs) or other equipment needed for space launch programs. All ships utilizing the harbor would do so in accordance with all applicable Santa Barbara County Air Pollution Control District (SBCAPCD) rules and regulations.

Under the No-Action Alternative, redredging of the harbor would not occur, potentially jeopardizing the space launch programs at Vandenberg AFB.

- Point of Contact
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Title: Contractor
Organization: M. S. Hatch Consulting, LLC
Email: massie.hatch@mshatch.com
Phone Number: 949.892.9515

Report generated with ACAM version: 5.0.23a

- Activity List:

Activity Type		Activity Title
2.	Construction / Demolition	Implementation of Dredge Plan

Emission factors and air emission estimating methods come from the United States Air Force's Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and Air Emissions Guide for Air Force Transitory Sources.

2. Construction / Demolition

2.1 General Information & Timeline Assumptions

- Activity Location
County: Santa Barbara
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Implementation of Dredge Plan

- Activity Description:
Implementation of the Dredge Plan would consist of maintenance dredging at the harbor to a minimum depth of -10 feet mean lower low water (MLLW), plus a 2-foot overdredge allowance for a maximum depth of -12 feet MLLW. Dredging would occur in a 3.5-acre subtidal dredge area a. Predicted sediment volumes would be up to 10,000 cubic yards (cy) annually in years that dredging occurs.
dredging would occur over a 3- to 5-week period, including mobilization and demobilization. It is anticipated that it will take from 1 to 3 weeks to dredge the harbor depending on the amount needed to dredge, with a week prior to dredging required for mobilization set up and a week following completion to breakdown and demobilize the equipment. The overall amount of time to conduct dredging would depend on the total dredge volume. It is anticipated that approximately 1,000 cy of sediment would be dredged each day.

- Activity Start Date
Start Month: 1
Start Month: 2025

- Activity End Date
Indefinite: False
End Month: 2
End Month: 2025

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.007537
SO_x	0.000221
NO_x	0.075903
CO	0.081000

Pollutant	Total Emissions (TONs)
PM 10	2.019774
PM 2.5	0.002274
Pb	0.000000
NH_3	0.002103

- Activity Emissions of GHG:

Pollutant	Total Emissions (TONs)
CH_4	0.000506
N_2O	0.002098

Pollutant	Total Emissions (TONs)
CO_2	23.599771
CO_2e	24.237658

- Global Scale Activity Emissions for SCGHG:

Pollutant	Total Emissions (TONs)
CH_4	0.000506
N_2O	0.002098

Pollutant	Total Emissions (TONs)
CO_2	23.599771
CO_2e	24.237658

2.1 Trenching/Excavating Phase

2.1.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 1
Number of Days: 10

2.1.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 152460
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 10000

- Trenching Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20
Average Hauling Truck Round Trip Commute (mile): 20

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.1.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour)

Excavators Composite [HP: 36] [LF: 0.38]						
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**
Emission Factors	0.40191	0.00542	3.44643	4.21104	0.10704	0.09848
Other General Industrial Equipment Composite [HP: 35] [LF: 0.34]						
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**
Emission Factors	0.49122	0.00542	3.71341	4.67487	0.13603	0.12515
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.19600	0.00489	2.00960	3.48168	0.07738	0.07119

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour)

Excavators Composite [HP: 36] [LF: 0.38]				
	CH_4	N_2O	CO_2	CO_2e
Emission Factors	0.02382	0.00476	587.13772	589.15263
Other General Industrial Equipment Composite [HP: 35] [LF: 0.34]				
	CH_4	N_2O	CO_2	CO_2e
Emission Factors	0.02385	0.00477	588.02637	590.04433
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH_4	N_2O	CO_2	CO_2e
Emission Factors	0.02149	0.00430	529.86270	531.68105

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	NH_3
LDGV	0.15014	0.00272	0.08183	1.15414	0.01648	0.00579	0.03482
LDGT	0.19850	0.00338	0.15423	1.58574	0.01798	0.00647	0.03664
HDGV	0.25262	0.00518	0.25160	1.83327	0.02830	0.01002	0.03696
LDDV	0.02453	0.00212	0.21377	0.31526	0.03028	0.01896	0.00310
LDDT	0.01608	0.00283	0.07126	0.15320	0.02417	0.01248	0.00310
HDDV	0.10482	0.01080	2.21934	0.52071	0.11665	0.05708	0.18048
MC	5.55535	0.00206	0.72741	17.74481	0.01913	0.00815	0.00862

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH_4	N_2O	CO_2	CO_2e
LDGV	0.01196	0.00928	275.34289	278.40759
LDGT	0.01652	0.01302	342.02606	346.32025
HDGV	0.02149	0.01816	523.58650	529.53564
LDDV	0.00114	0.03522	223.57891	234.10442
LDDT	0.00075	0.04708	298.82532	312.87385
HDDV	0.00487	0.17970	1140.57202	1194.24362
MC	0.25786	0.04719	207.94492	228.45331

2.1.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
HP: Equipment Horsepower
LF: Equipment Load Factor
EF_{POL}: Emission Factor for Pollutant (g/hp-hour)
0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform an analysis to estimate GHG emissions and assess the theoretical Social Cost of Greenhouse Gases (SC GHG) associated with the action. The analysis was performed in accordance with the Air Force Manual 32-7002, Environmental Compliance and Pollution Prevention; the Environmental Impact Analysis Process (EIAP, 32 CFR 989); and the USAF Air Quality Environmental Impact Analysis Process (EIAP) Guide. This report provides a summary of GHG emissions and SC GHG analysis.

Report generated with ACAM version: 5.0.23a

a. Action Location:

Base: VANDENBERG AFB
State: California
County(s): Santa Barbara
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Harbor Activities at Vandenberg Air Force Base

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2025

e. Action Description:

Alternative 1 – Implementation of Dredge Plan and Continued Use of Harbor
Alternative 1 includes two distinct actions: 1) implementation of the Dredge Plan and 2) continued use of the harbor for vessel entry and off-loading during implementation of the Dredge Plan. Implementation of the Dredge Plan would consist of maintenance dredging at the harbor to a minimum depth of -10 feet mean lower low water (MLLW), plus a 2-foot overdredge allowance for a maximum depth of -12 feet MLLW. Vessel Usage of the Harbor would allow authorized ships to enter the harbor to offload Common Core Boosters (CCBs) or other equipment needed for space launch programs. All ships utilizing the harbor would do so in accordance with all applicable Santa Barbara County Air Pollution Control District (SBCAPCD) rules and regulations.

Under the No-Action Alternative, redredging of the harbor would not occur, potentially jeopardizing the space launch programs at Vandenberg AFB.

f. Point of Contact:

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Title: Contractor
Organization: M. S. Hatch Consulting, LLC
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2. Analysis: Total combined direct and indirect GHG emissions associated with the action were estimated through ACAM on a calendar-year basis from the action start through the expected life cycle of the action. The life cycle for Air Force actions with "steady state" emissions (SS, net gain/loss in emission stabilized and the action is fully implemented) is assumed to be 10 years beyond the SS emissions year or 20 years beyond SS emissions year for aircraft operations related actions.

GHG Emissions Analysis Summary:

GHGs produced by fossil-fuel combustion are primarily carbon dioxide (CO2), methane (CH4), and nitrous oxide (NO2). These three GHGs represent more than 97 percent of all U.S. GHG emissions. Emissions of GHGs are typically quantified and regulated in units of CO2 equivalents (CO2e). The CO2e takes into account the global

warming potential (GWP) of each GHG. The GWP is the measure of a particular GHG's ability to absorb solar radiation as well as its residence time within the atmosphere. The GWP allows comparison of global warming impacts between different gases; the higher the GWP, the more that gas contributes to climate change in comparison to CO2. All GHG emissions estimates were derived from various emission sources using the methods, algorithms, emission factors, and GWPs from the most current Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and/or Air Emissions Guide for Air Force Transitory Sources.

The Air Force has adopted the Prevention of Significant Deterioration (PSD) threshold for GHG of 75,000 ton per year (ton/yr) of CO2e (or 68,039 metric ton per year, mton/yr) as an indicator or "threshold of insignificance" for NEPA air quality impacts in all areas. This indicator does not define a significant impact; however, it provides a threshold to identify actions that are insignificant (de minimis, too trivial or minor to merit consideration). Actions with a net change in GHG (CO2e) emissions below the insignificance indicator (threshold) are considered too insignificant on a global scale to warrant any further analysis. Note that actions with a net change in GHG (CO2e) emissions above the insignificance indicator (threshold) are only considered potentially significant and require further assessment to determine if the action poses a significant impact. For further detail on insignificance indicators see Level II, Air Quality Quantitative Assessment, Insignificance Indicators (April 2023).

The following table summarizes the action-related GHG emissions on a calendar-year basis through the projected life cycle of the action.

Action-Related Annual GHG Emissions (mton/yr)						
YEAR	**CO2**	**CH4**	**N2O**	**CO2e**	**Threshold**	**Exceedance**
2025	21	0.00045936	0.00190335	22	68,039	No
2026 [SS Year]	0	0	0	0	68,039	No

The following U.S. and State's GHG emissions estimates (next two tables) are based on a five-year average (2016 through 2020) of individual state-reported GHG emissions (Reference: State Climate Summaries 2022, NOAA National Centers for Environmental Information, National Oceanic and Atmospheric Administration. https://statesummaries.ncics.org/downloads/).

State's Annual GHG Emissions (mton/yr)				
YEAR	**CO2**	**CH4**	**N2O**	**CO2e**
2025	336,950,322	1,567,526	55,459	338,573,307
2026 [SS Year]	0	0	0	0

U.S. Annual GHG Emissions (mton/yr)				
YEAR	**CO2**	**CH4**	**N2O**	**CO2e**
2025	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2026 [SS Year]	0	0	0	0

GHG Relative Significance Assessment:

A Relative Significance Assessment uses the rule of reason and the concept of proportionality along with the consideration of the affected area (i.e., global, national, and regional) and the degree (intensity) of the proposed action's effects. The Relative Significance Assessment provides real-world context and allows for a reasoned choice against alternatives through a relative comparison analysis. The analysis weighs each alternative's annual net change in GHG emissions proportionally against (or relative to) global, national, and regional emissions.

The action's surroundings, circumstances, environment, and background (context associated with an action) provide the setting for evaluating the GHG intensity (impact significance). From an air quality perspective, context of an action is the local area's ambient air quality relative to meeting the NAAQSs, expressed as attainment, nonattainment, or maintenance areas (this designation is considered the attainment status). GHGs are non-hazardous to health at normal ambient concentrations and, at a cumulative global scale, action-related GHG emissions can only potentially cause warming of the climatic system. Therefore, the action-related GHGs generally have an insignificant impact to local air quality.

However, the affected area (context) of GHG/climate change is global. Therefore, the intensity or degree of the proposed action's GHG/climate change effects are gauged through the quantity of GHG associated with the action as compared to a baseline of the state, U.S., and global GHG inventories. Each action (or alternative) has significance, based on their annual net change in GHG emissions, in relation to or proportionally to the global, national, and regional annual GHG emissions.

To provide real-world context to the GHG and climate change effects on a global scale, an action's net change in GHG emissions is compared relative to the state (where action will occur) and U.S. annual emissions. The following table provides a relative comparison of an action's net change in GHG emissions vs. state and U.S. projected GHG emissions for the same time period.

Total GHG Relative Significance (mton)					
		CO2	CH4	N2O	CO2e
2025-2036	State Total	336,950,322	1,567,526	55,459	338,573,307
2025-2036	U.S. Total	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2025-2036	Action	21	0.000459	0.001903	22
Percent of State Totals		0.00000635%	0.00000003%	0.00000343%	0.00000649%
Percent of U.S. Totals		0.00000042%	0.00000000%	0.00000013%	0.00000043%

From a global context, the action's total GHG percentage of total global GHG for the same time period is: 0.00000006%.*

* Global value based on the U.S. emits 13.4% of all global GHG annual emissions (2018 Emissions Data, Center for Climate and Energy Solutions, accessed 7-6-2023, https://www.c2es.org/content/international-emissions).

Climate Change Assessment (as SC GHG):
On a global scale, the potential climate change effects of an action are indirectly addressed and put into context through providing the theoretical SC GHG associated with an action. The SC GHG is an administrative and theoretical tool intended to provide additional context to a GHG's potential impacts through approximating the long-term monetary damage that may result from GHG emissions effect on climate change. It is important to note that the SC GHG is a monetary quantification, in 2020 U.S. dollars, of the theoretical economic damages that could result from emitting GHGs into the atmosphere.

The SC GHG estimates are derived using the methodology and discount factors in the "Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990," released by the Interagency Working Group on Social Cost of Greenhouse Gases (IWG SC GHGs) in February 2021.

The speciated IWG Annual SC GHG Emission associated with an action (or alternative) are first estimated as annual unit cost (cost per metric ton, $/mton). Results of the annual IWG Annual SC GHG Emission Assessments are tabulated in the IWG Annual SC GHG Cost per Metric Ton Table below:

IWG SC GHG Discount Factor: 2.5%

IWG Annual SC GHG Cost per Metric Ton ($/mton [In 2020 $])			
YEAR	CO2	CH4	N2O
2025	$83.00	$2,200.00	$30,000.00
2026 [SS Year]	$84.00	$2,300.00	$30,000.00

Action-related SC GHG were estimated by calendar-year for the projected action's lifecycle. Annual estimates were found by multiplying the annual emission for a given year by the corresponding IWG Annual SC GHG Emission value (see table above).

Action-Related Annual SC GHG ($K/yr [In 2020 $])				
YEAR	**CO2**	**CH4**	**N2O**	**GHG**
2025	$1.78	$0.00	$0.06	$1.84
2026 [SS Year]	$0.00	$0.00	$0.00	$0.00

The following two tables summarize the U.S. and State's Annual SC GHG by calendar-year. The U.S. and State's Annual SC GHG are in 2020 dollars and were estimated by each year for the projected action lifecycle. Annual SC GHG estimates were found by multiplying the U.S. and State's annual five-year average GHG emissions for a given year by the corresponding IWG Annual SC GHG Cost per Metric Ton value.

State's Annual SC GHG ($K/yr [In 2020 $])				
YEAR	**CO2**	**CH4**	**N2O**	**GHG**
2025	$27,966,876.69	$3,448,557.38	$1,663,780.19	$33,079,214.26
2026 [SS Year]	$0.00	$0.00	$0.00	$0.00

U.S. Annual SC GHG ($K/yr [In 2020 $])				
YEAR	**CO2**	**CH4**	**N2O**	**GHG**
2025	$426,325,696.86	$56,379,205.70	$45,021,229.08	$527,726,131.63
2026 [SS Year]	$0.00	$0.00	$0.00	$0.00

Relative Comparison of SC GHG:

To provide additional real-world context to the potential climate change impact associate with an action, a Relative Comparison of SC GHG Assessment is also performed. While the SC GHG estimates capture an indirect approximation of global climate damages, the Relative Comparison of SC GHG Assessment provides a better perspective from a regional and global scale.

The Relative Comparison of SC GHG Assessment uses the rule of reason and the concept of proportionality along with the consideration of the affected area (i.e., global, national, and regional) and the SC GHG as the degree (intensity) of the proposed action's effects. The Relative Comparison Assessment provides real-world context and allows for a reasoned choice among alternatives through a relative contrast analysis which weighs each alternative's SC GHG proportionally against (or relative to) existing global, national, and regional SC GHG. The below table provides a relative comparison between an action's SC GHG vs. state and U.S. projected SC GHG for the same time period:

Total SC-GHG ($K [In 2020 $])					
		CO2	**CH4**	**N2O**	**GHG**
2025-2036	State Total	$27,966,876.69	$3,448,557.38	$1,663,780.19	$33,079,214.26
2025-2036	U.S. Total	$426,325,696.86	$56,379,205.70	$45,021,229.08	$527,726,131.63
2025-2036	Action	$1.78	$0.00	$0.06	$1.84
Percent of State Totals		0.00000635%	0.00000003%	0.00000343%	0.00000555%
Percent of U.S. Totals		0.00000042%	0.00000000%	0.00000013%	0.00000035%

From a global context, the action's total SC GHG percentage of total global SC GHG for the same time period is: 0.00000005%.*

* Global value based on the U.S. emits 13.4% of all global GHG annual emissions (2018 Emissions Data, Center for Climate and Energy Solutions, accessed 7-6-2023, https://www.c2es.org/content/international-emissions).

Massie Hatch, Contractor — Oct 22 2024

Name, Title — **Date**

Appendix E
2024 National Marine Fisheries Service Letter of Authorization

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
1315 East-West Highway
Silver Spring, Maryland 20910

DEPARTMENT OF COMMERCE

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

NATIONAL MARINE FISHERIES SERVICE

Letter of Authorization

The U.S. Space Force (USSF), is hereby authorized to take marine mammals incidental to those activities at Vandenberg Space Force Base (VSFB), California, in accordance with 50 CFR 217, Subpart G--Taking Marine Mammals Incidental to U.S. Space Force Launches and Operations at Vandenberg Space Force Base (VSFB), California subject to the provisions of the Marine Mammal Protection Act (16 U.S.C. 1361 *et seq.*; MMPA) and the following conditions:

1. This Letter of Authorization (LOA) is valid April 10, 2024, through April 9, 2029.

2. This Authorization is valid only for the unintentional taking of the species and stocks of marine mammals identified in Condition 4 incidental to rocket and missile launches and supporting operations originating at VSFB.

3. This Authorization is valid only if USSF or any person(s) operating under its authority implements the mitigation, monitoring, and reporting required pursuant to 50 CFR §§ 217.64 and 217.65 and implements the Terms and Conditions of this Authorization.

4. General Conditions

   (a) A copy of this LOA must be in the possession of USSF, its designees, and personnel operating under the authority of this LOA.

   (b) The incidental take of marine mammals under the activities identified in Condition 2 and 50 CFR § 217.60 of the regulations, by Level B harassment only, is limited to the species and stocks and number of takes shown in Table 1.

Species	**Stock**	**Annual Take by Level B harassment**	**5-Year Total Take by Level B harassment**
Harbor seal	California	11,135	38,591
California sea lion	United States	84,870	281,021
Northern elephant seal	California Breeding	9,438	29,590
Steller sea lion	Eastern	550	1,900
Northern fur seal	California	5,909	18,383
Guadalupe fur seal	Mexico	23	71

(c) The taking by injury (Level A harassment), serious injury, or death of any of the species listed in condition 3(b) of the Authorization or any taking of any other species of marine mammal is prohibited and may result in the modification, suspension, or revocation of this LOA.

5. Mitigation

USSF, and any persons operating under its authority, must implement the following mitigation measures when conducting the activities identified in Condition 2 of this Authorization.

(a) USSF must provide pupping information to launch proponents at the earliest possible stage in the launch planning process and direct launch proponents to, if practicable, avoid scheduling launches during pupping seasons on VSFB from 1 March to 30 April and on the Northern Channel Islands from 1 June- 31 July. If practicable, rocket launches predicted to produce a sonic boom on the Northern Channel Islands >3 pounds per square foot (psf) from 1 June – 31 July will be scheduled to coincide with tides in excess of +1.0 ft (0.3 m), with an objective to do so at least 50 percent of the time.

(b) For manned flight operations, aircraft must use approved routes for testing and evaluation. Manned aircraft must also remain outside of a 1,000-ft (305 m) buffer around pinniped rookeries and haul-out sites (except in emergencies such as law enforcement response or Search and Rescue operations, and with a reduced, 500-ft (152 m) buffer at Small Haul-out 1).

(c) UAS classes 0-2 must maintain a minimum altitude of 300 ft (91 m) over all known marine mammal haulouts when marine mammals are present, except at take-off and landing. Class 3 must maintain a minimum altitude of 500 ft (152 m), except at take-off and landing. UAS classes 4 and 5 only operate from the VSFB airfield and must maintain a minimum altitude of 1,000 ft (305 m) over marine mammal haulouts except at take-off and landing. USSF must not fly class 4 or 5 UAS below 1,000 ft (305 m) over haulouts.

6. Monitoring

USSF is required to conduct marine mammal and acoustic monitoring as described below:

(a) Monitoring at VSFB and NCI must be conducted by at least one NMFS-approved Protected Species Observer (PSO) trained in marine mammal science. PSOs must have demonstrated proficiency in the identification of all age and sex classes of all marine mammal species that occur at VSFB and on NCI. They must be knowledgeable of approved count methodology and have experience in observing pinniped behavior, especially that due to human disturbances.

(b) In the event that the PSO requirements described in paragraph (a) of this section cannot be met (*e.g.*, access is prohibited due to safety concerns), daylight or nighttime video monitoring must be used in lieu of PSO monitoring. In certain circumstances where the daylight or nighttime video monitoring is also not possible (*e.g.*, USSF is unable to access a monitoring site due to road conditions or human safety concerns), USSF must notify NMFS.

(c) At VSFB, USSF must conduct marine mammal monitoring and take acoustic measurements for all new rockets, for rockets (existing and new) launched from new facilities, and for larger or louder rockets (including those with new launch proponents) than those that have been previously launched from VSFB during their first three launches and for the first three launches from any new facilities during March through July.

i. For launches that occur during the harbor seal pupping season (March 1 through June 30) or when higher numbers of California sea lions are present (June 1 through July 31), monitoring must be conducted. At least one NMFS-approved PSO trained in marine mammal science must conduct the monitoring.

ii. When launch monitoring is required, monitoring must begin at least 72 hours prior to the launch and continue through at least 48 hours after the launch. Monitoring must include multiple surveys each day, with a minimum of four surveys per day.

iii. For launches within the harbor seal pupping season, USSF must conduct a follow-up survey of pups.

iv. For launches that occur during daylight, USSF must make time-lapse video recordings to capture the reactions of pinnipeds to each launch. For launches that occur at night, USSF must employ night video monitoring, when feasible.

v. When possible, PSOs must record: species, number, general behavior, presence and number of pups, age class, gender, and reaction to launch noise, or to natural or other human-caused disturbances. PSOs must also record environmental conditions, including visibility, air temperature, clouds, wind speed and direction, tides, and swell height and direction.

(d) USSF must conduct sonic boom modeling prior to the first three small or medium rocket launches from new launch proponents or at new launch facilities, and all heavy or super-heavy rocket launches.

(e) USSF must conduct marine mammal monitoring and take acoustic measurements at the NCI if the sonic boom model indicates that pressures from a boom will reach or exceed 7 psf from 1 January through 28 February, 5 psf from 1 March through 31

July, or 7 psf from 1 August through 30 September. No monitoring is required on NCI from 1 October through 31 December.

i. The monitoring site must be selected based upon the model results, prioritizing a significant haulout site on one of the islands where the maximum sound pressures are expected to occur.

ii. USSF must estimate the number of animals on the monitored beach and record their reactions to the launch noise and conduct more focused monitoring on a smaller subset or focal group.

iii. Monitoring must commence at least 72 hours prior to the launch, during the launch and at least 48 hours after the launch, unless no sonic boom is detected by the monitors and/or by the acoustic recording equipment, at which time monitoring may be stopped.

iv. For launches that occur in darkness, USSF must use night vision equipment.

v. Monitoring for each launch must include multiple surveys each day that record, when possible: species, number, general behavior, presence of pups, age class, gender, and reaction to sonic booms or natural or human-caused disturbances.

vi. USSF must collect photo and/or video recordings for daylight launches when feasible, and if the launch occurs in darkness night vision equipment will be used.

vii. USSF must record environmental conditions, including visibility, air temperature, clouds, wind speed and direction, tides, and swell height and direction.

(f) USSF must continue to test equipment and emerging technologies, including but not limited to night vision cameras, newer models of remote video cameras and other means of remote monitoring at both VSFB and on the NCI.

(g) USSF must evaluate UAS based or space-based technologies that become available for suitability, practicability, and for any advantage that remote sensing may provide to existing monitoring approaches.

(h) USSF must monitor marine mammals during the first three launches of the missiles for the new Ground Based Strategic Defense program during the months of March through July across the 5-year duration of this LOA.

i. When launch monitoring is required, monitoring must include multiple surveys each day, with a minimum of four surveys per day.

ii. When possible, PSOs must record: species, number, general behavior, presence and number of pups, age class, gender, and reaction to launch noise, or to natural or other human-caused disturbances. PSOs must also record environmental conditions, including visibility, air temperature, clouds, wind speed and direction, tides, and swell height and direction.

(i) USSF must conduct semi-monthly surveys (two surveys per month) to monitor the abundance, distribution, and status of pinnipeds at VSFB. Whenever possible, these surveys will be timed to coincide with the lowest afternoon tides of each month when the greatest numbers of animals are usually hauled out. If a VSFB or area closure precludes monitoring on a given day, USSF must monitor on the next best day.

i. PSOs must gather the following data at each site: species, number, general behavior, presence and number of pups, age class, gender, and any reactions to natural or human-caused disturbances. PSOs must also record environmental conditions, including visibility, air temperature, clouds, wind speed and direction, tides, and swell height and direction.

7. Reporting

(a) USSF must submit an annual report each year to NMFS Office of Protected Resources and West Coast Region on March 1st of each year that describes all activities and monitoring for the specified activities during that year. This includes launch monitoring information in Condition 7(a)(i) through (iii) for each launch where monitoring is required or conducted. The annual reports must also include a summary of the documented numbers of instances of harassment incidental to the specified activities, including non-launch activities (*e.g.*, takes incidental to aircraft or helicopter operations observed during the semi-monthly surveys). Annual reports must also include the results of the semi-monthly sentinel marine mammal monitoring described in Condition 6(i), results of tests of equipment and emerging technologies described in condition 6(f), and results of evaluation of UAS based or space-based technologies described in condition 6(g).

i. Launch information, including:

1) Date(s) and time(s) of the launch (and sonic boom, if applicable);

2) Number(s), type(s), and location(s) of rockets or missiles launched;

ii. Monitoring program design; and

iii. Results of the launch-specific monitoring program, including:

1) Date(s) and location(s) of marine mammal monitoring;

2) Number of animals observed, by species, on the haulout prior to commencement of the launch or recovery;

3) General behavior and, if possible, age (including presence and number of pups) and sex class of pinnipeds hauled out prior to the launch or recovery;

4) Number of animals, by species, age, and sex class that responded at a level indicative of harassment. Harassment is characterized by:

A. Movements in response to the source of disturbance, ranging from short withdrawals at least twice the animal's body length to longer retreats over the beach, or if already moving a change of direction of greater than 90 degrees; or

B. All retreats (flushes) to the water.

5) Number of animals, by species, age, and sex class that entered the water, the length of time the animal(s) remained off the haulout, and any behavioral responses by pinnipeds that were likely in response to the specified activities, including in response to launch noise or a sonic boom;

6) Environmental conditions including visibility, air temperature, clouds, wind speed and direction, tides, and swell height and direction; and

7) Results of acoustic monitoring, including the following:

A. Recorded sound levels associated with the launch (in SEL, SPL_{peak}, and SPL_{rms});

B. Recorded sound levels associated with the sonic boom (if applicable), in psf; and

C. The estimated distance of the recorder to the launch site and the distance of the closest animals to the launch site.

iv. Results of the semi-monthly sentinel marine mammal monitoring described in Condition 6(i), including:

1) Number of animals observed, by species;

2) General behavior and, if possible, age (including presence and number of pups) and sex class of pinnipeds hauled out;

3) Any reactions to natural or human-caused disturbances;

4) Environmental conditions including visibility, air temperature, clouds, wind speed and direction, tides, and swell height and direction.

(b) USSF must submit a final, comprehensive 5-year report to NMFS Office of Protected Resources within 90 days of the expiration of this LOA. This report must:

i. Summarize the activities undertaken and the results reported in all annual reports;

ii. Assess the impacts at each of the major rookeries; and

iii. Assess the cumulative impacts on pinnipeds and other marine mammals from the activities specified in Condition 2.

(c) If the activity identified in Condition 2 likely resulted in the take of marine mammals not identified in Condition 4(b), then the USSF must notify the NMFS Office of Protected Resources and the NMFS West Coast Region stranding coordinator within 24 hours of the discovery of the take.

(d) In the event that personnel involved in the activities discover an injured or dead marine mammal, USSF must report the incident to the Office of Protected Resources (OPR), NMFS (PR.ITP.MonitoringReports@noaa.gov and itp.davis@noaa.gov) and to the West Coast regional stranding network (866-767-6114) as soon as feasible.

The report must include the following information:

i. Time, date, and location (latitude/longitude) of the first discovery (and updated location information if known and applicable);

ii. Species identification (if known) or description of the animal(s) involved;

iii. Condition of the animal(s) (including carcass condition if the animal is dead);

iv. Observed behaviors of the animal(s), if alive;

v. If available, photographs or video footage of the animal(s); and

vi. General circumstances under which the animal was discovered.

(e) If real-time monitoring during a launch shows that the activity identified in Condition 2 is reasonably likely to have resulted in the mortality or injury of any marine mammal, USSF must notify NMFS within 24 hours (or next business day). NMFS and USSF must then jointly review the launch procedure and the mitigation

requirements and make appropriate changes through the adaptive management process, as necessary and before any subsequent launches of rockets and missiles with similar or greater sound fields and/or sonic boom pressure levels.

8. This Authorization may be modified, suspended or withdrawn if USSF fails to abide by the conditions prescribed herein or if the authorized taking is having more than a negligible impact on the species or stock of affected marine mammals.

9. Renewals and Modifications of Letter of Authorization

(a) A LOA issued under 50 CFR §§ 216.106 and § 217.66 for the activity identified in Condition 2 of this Authorization and 50 CFR § 217.60(a) and (b) shall be modified upon request by USSF, provided that:

i. The specified activity and mitigation, monitoring, and reporting measures, as well as the anticipated impacts, are the same as those described and analyzed for this subpart (excluding changes made pursuant to the adaptive management provision in paragraph (c) of this section); and

ii. NMFS determines that the mitigation, monitoring, and reporting measures required by the previous LOA under these regulations were implemented.

(b) For LOA modification or renewal requests by the applicant that include changes to the activity or the mitigation, monitoring, or reporting measures (excluding changes made pursuant to the adaptive management provision in paragraph (c) of this section) that do not change the findings made for the regulations or that result in no more than a minor change in the total estimated number of takes (or distribution by species or stock or years), NMFS may publish a notice of proposed changes to the LOA in the *Federal Register*, including the associated analysis of the change, and solicit public comment before issuing the LOA.

(c) An LOA issued under 50 CFR §§ 216.106 and 217.66 for the activity identified in Condition 2 of this Authorization and 50 CFR § 217.60(a) and (b) may be modified by NMFS under the following circumstances:

i. After consulting with the USSF regarding the practicability of the modifications, NMFS, through adaptive management, may modify (including adding or removing measures) the existing mitigation, monitoring, or reporting measures if doing so creates a reasonable likelihood of more effectively accomplishing the goals of the mitigation and monitoring.

ii. Possible sources of data that could contribute to the decision to modify the mitigation, monitoring, or reporting measures in an LOA include:

1) Results from the USSF's monitoring from the previous year(s);

2) Results from other marine mammal and/or sound research or studies; or

3) Any information that reveals marine mammals may have been taken in a manner, extent or number not authorized by these regulations or a subsequent LOA.

iii. If, through adaptive management, the modifications to the mitigation, monitoring, or reporting measures are more than minor, NMFS will publish a notice of the proposed changes to the LOA in the *Federal Register* and solicit public comment.

(d) If NMFS determines that an emergency exists that poses a significant risk to the well-being of the species or stocks of marine mammals specified in the regulations and this Authorization, an LOA may be modified without prior notice or opportunity for public comment. Notice would be published in the *Federal Register* within 30 days of the action.

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For Kimberly Damon-Randall, Director
Office of Protected Resources