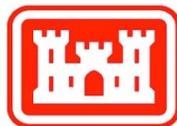


**DRAFT Environmental Assessment
and
404 (b)(1) Analysis**

for

**The N. Half Moon Bay (Princeton) Pillar Point Harbor
CAP §111 Feasibility Study**

Half Moon Bay, San Mateo County, California



**U.S. Army Corps of Engineers
San Francisco District**

October 2015

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TABLE OF CONTENTS

1.0 Proposed Project	1
1.1 Introduction.....	1
1.2 Description and Location.....	1
1.3 Purpose and Need for Proposed Action.....	4
1.4 Clean Water Act Section 404(b)(1) Basic and Overall Project Purpose	6
1.5 Study Authority.....	6
2.0 Scope of Analysis	6
3.0 Proposed Action and Alternatives	7
3.1 Proposed Action (Agency-preferred Alternative).....	7
3.2 No-action alternative.....	9
3.4 Alternatives Considered but Eliminated	10
3.5 404(b)(1) Alternatives Comparison.....	11
4.0 Affected Environment and Consequences	14
4.1 Water.....	14
4.2 Biological Environment.....	22
4.3 Physical Environment	40
4.4 Human Environment.....	42
4.5 Irreversible Changes and Cumulative Effects.....	49
5.0 Summary of Indirect and Cumulative Effects	50
6.0 Environmental Compliance	50
7.0 Agencies Consulted and Public Notification	55
7.1 Summary of comments	55
8.0 Determinations and Statement of Findings.....	56
9.0 References.....	57

APPENDICES

Appendix A – Assessment of Potential for Listed Species to Occur in the Proposed Project Area..... 60

Appendix B – Preparers..... 67

ACRONYMS AND ABBREVIATIONS

BA	Biological Assessment
BAAQMD	Bay Area Air Quality Management District
BMPs	Best Management Practices
CAA	Clean Air Act
CalTrans	California Department of Transportation
CAP	Continuing Authorities Program
CCC	California Coastal Commission; Central California Coastal
CCMP	California Coastal Management Program
CDFW	California Department of Fish and Wildlife
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CNDDB	California Natural Diversity Database
CSMW	Coastal Sediment Management Workgroup
CWA	Clean Water Act
CY	Cubic yard(s)
CZMA	Coastal Zone Management Act
dB	Decibel
DO	Dissolved Oxygen
DPS	Distinct Population Segment
EA	Environmental Assessment
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EPA	Environmental Protection Agency
ER	Engineering Regulation
ERL	Effects Range Low
ESA	Endangered Species Act
FMP	Fishery Management Plan
ft	foot; feet
FONSI	Finding of No Significant Impact
GFMNS	Gulf of the Farallones National Marine Sanctuary
m	Meter
MBMNS	Monterey Bay National Marine Sanctuary
MBTA	Migratory Bird Treaty Act
MHW	Mean High Water
MHHW	Mean Higher High Water
MLLW	Mean Lower Low Water
MMPA	Marine Mammal Protection Act
MSFCMA	Magnuson-Stevens Fisheries Conservation and Management Act
NAAQS	National Ambient Air Quality Standards
NAVD88	North American Vertical Datum 88
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NMSA	National Marine Sanctuaries Act
NOAA	National Oceanic and Atmospheric Administration
ppt	parts per thousand
re 1 μ Pa	Referenced to 1 micro-Pascal
RMS	Root Mean Square
RWQCB	Regional Water Quality Control Board

SCCC	South-Central California coastal
SAIC	Science Applications International Corporation
SAV	Submerged Aquatic Vegetation
SHPO	State Historic Preservation Officer
SFBAAB	San Francisco Bay Area Air Basin
SMCHD	San Mateo County Harbor District
TSS.....	Total Suspended Solids
USACE	United States Army Corps of Engineers
USC.....	United States Code
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WDR	Waste Discharge Requirements

FIGURES AND TABLES

Figure 1: Pillar Point Harbor Region and Study Area	2
Figure 2: Detailed Study Area	3
Figure 3: Study Vicinity.....	3
Figure 4: Extent of Projected Bluff Retreat at 10 and 50 Years.	5
Figure 5: Area of Excessive Sediment Accumulation and Shoaling in Pillar Point Harbor..	5
Figure 6: Schematic of Proposed Action Design.....	8
Figure 7: Comparison of Placement Areas Along Surfer’s and Vallejo Beaches Under the Maximum Beach Fill (a.) and Proposed Action (b.) Alternatives	13
Figure 8: Modeled Erosion and Accretion in the Vicinity of Beach Fill Placement (140,000 to 150,000 CY) and Borrow Areas from June 2009 to November 2009	20
Figure 9: Rocky Intertidal Zone at Pillar Point Harbor’s East Breakwater	22
Figure 10: Fenced-off Coastal Strand Habitat at Pillar Point Harbor (Left) and Aerial View of Habitat Location (Right).....	27
Figure 11: Proposed Location of the Project (yellow outline) in Relation to the MBNMS	29
Figure 12: Critical Habitat in the Proposed Project Region	32
Figure 13: Coastal geography of Offshore of Half Moon Bay Area	41
Table 1: Summary of Impacts to Waters of the U.S.	12
Table 2: Pillar Point Harbor Water Quality Characteristics.	14
Table 3: Listed species With the Potential to Occur in the Proposed Action Area.	31
Table 4: Summary of Environmental Compliance	52

1.0 Proposed Project

1.1 Introduction

This Environmental Assessment (EA) is written in compliance with the National Environmental Policy Act (NEPA) of 1969 (42 USC § 4321 *et seq*), as amended, the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of the NEPA (40 C.F.R. §§1500-1508), and U.S. Army Corps of Engineers (USACE) Planning Regulations (Engineering Regulation (ER) 200-2-2). It presents an evaluation of the potential impacts associated with dredging of sand from Pillar Point Harbor and subsequent placement of that sand adjacent to the East Breakwater outside the harbor in front of a stretch of eroding coastline in the area of Surfer's, Vallejo, and Miramar Beaches.

It should be noted that, this draft EA and Section 404(b)(1) analysis are being prepared for USACE's feasibility review process during which federal interest in the project will be evaluated. The USACE will not make a NEPA determination on the project unless it is determined during the feasibility phase that there is a federal interest in conducting the project. Because federal interest in this project has yet to be determined, this document has not been released for public/agency review/comment and is not accompanied by a draft Finding of No Significant Impact (FONSI) or environmental compliance permits.

1.2 Description and Location

The proposed action would involve dredging of approximately 140,000 to 150,000 cubic yards (CY) of sand accumulated along the inside of Pillar Point Harbor's East Breakwater and a one-time placement of that sand to form a 125-foot wide elevated berm along the approximately 3,100-foot long section of shoreline that makes up Surfer's, Vallejo, and Miramar Beaches in Half Moon Bay.

The project area is located at Pillar Point Harbor in Half Moon Bay, California. Half Moon Bay lies approximately 25 miles south of San Francisco in San Mateo County, California. In 1948, Congress authorized the construction of two breakwaters (west and east) at the northern end of Half Moon Bay to create the 245-acre Pillar Point Harbor (Figure 1). The harbor, which encloses 1.6 miles of shoreline, comprises an inner harbor and outer harbor.

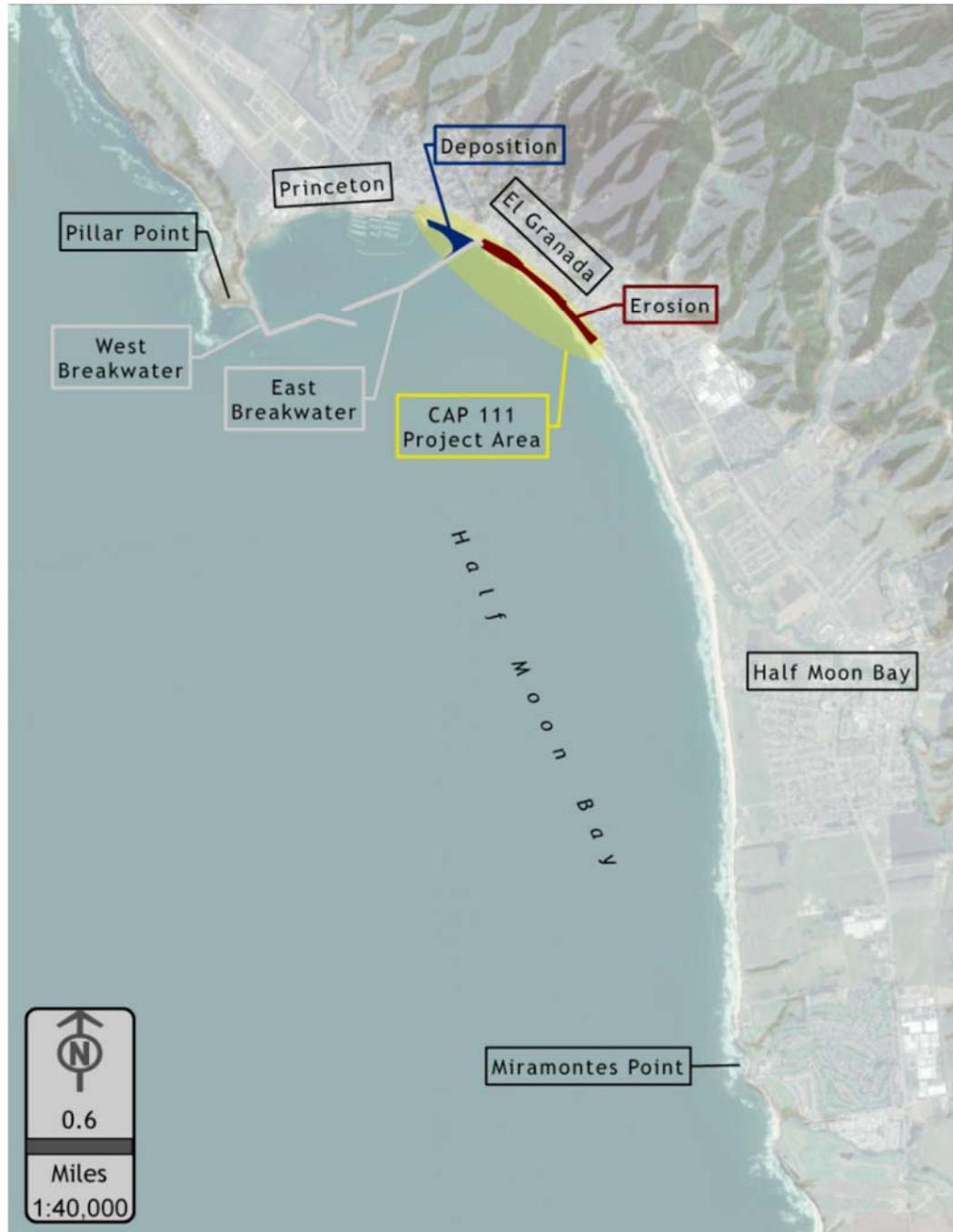


Figure 1. Pillar Point Harbor Region and Study Area.

The harbor houses commercial fishing vessels and recreational boats, and the surrounding country includes an airport as well as agricultural, commercial, and residential areas. The unincorporated community of Princeton borders the harbor to the north and the community of El Granada lies east of the harbor (Figure 1). An Air Force facility is situated on the bluff overlooking the harbor. The study area (outlined in Figure 2) encompasses part of Pillar Point's outer harbor adjacent to the East Breakwater and extends 0.9 miles southeast of the breakwater along the shoreline. South of the East Breakwater lie Surfer's Beach, Vallejo Beach, and Miramar Beach respectively (Figure 3). The area outside of Pillar Point Harbor is within the northern part

1.3 Purpose and Need for Proposed Action

The primary purposes of the proposed action are to minimize near-term bluff and beach erosion along the shoreline just south of Pillar Point Harbor's East Breakwater (in the areas known as Surfer's, Vallejo, and Miramar Beaches [Figure 3]) and to remove material that has collected inside the harbor along that breakwater. The proposed action is necessary to prevent future damages from being caused by the East Breakwater (a USACE navigation structure) including structural damage and loss of recreation associated with the ongoing erosion at these beaches. Additionally, removal of material inside the harbor under the proposed action is needed to help alleviate a potential navigation hazard for vessels utilizing the nearby small boat launch ramp.

The USACE constructed the East Breakwater between 1959 and 1961. Concurrently and subsequently, rates of coastal erosion along the shoreline directly southeast of the breakwater dramatically increased (Griggs et al., 2005, as cited in Lin et al., 2015). That rapid erosion of the beach and bluffs extending south of Pillar Point Harbor has been a source of concern over the past several decades (Lin, Li, Zoulas, Andes, and Wu, 2015). Bluff retreat rates of several tens of feet a year led to the construction of revetments – one in front of Highway 1 at Surfer's Beach (labeled "Caltrans Revetment" in Figure 3) and one at Miramar Beach in front of Miranda Road (labeled "San Mateo County Revetment" in Figure 3). A recent analysis of bluff retreat in the region from 1993 to 2012 indicates that an approximately 2,200-foot (ft) long unprotected section of bluff between the two revetments (along Vallejo Beach) is retreating at a rate of 1.64 feet (ft) per year, a significantly greater rate than at a geologically similar unprotected section of bluff down coast (Lin et al., 2015). This suggests that the locally higher rates of beach and bluff erosion may be partially attributable to changes in local wave and current conditions and sediment supply related to the construction of the East Breakwater. In addition to the problem of erosion, the construction of the East Breakwater has also been associated with the accumulation of a significant amount of sediment (primarily sand) within Pillar Point Harbor (Lin et al., 2015). This sand has formed a beach near the root of the East Breakwater and a shoal along the harbor side of the breakwater that is approximately 200 to 250 ft wide and 2,000 ft long.

The proposed project is necessary to reduce the threat of structural damage and recreation loss along the coastal stretch in the project area (Surfer's, Vallejo, and Miramar Beaches). It also presents the opportunity to reduce a navigation hazard in Pillar Point Harbor. Severe shoreline erosion in the 1980s destroyed one cliff-top road, and threatened the integrity of California Highway 1 and several commercial and private structures. At that time, rubble-mound revetments were constructed by State and local agencies south of the East Breakwater (Figure 3). However, the threat of structural damage and loss of recreational public beach still exists along the shoreline directly adjacent to the East Breakwater. For example, USACE projected current bluff erosion rates 10 and 50 years into the future and determined that infrastructure, such as Highway 1 and coastal pedestrian paths leading to the beach, would be significantly threatened without action (Figure 4). The proposed project would also alleviate some of the shoaling of sediment in Pillar Point Harbor adjacent to the East Breakwater (Figure 5). The area of excessive sedimentation inside the harbor presents a potential navigation hazard for vessels utilizing the nearby small boat launch ramp. The entire area surrounding the boat launch ramp is above the minus 10-foot North American Vertical Datum 88 (NAVD88). The San Mateo County Harbor District (SMCHD) has voiced concern with the impact of this shoaling on navigation in the harbor.



Figure 4. Extent of Projected Bluff Retreat at 10 and 50 Years (based on the estimated retreat rate of 1.64 ft/yr) Source: Lin et al. (2015).

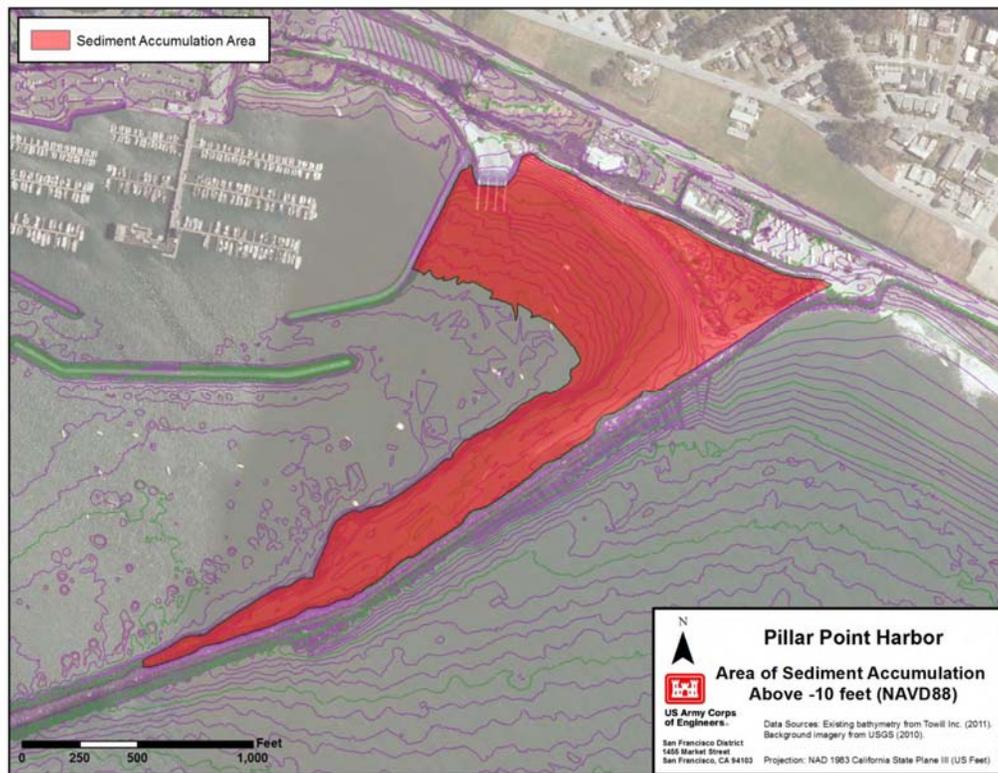


Figure 5. Area of Excessive Sediment Accumulation and Shoaling in Pillar Point Harbor. Source: Lin et al. (2015).

1.4 Clean Water Act Section 404(b)(1) Basic and Overall Project Purpose

Section 404 of the Federal Water Pollution Control Act Amendments of 1972 (Clean Water Act [CWA]) requires USACE to analyze its activities that involve placement of dredged or fill material into waters of the United States (33 U.S.C. 1344). For both water-dependent and non-water-dependent projects, the Guidelines prohibit discharges of dredged or fill material into waters of the United States if a practicable alternative to the proposed project exists that would have less adverse impacts on the aquatic ecosystem, including wetlands, and does not have other significant environmental consequences (40 Code of Federal Regulations [C.F.R.] 230 [a]).

The basic project purpose, which comprises the fundamental, essential, or irreducible purpose of the proposed project, is used to determine whether the project is water dependent. Water dependency is defined as an activity requiring access, proximity to, or siting within a special aquatic site (as defined in 40 C.F.R. § 230.40- 230.45) to fulfill its basic project purpose. Special aquatic sites include (1) sanctuaries and refuges; (2) wetlands; (3) mud flats; (4) vegetated shallows; (5) coral reefs; and (6) riffle and pool complexes. The basic purpose for the proposed action is beach nourishment, which is considered a water dependent activity given that the proposed action is located within the MBNMS, a special aquatic site.

The overall project purpose serves as the basis for the alternatives analysis and further defines the basic project purpose in a manner that describes the specific goals for the project, and allows a reasonable range of alternatives to be analyzed. The overall purpose for the proposed action is to minimize near-term bluff and beach erosion in the vicinity of Surfer's, Vallejo, and Miramar Beaches.

1.5 Study Authority

Construction and maintenance of Pillar Point Harbor were authorized by the Rivers and Harbors Act of 1948 and 1958, respectively. The proposed study is authorized by the River and Harbor Act of 1968, under the Continuing Authorities Program (CAP) Section 111 - Shore Damage Prevention or Mitigation Caused by Federal Navigation Projects. The study is currently in the Feasibility Phase during which USACE is analyzing the feasibility of, and federal interest in, the proposed project.

As noted in the introduction, this draft EA and Section 404(b)(1) analysis are being prepared for USACE's feasibility review process, during which federal interest in this project will be evaluated. The USACE will not make a NEPA determination (e.g. Finding of No Significant Impact) on the project unless it is determined during the feasibility phase that there is a federal interest in conducting the project. Because federal interest in this project has yet to be determined, this document has not been released for public review and comment, and is not accompanied by a draft FONSI or environmental compliance permits.

2.0 Scope of Analysis

This EA analyzes whether the proposed action will significantly affect the quality of the human environment. The scope of this project analysis is limited in time and space by the reasonably foreseeable direct, indirect, and cumulative impacts of the proposed action. Direct effects are caused by the action, and occur at the same time and place as the action (40 CFR 1508.8a) while indirect effects are caused by the action, but may occur later in time or further removed in distance (40 C.F.R. § 1508.8b). Cumulative effects "result from the incremental impact of the

action when added to other past, present, and reasonably foreseeable future actions” (40 C.F.R. § 1508.7).

The action area for this analysis includes the backshore beach, intertidal zone, and subtidal zone along Surfer’s, Vallejo, and Miramar Beaches as well as inside Pillar Point Harbor adjacent to the base of the East Breakwater. It also includes the open-water area at and around the shoaled sediment along the inside of the East Breakwater. For certain potential impacts, such as construction-related noise, the scope of analysis also includes adjacent properties and recreational trails surrounding the project site. Additionally, the scope of analysis incorporates evaluation of potential cumulative impacts associated with future projects reasonably foreseeable to occur within the vicinity of the action area as of June 2015.

3.0 Proposed Action and Alternatives

To satisfy the requirements of NEPA and provide the basis for the required 404(b)(1) alternatives analysis, this section describes the proposed action, the no-action alternative (under which no new action would be taken), and alternatives that have been considered but eliminated from further consideration.

In evaluating USACE projects under Section 404 of the Clean Water Act, USACE must clearly demonstrate that there are no practicable, less damaging alternatives. Under the Environmental Protection Agency’s (EPA’s) Clean Water Act guidelines, an alternative is considered practicable if, in light of the project purpose, it is "available and capable of being done after taking into consideration cost, existing technology, and logistics" (40 C.F.R. §230.10 [a][2]). In addition to summarizing practicable alternatives in detail, this section provides information regarding alternatives that, after preliminary stages of screening, were determined not to meet the project purpose or to be impracticable, and which are not analyzed in detail in the EA. The USACE is responsible for making the formal determination of compliance with the 404 (b)(1) guidelines. The alternatives analysis for this project and other data included in this EA are intended to serve as input to facilitate that decision.

3.1 Proposed Action (Agency-preferred Alternative)

The proposed action would involve a one-time dredging episode of approximately 140,000 to 150,000 CY of sand accumulated along the East Breakwater and placement of that sand to form a 125-foot wide elevated berm along the approximately 3,100-foot long section of shoreline that makes up Surfer’s and Vallejo Beaches (Figure 6). This action would satisfy the project purpose of mitigating near-term beach and bluff erosion by providing a buffer that would reduce the erosional impacts of elevated water levels and wave attack in the placement area. Additionally, the proposed action would take advantage of the opportunity to remove excess shoaled sediment along the East Breakwater within the harbor, reducing a navigation hazard posed to vessels using the harbor’s small boat launch ramp.

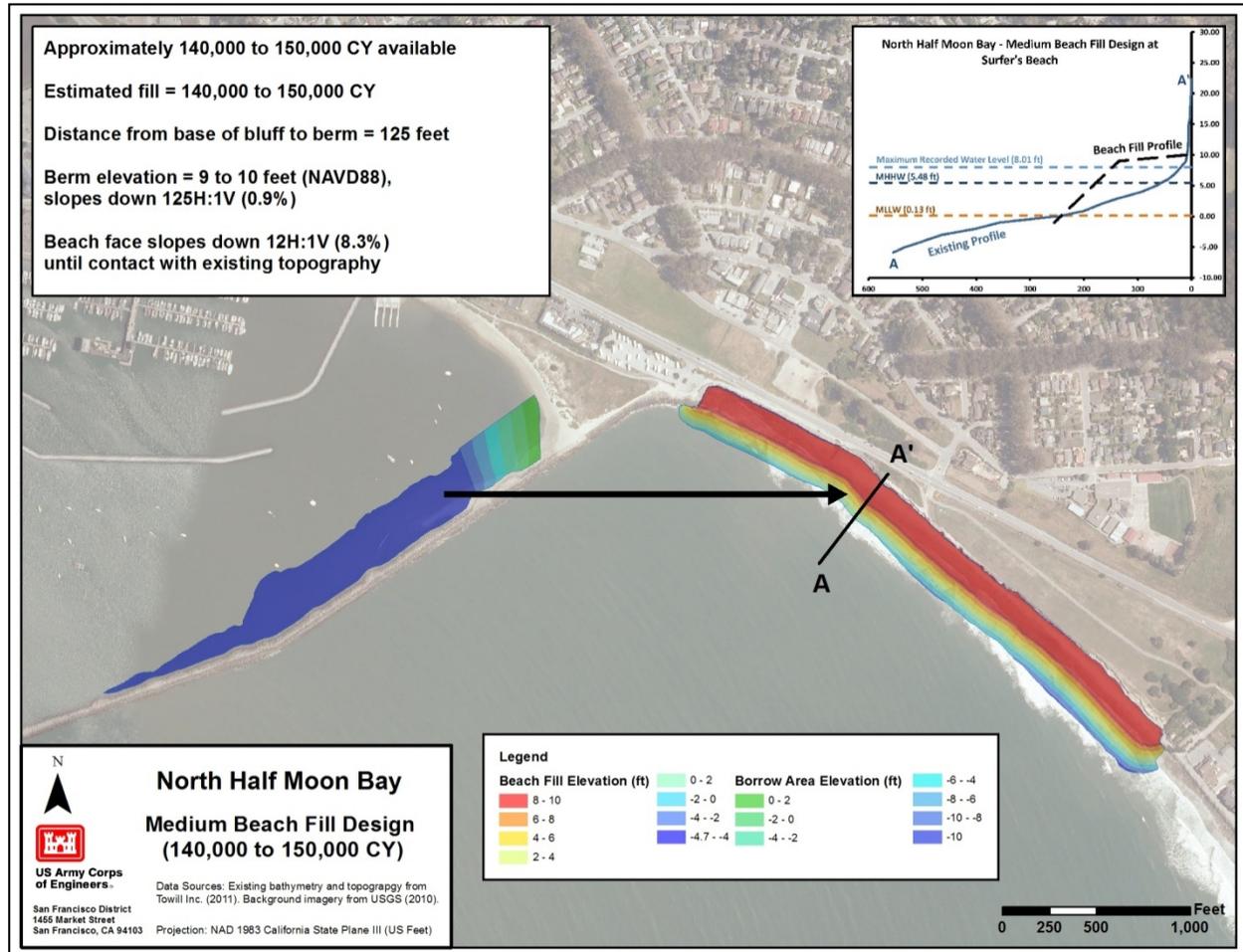


Figure 6. Schematic of Proposed Action Design. The design includes a borrow area along the East Breakwater and placement area along Surfer's and Vallejo Beaches. Source: Lin et al. (2015).

The extensive sand shoal that has formed on the north side of the East Breakwater would serve as the exclusive source of sand for this proposed action (Figure 5). The sand would be dredged down to a depth of 10 ft (NAVD88) to approximately match the surrounding bathymetry then pumped onto the adjacent beach south of the breakwater. This analysis assumes a pipeline dredge would be used to remove and then pump the sand. The proposed action includes only a one-time placement of sand and assumes that there will be no maintenance (additional sand placement) in the future. Sand placement is anticipated to be most effective in reducing the erosion of the unprotected bluff and in creating a beach in the immediate vicinity of the East Breakwater. Thus, sand placement would extend along the approximately 3,100-ft section of shoreline from the root of the East Breakwater to the start of Miramar Beach. Over time, coastal processes would transport sand to the south, forming a beach in front of the revetment at Miramar Beach.

To minimize potential impacts to the nearshore zone and recreation activities like surfing, the proposed action maximizes the amount of fill placed on the sub-aerial beach (the part of the beach uncovered by water). The sand would initially be placed in an “over-built” berm shape. This analysis assumes the berm would be shaped with equipment including a small lightweight dozer and low ground-pressure scraper. Existing profiles in the proposed fill area indicated a

steep upper beach with no natural berm or defined backshore beach (Lin et al., 2015). Profiles from a nearby beach suggested that a “natural” beach berm tends to form at an elevation of 15 ft (NAVD88) in this region. For the proposed action, a target berm elevation of 9 to 10 ft was selected, based on the highest recorded water level in the region (8.01 ft) and the elevation of the toe of the bluff backing the beach (10.0 ft). Given the available fill quantity (140,000–150,000 CY), the berm would be approximately 125 ft wide, with a beach face that will slope down at 1V:12H (i.e., Vertical: Horizontal), until it contacts the existing nearshore bathymetry. The berm is expected to narrow overtime as the new beach profile approaches equilibrium with existing hydrodynamic conditions (USACE, 2002 as cited in Lin et al., 2015).

Because the project is currently in the feasibility phase and federal interest has not yet been determined, project details such as construction timing and staging locations are not available. However, the proposed action is anticipated to require approximately six months to complete and would likely occur during the early spring to summer months because of the minimal chance of rain and large, damaging waves during this period.

3.2 No-action alternative

The no-action alternative characterizes current and anticipated future conditions at the project site in the absence of the proposed action to address beach and bluff erosion. The USACE has analyzed recent bluff and beach erosion rates at the site and considered the potential impacts of “intermediate” and “high” sea level change on these rates over the next 50 years (Lin et al., 2015). These analyses suggest that high rates of erosion are present along Surfer’s, Vallejo, and Miramar Beaches while high accretion of sand is occurring in Pillar Point Harbor adjacent to the East Breakwater. Unabated, this erosion and accretion will result in loss of recreational opportunities as well as threats to public safety along highway one and navigational safety in Pillar Point Harbor.

The results of the current bluff erosion analysis indicate that the bluffs directly south of the East Breakwater, between the Highway 1 revetment and Mirada Road revetment, retreated at a rate of 1.64 ft/yr from 1993 to 2012. This is approximately seven times greater than the background rate of erosion as measured at a geologically similar section of shoreline further down the coast which Lin et al. (2015) found to be in the range of 0.23 ft/yr from 1993 to 2012. However, the accelerated erosion rate does not appear to extend south of Miramar Beach, as the analysis showed a slow bluff retreat rate to the south of the San Mateo County revetment. Similarly, Lin et al. (2015) found a high rate of net beach erosion (4,200 CY/yr) along and offshore of the coast extending from the East Breakwater to the Miranda Road revetment, accompanied by significant accumulation of sand within Pillar Point Harbor (approximately 2,000 CY). Increases in sea level to intermediate or high levels would cause the water surface in the region to rise by 0.71 ft or 2.06 ft, respectively in the study area over the course of 50 years. Under such conditions, Lin et al. (2015) find that rates of erosion of beach sands and adjacent bluffs as well as accretion of sand in the harbor would increase, as the higher water levels expose the upper beach and bluff toes to more wave attack and carry more sediment into the harbor.

Under the no-action alternative, the high rates of beach and bluff erosion along the coastline would continue unabated wherever there is not a revetment, and accretion of sediment within Pillar Point Harbor – adjacent to the East Breakwater – would continue. Extrapolating the current bluff erosion rates into the future, Lin et al. (2015) found that an approximately 80-ft-long

section of the southbound shoulder of Highway 1 would be undermined in the next 10 years, with approximately 250 ft at risk in the next 50 years. This would create significant impacts to public safety and likely require relocating a portion of the highway, which would be expensive and could cause significant environmental impacts. Continued beach and bluff erosion would also threaten recreational uses in the area. Beach erosion would result in loss of recreational beach area at Surfer's, Vallejo, and Miramar Beaches, while sections of the pedestrian Coastal Trail on the bluffs behind the beaches would likely be lost given that a 25-ft-long section of the pathway at the north end of the San Mateo County revetment is already being actively undermined by bluff erosion. Conversely, continued accretion of sediment in Pillar Point Harbor would increase the size of the existing shoal and pose an increasingly significant navigational risk of ship damage or stranding. These impacts could occur more quickly given potential sea level change.

3.3 Alternatives Considered but Eliminated

Seven alternatives were considered and eliminated because they were either found to have a large impact on waters of the US, did not meet the project purpose, or were infeasible in terms of constructability or cost. Those alternatives included a wide array of structural and non-structural actions including beach fill, dredging, alteration of the East Breakwater, construction of a spur breakwater, and managed retreat. These alternatives were formulated with significant input from USACE's coastal engineering section, USACE project team members, and the public¹. The remaining proposed action is carried forward for detailed analysis in this EA. The alternatives that were considered but eliminated are:

- *Maximum Beach Fill Alternative:* This alternative was nearly identical to the proposed action but would have involved a one-time dredging of approximately 200,000 to 250,000 CY of sand from inside Pillar Point Harbor and placing that along the shoreline at Surfer's and Vallejo Beaches to create a 180-foot wide berm. This alternative would satisfy the project purpose of nourishing the beach to mitigate near-term beach and bluff erosion and would reduce the navigation hazard posed to vessels using the harbor's small boat launch ramp. However, it would have a large 404(b)(1) impact on waters of the U.S. (in terms of acreage and cubic yards) and thus was eliminated from further consideration (see 404(b)(1) analysis in section 3.4).
- *Sealing the East Breakwater:* This alternative involved sealing a 2,500 ft section of the East Breakwater with concrete to prevent sand from surging through voids in the breakwater. Modeling of erosion and accretion patterns under this alternative suggested that while it would decrease accretion of sediment within the harbor, it was not likely to reduce beach and bluff erosion along Surfer's and Vallejo Beaches (Lin et al., 2015). This alternative was eliminated from further consideration because it would not meet the project purpose of nourishing the shoreline to mitigate beach and bluff erosion.
- *Creating a Notch in the East Breakwater:* This alternative involved removing a short (~200-ft long) section of the East Breakwater to allow currents to move sand from inside the harbor

¹ A public meeting was held on November 8, 2013 providing a forum for the USACE project team and the public to exchange ideas on potential alternatives.

to just offshore of the adjacent shoreline outside the harbor. Modeling of erosion and accretion patterns under this alternative suggested that while it would result in the release of a small quantity of sand from the harbor, it would not be enough to mitigate the erosion concerns Surfer's and Vallejo Beaches in the near-term (Lin et al., 2015). Additionally, the opening of a notch could alter hydrodynamic conditions inside the harbor in such a way that would potentially create navigation hazards from larger waves entering the harbor and damaging vessels (Lin et al., 2015). This alternative was eliminated because it would not meet the project purpose of nourishing the shoreline to mitigate beach and bluff erosion.

- *Alternative Dredged Material Placement:* This alternative involved the continuous removal of sand from the shoal along the harbor side of East Breakwater and placing that sand near the harbor entrance where it could move shoreward. Modeling of the potential sediment transport from this location suggests that most of this sand would be transported to the relatively deep (~30 ft) water directly offshore of the entrance where it would settle and not provide shoreline erosion mitigation benefits for Surfer's, Vallejo, and Miramar Beaches (Lin et al., 2015). This alternative was also eliminated because it would not meet the project purpose of nourishing the shoreline to mitigate beach and bluff erosion.
- *Spur Breakwater:* This alternative involved constructing a 500-600foot long spur (deflector-arm) breakwater in conjunction with placement of 230,000 CY of fill in the nearshore zone. The spur would extend southeast from the existing East Breakwater, oriented parallel to the shoreline, to reduce wave energy and induce accretion of the placed sediment. The cost of the spur breakwater was estimated by USACE in 1971 and 2006 to be on the order of \$2.5-3.2 million and placement of this quantity of sand would cost approximately \$6.4 million for a total cost of \$8.9-9.6 million for this alternative. Given the high cost of this alternative and the fact that the construction of the breakwater would have significant environmental impacts, this alternative was eliminated from further consideration.
- *Managed Retreat:* This alternative involved accommodation of future erosion of the unprotected marine terrace (bluff) backing Surfer's and Vallejo Beaches. This alternative assumed only the infrastructure that is not currently protected by well-maintained revetments would need to be relocated. Based on extrapolation of current bluff erosion rates, a portion of Highway 1 as well as part of the pedestrian coastal trail would need to be relocated. Although detailed plans for relocation have not been developed, based on the cost per linear foot of comparable relocation of the Great Highway at Ocean Beach in San Francisco, the cost of relocating a 4,400-ft section of Highway 1 would be approximately \$16 million. This alternative would not meet the project purpose of nourishing the shoreline to mitigate beach and bluff erosion and is the most expensive of all the alternatives screened. Thus it was eliminated from further consideration.

3.4 404(b)(1) Alternatives Comparison

Table 1 compares the direct, indirect, permanent and temporary impacts to waters of the U.S. for the alternatives determined to be practicable including the proposed action and the maximum beach fill alternative. Both these alternatives would not affect any wetlands because there are no wetlands present at or near the project area. These alternatives, however, would occur in the proximity of navigable tidal waters of the U.S. The USACE generally defines the navigable waters of the U.S. as “those waters subject to the ebb and flow of the tide shoreward to the mean

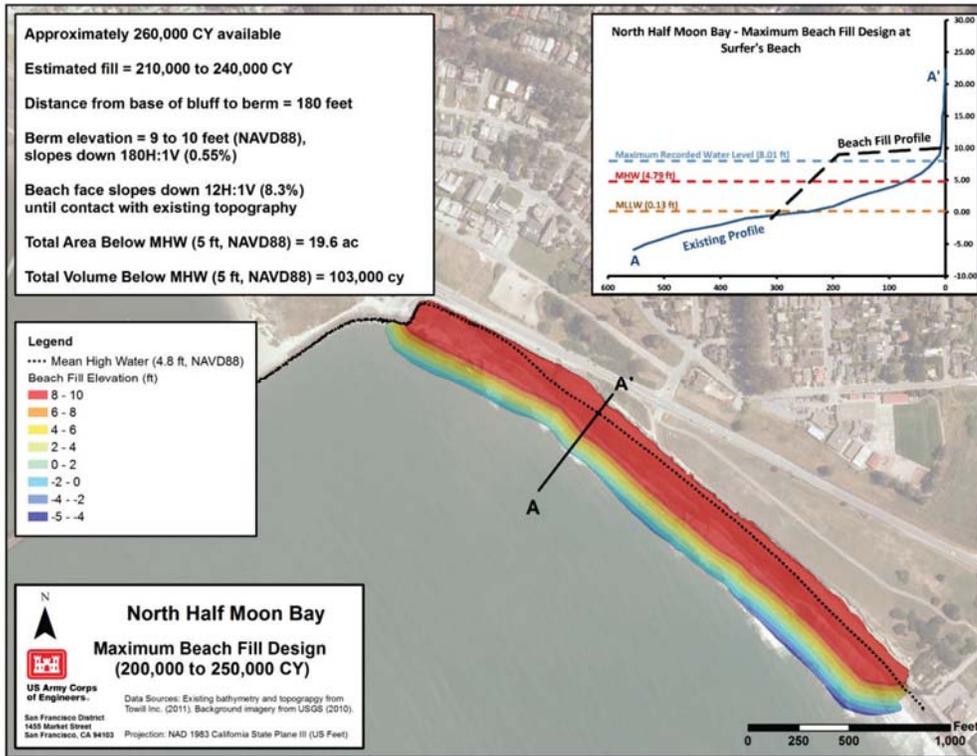
high water mark and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce” (USACE, 2012). Thus, for the purposes of this 404(b)(1) analysis, the impacts to non-wetland waters of the U.S. are measured as the acreage of sand that would be placed below the Mean High Water (MHW) line.

We define the MHW line using the Mean High Water tidal datum (4.79 ft, NAVD88) established at the National Oceanic and Atmospheric Administration (NOAA) Monterey Tide Station (9413450). We produced a contour depicting an elevation of 4.8 ft (NAVD88) in a geographic information system (GIS) environment from data depicting topography and bathymetry in the region that was collected in 2009 and 2010 (Towill, Inc., 2011). We then used the contour to identify the sections of the delineated fill footprints for the maximum beach fill and proposed action alternatives that fall below MHW (Figure 7). The results are presented in Table 1.

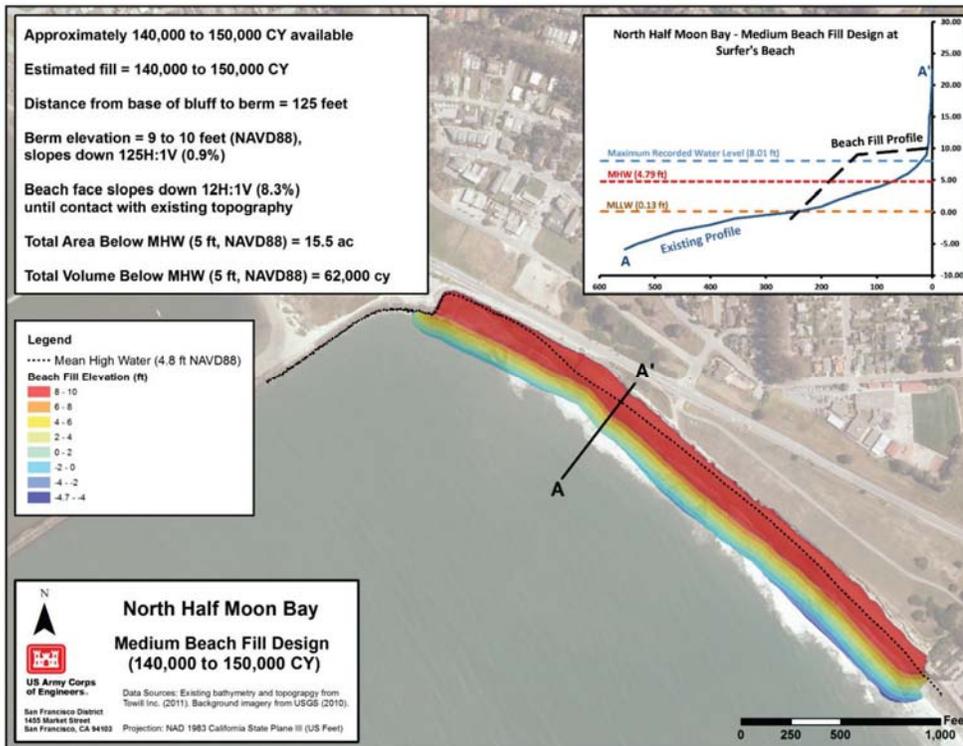
Table 1: Summary of Impacts to Waters of the U.S. The calculated fill is based on acreage of sand placed below the MHW line as delineated in GIS as a contour at 4.8 ft (NAVD88).

Alternative	Non- Wetland Waters of the U.S. (acres and cubic yards)				Wetlands (acres)			
	Permanent		Temporary		Permanent		Temporary	
	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect
Maximum Beach Fill Alternative	19.6 acres (103,000 CY)	0	0	0	0	0	0	0
Proposed Action	15.5 acres (62,000 CY)	0	0	0	0	0	0	0

Because the Maximum Beach Fill alternative would have greater adverse impacts on the aquatic ecosystem (in terms of quantity of water of the U.S. impacted) than the proposed action, the maximum beach fill alternative would not be allowed under the provisions of Section 404(b)(1). Thus, as described in section 3.3 above, the Maximum Beach Fill Alternative was eliminated from further consideration. The proposed action is carried forward in this EA for detailed analysis as the least environmentally damaging practicable alternative.



a.



b.

Figure 7. Comparison of Placement Areas Along Surfer's and Vallejo Beaches Under the Maximum Beach Fill (a.) and Proposed Action (b.) Alternatives. The quantity of material placed below MHW is that below the dotted black line. Source: Lin et al. (2015).

4.0 Affected Environment and Consequences

This section provides an assessment of the potential impacts of the proposed action (agency-preferred alternative) in relation to the no-action alternative. If an environmental factor is considered not applicable to the proposed action, the factor is followed by N/A.

It should be noted that the following evaluation of impacts is based on the level of detail currently included in the project design. The project is currently in the feasibility phase and being evaluated to determine if there is federal interest in the project. Thus, project details such as construction timing and work schedules, equipment specifics, location of staging areas, and specific best management practices have not yet been determined. In some cases this analysis includes assumptions about such project specifics and practices that will be implemented. Assumptions are clearly identified.

4.1 Water

(X) Surface water or drainages: The proposed action would involve dredging and placement of sand within the waters of Half Moon Bay. Approximately 140,000 to 150,000 CY would be dredged from the accumulated sand shoal that has formed along the East Breakwater of Pillar Point Harbor. The shoal would be dredged to a depth of 10 ft (NAVD88) and the dredged sand would be placed on the shoreline adjacent to the opposite side of the breakwater (along Surfer's and Vallejo Beaches). Only approximately 62,000 CY of the removed sand would be placed below MHW and thus readily within the waters of Half Moon Bay. This would result in net removal of shoaled material from waters in the action area, effectively restoring the depth of the water column within the currently shoaled region of Pillar Point Harbor to approximately match the surrounding bathymetry.

The proposed action may slightly increase the surface water area within Pillar Point Harbor by removing sand that has shoaled nearshore at elevations of 0 to 2 ft above sea level (figure 5). This change is not expected to adversely affect surface waters, because it will restore surface water area that would otherwise be present had shoaling not occurred as a result of breakwater construction. Additionally, while Denniston Creek and Deer Creek drain into Pillar Point Harbor, the proposed action would not involve or affect these drainages. Under the no-action alternative there would be no change in existing surface water area and no changes to drainages in the action area.

(X) Water Quality - temperature, salinity patterns, and other parameters: Typical water quality indicators include temperature, salinity, pH, turbidity, suspended solids, natural light transmission (transmissivity), and dissolved oxygen (DO). Table 2 characterizes typical water quality parameters for May to August that were compiled from several sample points near Pillar Point Harbor's East Breakwater (USACE, 2006).

Table 2 - Pillar Point Harbor Water-Quality Characteristics (Source: USACE, 2006)

Parameter	Typical results from May to August
Temperature (°C)	9 to 15
Salinity (ppt)	33 to 34.5
Transparency	160 to 230
DO at surface (% saturation)	85 to 130
DO at bottom (% saturation)	70 to 120

Water quality in Pillar Point Harbor has also been considered chronically impaired by the State Water Resources Control Board because of the presence of coliform bacteria, primarily in the vicinity of Capistrano Beach (upcoast of the inner harbor). In 2013, the San Mateo County Resource Conservation District conducted a study to identify the sources of bacteria, and opportunities for remediation are being developed with the goal of reducing the number of days that beaches in the harbor are posted or closed for excessive fecal bacteria levels (Dyett & Bhatia, 2014).

Dredging or beach nourishment activities in general have the potential to affect water quality, primarily through sediment suspension and re-suspension (Science Applications International Corporation [SAIC], 2007). This analysis assumes a cutterhead-hydraulic pipeline dredge will be used for dredging and beach placement activities associated with the proposed action, which would occur partially within the waters of Half Moon Bay around and downshore of Pillar Point Harbor's East Breakwater. Studies have shown placement of dredged material from hydraulic dredges into the water column does not cause significant short- or long-term changes in salinity, temperature, or pH (USACE 1976a; USACE 1976b). Thus, the proposed dredging and placement activities are not expected to result in changes to ambient temperature, salinity, or pH levels in the action area. Additionally, the proposed action would not contribute to increased bacterial loads. Potential effects on turbidity, suspended solids, and light transmission are discussed in the "Turbidity, Suspended Particulates" section.

While dredging projects that significantly increase water depths have the potential to result in decreased DO concentrations in the dredge area vicinity, significant reduction of DO is not expected from the proposed action. Dissolved oxygen concentrations naturally decrease with depth because of losses from biological respiration and decomposition (SAIC, 2007). Increased water depth can similarly result in a decrease in biological production of oxygen from photosynthesis when the depth is beyond light compensation ranges of submerged aquatic vegetation (SAIC, 2007). Very deep dredging holes have been found to create these conditions and result in long-term reduction of DO (NRC, 1995 as cited in SAIC, 2007). The maximum increase in depth associated with dredging under the proposed action would be 10 ft, which would restore the depth of the water column within the currently shoaled region of Pillar Point Harbor to approximately match the surrounding bathymetry. Dissolved oxygen levels may experience minor and temporary reductions (1-2 parts per million) because of sediment suspension, however, studies have shown ambient conditions are shortly regained following settlement of the suspended sediment (USACE 1976a). Given the relatively shallow proposed dredging depth, the existing depth of the surrounding harbor, and the fact that any reductions in DO from sediment suspension would be minor and temporary, the proposed dredging of shoaled sand adjacent to the East Breakwater is not expected to significantly alter DO concentrations.

Minor oil spills or leaks from dredges, vehicles, and equipment used during dredging and placement activities could potentially adversely affect water quality as well. This analysis assumes that best management practices (BMPs) would be developed and exercised throughout the proposed action to ensure no oil, petroleum products, other potential fluid leaks, or debris from project activities significantly impact water quality. Fueling of marine-based equipment would take place offsite at authorized marine fueling facilities or at designated locations adjacent to the project. If fueling were to occur adjacent to the project site, marine-fueling BMPs would be implemented to avoid discharge of pollutants to marine waters. Similarly, fueling of land-based equipment would assumedly occur in staging areas over pavement, and BMPs would be

implemented to ensure that no water pollution occurs. Storage, maintenance, and staging of such equipment would also occur in the designated staging areas and in a manner that would not result in a discharge of any substance to marine waters. Furthermore, a spill prevention plan would be developed prior to project implementation, and spill response equipment would be onsite for immediate implementation to minimize the impacts of any accidental spills.

In addition to BMPs, pursuant to Section 401 of the Clean Water Act (33 U.S.C. Part 1251), the proposed action will require a Waste Discharge Requirements (WDRs) / 401 Certification from the Regional Water Quality Control Board (RWQCB) to ensure the project meets State water quality standards. This draft environmental assessment is being prepared for USACE's feasibility review process, during which federal interest in the project will be evaluated. If it is determined that USACE has federal interest in the project and will serve as the lead Federal agency, USACE will work with the RWQCB to obtain the necessary permits. Generally, some combination of visual observations, receiving water limitations, effluent limitations, and water quality monitoring at the dredge and discharge sites is required by the RWQCB (SAIC, 2007). The project would comply with all provisions of the certification to ensure project implementation meets permitted requirements.

Given the lack of expected effects to water quality parameters, the BMPs this analysis assumes would be implemented, and the fact that the project would comply with any WDRs/ 401 certification issued by the RWQCB, no significant detrimental impacts to water quality are expected from the proposed action. Under the no-action alternative, there would be no dredging or placement of material, no change to water quality parameters in the action area, and no additional potential for pollution or spills.

(X) Turbidity, suspended particulates: Turbidity is related to water clarity and based on factors such as suspended sediment concentration, shape, size, refractive index, color, and absorption spectra. Increased turbidity levels can affect flora and fauna by preventing light transmission, injuring fish gills, and interfering with prey or predator recognition or egg and larvae development. Furthermore, sediment suspension can mobilize sediment-bound contaminants into the water column. There is general consensus that the potential for impacts increases as project size and exposure concentration (a function of sediment characteristics) increase (SAIC, 2007). Additionally, the equipment employed for dredging and placement, including how that equipment is operated, affects the nature of these potential impacts.

Dredging and beach nourishment associated with the proposed action are likely to result in temporary but minor turbidity, sediment suspension, and light transmission impacts associated with removal and placement of sand in aquatic habitats. This analysis assumes that a cutterhead-hydraulic pipeline method will be used to dredge sand from Pillar Point Harbor and place it at Surfer's and Vallejo Beaches. SAIC (2007) report total suspended solids (TSS) concentrations measured 100 ft from cutterhead dredges range from ≤ 150 mg/L near the surface to ≤ 500 mg/L near the bottom. LaSalle et al. (1991, as cited in SAIC, 2007) found general suspended sediment plume lengths around hydraulic suction cutterhead dredges ranged from 0 to 328 ft near the surface, to ≤ 1640 ft near the bottom. Turbidity (TSS) measurements associated with beach sand placement tend to show greater variation but were reported by SAIC (2007) to range from 452 mg/L at the discharge location to 45 mg/L at mid depth approximately 500 ft offshore of the discharge location. The turbidity plume associated with sand placement tended to remain close to

shore and most pronounced within the swash zone, its direction of displacement being associated with tide stage and currents.

These turbidity concentrations are similar to those experienced during storms, high river runoff, or other vessel activities (SAIC, 2007) and would likely represent minor increases relative to ambient conditions in the action area. During storms off California, TSS concentrations may range from 50 to >1,000 mg/L near river discharges and were measured at 340 mg/L in the nearshore (39 ft) off central California's coast during high waves (SAIC, 2007). Moreover, turbidity levels and suspended sediment concentrations in harbors generally range higher than in the open ocean because of creek, river, or stream discharges; relatively shallow depths; or re-suspension by vessel traffic. Similarly, although turbidity is the primary factor affecting light penetration, light transmittance in enclosed bays and harbors may also range lower than in the open ocean because of vessel traffic.

Turbidity also generally dissipates rapidly after construction ceases. TSS concentrations, turbidity values, and associated water quality depressions generally decrease within one hour after dredging operations or beach nourishment activities cease, with ambient conditions returning within one tide cycle (SAIC 2007). This is especially true for sandy material with low silt or clay content (SAIC, 2007). Dredged-material testing in Pillar Point Harbor in 2007 found that sediment composites were predominantly sand, consisting of 84% to 65% sand near the mudline and 62% to 68% sand at or near 10 ft Mean Low Lower Water (MLLW) with an average of 19 % silt and 11 % clay across all (top and bottom) composites (Kinnetic Laboratories, 2007). Given the high sand content of the material in Pillar Point Harbor, any turbidity or suspended solid increases caused by the proposed actions are expected to quickly return to ambient conditions after the activity ceases. Moreover the material was found to be largely clear of contaminants (Kinnetic Laboratories, 2007), and contaminants generally bind to finer sediment such as silt, clay, and organic matter. The lack of contamination and high sand content of the tested sediments suggests any suspension is unlikely to mobilize sediment-bound contaminants.

Measures would be used to minimize any impacts from turbidity and suspended particulates. While cutterhead dredges involve a continuous operation of hydraulic removal and pumping of sediments between the dredge and discharge site, this analysis assumes standard work schedules would be used during the project which would limit impact exposure to daytime and exclude overnight and weekend periods during which turbidity would dilute and dissipate with tides and currents. Additionally, it is expected that temporary dikes or swales would be constructed from sand and native sediments near the onset of pipeline delivery of sediment slurry as a means to control turbidity during beach placement.

Although the proposed action includes dredging and placement of a moderate amount of sand (approximately 140,000 to 150,000 CY), the changes in turbidity, suspended particulates, and light transmission associated with these actions are expected to be temporary, very short-term, and not significantly greater than certain ambient conditions in the action area. Given this, the high sand content and lack of contamination in tested materials from the harbor, and the assumed measures that would be employed to minimize turbidity, the proposed action is not anticipated to have any significant adverse turbidity or suspended particulate effects. In comparison, the no-action alternative would not result in any changes to existing levels of turbidity or suspended particulates.

(X) Substrate: Dredging activities have the potential to lead to changes in substrate type by uncovering substrate that differs from surface sediments. The proposed action, however, is not expected to significantly change substrate type given that the material near the surface in Pillar Point Harbor has been found to be similar to that at the proposed dredge depth.

The proposed action would involve dredging approximately 140,000 to 150,000 CY from the accumulated sand shoal that has formed along the East Breakwater of Pillar Point Harbor. The shoal would be dredged to a depth of 10 ft MLLW (NAVD88). While sediment characteristics in dredged areas may change slightly because of exposure of new substrate, dredged material testing in Pillar Point Harbor in 2007 found that the physical and chemical properties of sediment composites composed of material from near the mudline and those composed of material at or at or near 10 ft MLLW “did not differ substantially” (Kinnetic Laboratories, 2007 pg. 10). This conclusion is also supported by a previous USACE analysis of sediments underlying the East Breakwater foundation, which indicated the bed was composed of beach quality sands that extended to a depth of approximately 21 ft at the shore ranging up to 147 ft approximately 1,000 ft offshore (USACE, 1986 as cited in Lin et al., 2015).

This similarity of material suggests that dredging the shoaled material adjacent to the East Breakwater would not result in substantial changes to substrate characteristics. Moreover, removal of the excess shoaled material would restore the area to approximately match the surrounding bathymetry, creating more similarity to adjacent substrate. Given the similarity of material at the surface and proposed dredge depth, no significant adverse changes to substrate are anticipated from the proposed action. The no-action alternative would involve no dredging and no changes in the physical and chemical characteristics of the substrate.

(X) Currents, circulation or drainage patterns: Circulation patterns in the vicinity of the study area are a function of waves, winds, and tides (Lin et al., 2015). Tides in Pillar Point Harbor area are characterized by the semi-diurnal signal common to the Pacific Coast, with a mean difference of approximately 5.5ft between the two high tides and two low tides in a 25-hour period. Mean seasonal offshore wave heights at the Half Moon Bay National Buoy Data Center Buoy, approximately 21 nautical miles west-southwest of the project site, range between 5.2 and 9.2 ft, and large waves occur almost every winter, with wave heights approaching 20 to 25 ft (Lin et al., 2015). Nearshore wave heights are smaller than at the offshore buoy, because of the dispersion of wave energy associated with refraction off Pillar Point headland and the harbor breakwaters. Wave data collected by the United States Geological Survey (USGS) between May 2 and June, 2011 at a nearshore mooring adjacent to the project site had a mean wave height of 2.6 ft (Lin et al., 2015). Currents measured by USGS at the nearshore mooring were relatively weak with an average current speed of 0.2 ft/s and no dominant current direction. Previous USACE studies have also noted that the primary offshore current in the study area, the California Current, is too weak and too far offshore to mobilize sediment in the region of the project (USACE, 1996).

Dredging and placement activities associated with the proposed action are not expected to significantly alter currents, circulation, or drainage patterns within the action area. Dredging of the shoaled area within the harbor, adjacent to the East Breakwater, may restore some tidal flushing to that area of the harbor but would not be expected to change currents or circulation, especially given the enclosed nature of the harbor and resulting weak current speed and

direction. Modeling of the performance of the proposed action showed little change in shoaling rates in the dredged area 1-year post-removal of the material (Lin et al. 2015), further suggesting no significant changes in hydrodynamics as a result of the dredging. In terms of placement, the proposed action is designed to maximize the amount of fill placed on the sub-aerial beach, and allow for the placed material to erode into the nearshore zone under existing hydrodynamic conditions. Given this, no significant changes to currents, circulation, or drainage patterns at the placement site would be expected. The no-action alternative would involve no dredging or placement and thus also would not cause any changes in circulation or drainage patterns.

(X) Mixing zone (in light of the depth of water at the disposal site; current velocity, direction and variability at the disposal site; degree of turbulence; water column stratification; discharge vessel speed and direction; rate of discharge; dredged material characteristics; number of discharges per unit of time; and any other relevant factors affecting rates and patterns of mixing): The proposed action would involve placement of dredged sand on the beach as opposed to ocean discharge and thus is not anticipated to have impacts on a mixing zone (where effluent or material is disposed of into the water). The placement design would maximize the amount of fill placed on the sub-aerial beach and allow for the placed material to erode into the nearshore zone under existing hydrodynamic conditions. Given this, no significant effect on rates and patterns of mixing in the nearshore zone are expected. The no-action alternative would involve no placement of material and thus also would not cause any changes in rates or patterns of mixing.

() Flood control functions: N/A

(X) Storm, wave, and erosion buffers: The proposed action is intended to provide immediate beneficial erosion buffering for the bluff at Vallejo Beach and a wider beach throughout the project area. The rapid erosion of the beach and bluffs extending south of Pillar Point Harbor has been a source of concern over the past several decades and a recent analysis of bluff retreat in the region between 1993 to 2012 suggests that an approximately 2,200 ft long unprotected section of bluff located between the revetments at Surfer's Beach and Miramar Beach is retreating at a rate of 1.64 ft per year, a significantly greater rate than at a geologically similar unprotected section of bluff further down coast (Lin et al., 2015).

Placement of material on the beach in a protective berm design is expected to provide a buffer to erosion of the shoreline and bluffs in the medium-term. Based on modeling of the performance of the proposed action, the expected lifespan of the material placed on the beach would be approximately 6 years under existing erosion conditions, but it is anticipated that the erosion rate will decrease after the placement so the so the expected lifespan would likely be longer (Lin et al., 2015). Moreover, this modeling indicated that much of the eroded placed sand would enter and remain in the nearshore zone where it could provide erosion mitigation benefits for 30-40 years by dissipating wave energy and effectively reducing the amount of wave energy reaching the sub-aerial beach (Lin et al. 2015).

The no-action alternative, in contrast, would involve no placement of material along Surfer's and Vallejo Beaches. There would be no erosion buffer benefit in this area and existing erosion and bluff retreat rates would be expected to continue. Bluff retreat rate modeling by Lin et al. (2015)

suggests that without such an erosion buffer, infrastructure including Highway 1 and coastal pedestrian paths leading to the beach, could be threatened within 10 years.

(X) Erosion and accretion patterns: Placement of sand along the shoreline is expected to result in temporary, localized, short-term changes to erosion and accretion patterns in the immediate vicinity of the placed material, and a beneficial decrease in erosion in the vicinity of the beaches over the medium term. Lin et al. (2015) modeled changes in erosion and accretion patterns within the action area for six months post-implementation of the proposed action and assuming the same hydrodynamic conditions as measured from June to November 2009. The results (Figure 8) show there is continued net erosion from the placement zone (outline a) and accretion of this material within the nearshore zone (box b). There is also modest erosion (approximately 300 CY) in the proposed dredged area within Pillar Point Harbor suggesting that sand will not immediately accumulate there. In addition to minor immediate changes in erosion and accretion patterns, it is anticipated that the erosion rate in the placement vicinity will decrease after an initial period of adjustment to ambient hydrodynamic conditions as the placed material remains in the nearshore zone and reduces the amount of wave energy reaching the sub-aerial beach.



Figure 8. Modeled Erosion and Accretion in the Vicinity of Beach Fill Placement (140,000 to 150,000 CY) and Borrow Areas from June 2009 to November 2009 (6 months). (Source: Lin et al., 2015)

The changes in erosion and accretion patterns associated with the proposed action are expected to be temporary but beneficial. They will minimize beach and bluff erosion along the shoreline south of the East Breakwater but would not reverse overall erosion at the site, and any decrease in erosion would only last as long as the material remains in the nearshore zone (30-40 years). Additionally, while the removal of sand from inside Pillar Point Harbor would not change

accretion rates in the harbor, immediate re-shoaling of the area would not occur, thereby reducing the navigation hazard posed by shoaled sediment.

In comparison, the no-action alternative would involve no dredging in Pillar Point Harbor and no placement of material along Surfer's and Vallejo Beaches. Thus, the no-action alternative would result in no changes to erosion and accretion patterns.

() **Aquifer recharge:** N/A

() **Base flow:** N/A

() **Water supplies, conservation:** N/A

(X) **Contaminants in dredge or fill material:** Pursuant to the Section 401 of the Clean Water Act, sediments to be dredged from waters of the United States require testing to determine potential environmental impacts and suitable disposal options. The USACE and EPA guidelines for acceptability of dredge material for beneficial use as beach nourishment specify that it should closely match the sediment composition of the eroding beach and be low in fine sediments, organic material, and pollutants. Such testing is generally a requirement to obtain a Section 401 water quality certification or waste discharge requirements permit. For the proposed action, this analysis assumes that testing of sediments prior to implementation of the project would occur. This testing would evaluate the suitability of the shoaled material adjacent to the East Breakwater inside Pillar Point Harbor for beneficial use for beach nourishment along the nearby shoreline at Surfer's and Vallejo Beaches, and would ensure sediments placed along the shore are free of substantial contamination.

Past sediment sampling suggests that the material in Pillar Point Harbor is primarily sand with a low silt and clay content, low contamination, and similar characteristics to material in the proposed fill area. Kinnetic Laboratories (2007) tested material at 10 sampling sites in Pillar Point Harbor in 2007 down to 10ft MLLW. While the sample sites were not within the shoaled area that would be dredged as part of the proposed action, the results showed that the material was predominantly sand (62 -84%) with an average of 19 % silt and 11% clay. In addition, a previous USACE analysis of sediments underlying the East Breakwater foundation indicated that the sand in the proposed borrow area is similar in grain size to sand in the proposed fill area (USACE, 1996). The total organic carbon content of the samples tested in 2007 was low, ranging from below the reporting limit to 0.5%. The only other organic compounds detected were low levels of tributyltin and a few polycyclic aromatic hydrocarbons well below Effects Range Low (ERL) values established by the NOAA (Kinnetic Laboratories, 2007). Metal concentrations were below ERL values, and Kinnetic (2007) concluded that toxic effects to benthic invertebrates or marine organisms from the material would be unlikely. The leaching characteristics of the material did reveal that copper, lead and zinc could be mobile and affect receiving waters, but Kinnetic (2007) suggested natural attenuation and initial dilution would mitigate these impacts.

Given the fact that previous testing suggests that material in Pillar Point Harbor is low in fine sediments, organic material, and pollutants; the close proximity of the borrow and placement sites; and under the assumption that specific testing of sediments in the shoaled area adjacent to

the East Breakwater and at Surfer's and Vallejo Beaches would occur prior to implementing the project, contamination and toxicity in the dredge and fill material associated with the proposed action are not anticipated. No adverse effects associated with contaminants in dredge or fill material are expected as part of the proposed action. The no-action alternative would also not result in any adverse effects associated with contaminants in dredge or fill material given that no dredging or placement activities would occur.

4.2 Biological Environment

(X) Aquatic Habitat and Organisms: Pillar Point Harbor and the project action area are located in a coastal inlet embayment (Half Moon Bay) formed by a natural outcrop along the coast, Pillar Point. Within this region, the proposed action area contains both intertidal and subtidal aquatic habitats and common species supported by those habitats.

Intertidal habitat

The intertidal zone, also known as the foreshore, is the area between MLLW and mean higher high water (MHHW) that is alternately exposed during low tides and inundated during high tides. The project area includes both sandy and rocky intertidal zones. The majority of the intertidal habitat in the project area is sandy and includes the portions of the shoreline within Pillar Point Harbor between the boat launch and the East Breakwater and along Surfer's, Vallejo, and Miramar Beaches that extend between MLLW and MHHW. Sandy intertidal zones are characterized by soft bottom sands, shells, and occasionally cobble in the area between the highest and lowest tides (USACE, MBNMSF, and Nobel Consultants, 2015). Rocky intertidal habitat is characterized by rocky substrate between the lowest and highest tidal water levels. The rocky intertidal zone in the project area is primarily limited to the portion of the rocks making up the East Breakwater that falls between MLLW and MHHW and borders the inside of Pillar Point Harbor adjacent to the proposed dredging area (Figure 9). The CalTrans and San Mateo County revetments may also serve as rocky intertidal habitat whenever there is insufficient sand on the beach.



Figure 9. Rocky Intertidal Zone at Pillar Point Harbor's East Breakwater when Inundated (Left) and Exposed (Right)

Subtidal habitat

The subtidal zone is located below MLLW and is covered by water. Subtidal habitat in the project area includes the open-water area inside of Pillar Point Harbor where dredging is proposed to take place, the submerged portion of the East Breakwater boarding the proposed

dredging area, and the nearshore zone seaward of the MLLW line along the outer coast within the project area. Unconsolidated sand or mud with some areas of hard bottom or rocky outcrops near shore comprise much of the sea floor in the subtidal zone (CSMW, 2015). The nearshore zone is relatively shallow, and high-energy waves and currents interact with the sandy bottom causing coarser sediments to settle closer to shore. The deeper areas of the subtidal zone experience less wave action, and are characterized by fine sands and sediment with a significant amount of mud.

Aquatic Organisms

The aquatic habitats in the action area support numerous invertebrates, fish, and marine mammals. Sandy intertidal habitat provides important habitat for various organisms living under the surface of the sand – e.g., clams, crabs, and other invertebrates – and also serves as an important feeding ground for shore birds (CSMW, 2015). Rocky intertidal habitat is capable of supporting many species, including sessile invertebrates such as mussels, barnacles and anemones and mobile grazers and predators such as crabs, amphipods, littorine snails, limpets, sea stars, sea urchins, and abalone (CSMW, 2015). Tidepool fish including striped surfperch, tidepool sculpin, tidepool snailfish, and cabezon may also occupy this habitat. Vegetation growing on the intertidal rocks of the East Breakwater include species of algae such as sea lettuce (*Ulva sp.*), lichens, plantain (*Plantago maritime*) and bristly ox tongue (*Picris echioides L.*).

The nearshore subtidal zone, which experiences high wave energy, is generally occupied by small, mobile, deposit-feeding crustaceans and contains fewer species of invertebrates than in the finer sandy to mixed sediments offshore (CSMW, 2015). Benthic subtidal habitat in the region is occupied by invertebrates such as polychaete worms (including *Mediomastus californiensis* and *Polydora kemp*), anemones, shrimp (*Neomysis rayii*, *Bathyleberis sp.*, and *Euphilomedes carcharodonta*), crabs (including *Hemigrapsus nudus*), bivalves (including *Macoma secta* and *Transennella tantilla*), Seastars (including *Amphiodia sp.*), and gammarid amphipods (including *Aoroides columbiae* and *Corophium acherusicum*), among other sessile and suspension feeding organisms (USACE, 2006). Subtidal waters provide foraging and summer nursery habitat for fish such as English sole (*Parophrys vetulus*), shiner surfperch (*Cymatogaster aggregate*), Pacific herring (*Clupea harengus*), and rockfish (*Sebastes sp.*) (California Coastal Commission, 1999). Starry flounder (*Platichthys stellatus*) and topsmelt are abundant in winter, when northern anchovy (*Engraulis mordax*), Pacific sardine, Mackerel, and striped bass are also present (California Coastal Commission, 1999). Marine birds also feed in this habitat. While kelp beds, an important type of submerged aquatic vegetation (SAV), have been documented growing in subtidal habitat in Half Moon Bay, no kelp beds are present in Pillar Point Harbor or close to Surfer's, Vallejo, and Miramar Beaches (Figure 12).

The most common marine mammal at Pillar Point is the harbor seal (*Phoca vitulina*). Harbor seals forage near the shore in water that is up to 16 feet deep, and rest on the breakwater jetties. This stretch of coast provides numerous haul-out sites for harbor seals and California sea lions, and marine protected areas north of the harbor are breeding areas for harbor seals. Several species of whales and porpoises are also found offshore (including gray whale (*Eschrichtius robustus*), humpback whale (*Megaptera novaeangliae*), blue whale (*Balaenoptera musculus*), and harbor porpoise (*Phocoena phocoena*) but are not likely to occur in the nearshore project action areas (CSMW, 2015; USACE, 2006).

Aquatic and terrestrial habitats in the project vicinity also support a variety of shorebirds, diving birds, gulls, terns, wading birds and waterfowl. Open water habitat is the most heavily used habitat by birds (primarily for resting on the surface and diving for submerged food; USACE, 2006). Shallow intertidal habitat is also used by birds for foraging and roosting. Pillar Point Harbor has an average of 1,200 individuals in the winter months, when waterfowl and shorebirds seek refuge in the protective harbor waters, but populations decrease in the summer as birds migrate, dropping to an average of approximately 300 individuals (USACE, 2006). Brown pelicans (*Pelecanus occidentalis*), pelagic cormorants (*Phalacrocorax pelagicus*), Brandt's cormorants (*Phalacrocorax penicillatus*), double-crested cormorants (*Phalacrocorax auritus*), black oystercatchers (*Haematopus bachmani*), western gulls (*Larus occidentalis*), California gulls (*Larus californicus*), common murrelets (*Uria aalge*), sooty shearwater (*Puffinus griseus*), and Cassin's auklets (*Ptychoramphus aleuticus*), are the most common species in the vicinity (Cochrane et al., 2014; Metropulos, 2014). Snowy plover (*Charadrius nivosus*), spotted sandpiper (*Actitis macularius*), and pectoral sandpiper (*Calidris melanotos*) may migrate in the region; summer visitors include terns; and winter visitors include common goldeneye (*Bucephala clangula*), loon species, grebe species, black (*Melanitta Americana*) and surf scoters (*Melanitta perspicillata*), mew gulls (*Larus canus*), and marbled (*Brachyramphus marmoratus*) and ancient murrelets (*Synthliboramphus antiquus*) (Metropulos, 2014).

Potential for Impacts

In general, both dredging and material placement activities have the potential to adversely affect aquatic habitat and organisms. Dredging activities remove soft bottom habitat and can thus cause the removal and burial of benthic invertebrates, demersal fish eggs, or nonmotile larvae; altered water quality (e.g. turbidity, suspended sediment) leading to reduced visibility or clogging of fish gills; damage to SAV habitats; increased water depth resulting in a decrease in primary productivity; or damage to fishery or spawning grounds (USACE, 2012; SAIC, 2007). Potential habitat impacts associated with dredging vessels and equipment may include disturbance of seafloor surfaces from vessel anchors, disturbance of organisms from increased movement and noise, and temporary displacement of mobile organisms. With hydraulic pipeline dredging and material pumping, pipeline placement, anchoring and removal also have the potential to damage aquatic habitats, crush sedentary organisms, or interfere with wildlife movement through habitat (SAIC, 2007). Beach nourishment activities can also cause burial of invertebrates within the intertidal or nearshore subtidal zone in the receiver site footprint and temporary interference with foraging patterns of avian predators.

Dredging and beach nourishment activities associated with the proposed action are likely to result in temporary, minor impacts to aquatic habitats and organisms in the action area, but such impacts are not expected to be significant. Impacts to aquatic habitat water quality are discussed in the "Water quality" and "Turbidity" sections above. Dredging of the shoaled sediment in the harbor adjacent to the East Breakwater will result in removal of soft bottom sediment in subtidal habitat and potential removal or temporary burial of benthic invertebrates and non-motile organisms. Such dredging could also temporarily increase turbidity and suspended sediment. Fish and shellfish organisms are most sensitive to such impacts during early life-history stages, such as the egg and larval stages as they have limited capability to avoid direct disturbance and water quality changes. Sessile organisms in the rocky intertidal habitat formed by the East Breakwater may also be susceptible. But the location of disturbance will change as the dredge moves and potential exposure durations of benthic and sessile organisms at a stationary point in

or near the dredge footprint would be expected to be only on the order of one to a few days using a cutterhead hydraulic pipeline dredge (SAIC, 2007). Moreover, because the material to be dredged is clean sand, any suspended sediment will settle out quickly and be unlikely to significantly reduce visibility or clog fish gills for long periods. Additionally, removal of the shoaled material would not damage SAV habitat as no SAV is present at the project site.

Any anchoring impacts associated with the dredge equipment in subtidal habitat would likely be equivalent to existing anchoring impacts in the action area given the frequent vessel traffic from the boat launch ramp and harbor berths adjacent to the proposed dredging site. Moreover, SAIC (2007) suggest that anchor damage is likely to be less substantial on sandy seafloors and at shallower depths like those associated with the proposed dredging area. Benthic community recovery in temperate shallow waters would be expected to occur in weeks (Boesch et al., 1987 as cited in SAIC, 2007) and would be promoted by the similarity of substrate characteristics to the existing and adjacent substrate (as described in the “Substrate” section above).

Movement and operational noise from dredge equipment could cause marine mammals and fish to avoid close proximity to the dredging action area. Ambient underwater noise levels of 74 to 100 decibels (dB)_{peak} referenced to 1 micro-Pascal (re 1 μ Pa) were reported off the coast of central California (Heathershaw et al. 2001, as cited in SAIC, 2007) but levels in harbors with vessel traffic generally range around 130 dB_{peak} (SAIC, 2007). The National Marine Fisheries Service (NMFS) current underwater sound thresholds for impacts to marine mammals suggests that a received sound pressure level between 180 and 190 dB root mean square (rms) (re 1 μ Pa) may result in injury to cetaceans and pinnipeds, respectively, and 120 dB_{rms} from a continuous noise source (e.g. dredging) may result in behavioral disturbance or harassment (Reine and Dickerson, 2014). Thresholds of 150 dB_{rms} have generally been adopted for protecting salmon and other fish species (WSDOT, 2006 as cited in SAIC 2007). Reine and Dickerson (2014) recorded and analyzed underwater sounds generated by a hydraulic cutterhead dredge removing sandy material from the Stockton deepwater shipping channel in California and found sound levels recorded from the bow of the dredge reached a maximum of 144 dB_{rms} (re 1 μ Pa) at 50m from the sound source, dropped to an average of 130dB_{rms} by 100m, and an average of below 120dB_{rms} by 200m.

Assuming these sound levels were given off by the cutterhead dredge in the proposed action, sound pressures would remain below injury thresholds for marine mammals and disturbance thresholds for fish species. Marine mammals could exhibit behavioral disturbance within 200m of the dredge, but given the location is a harbor with frequent vessel traffic, ambient noise levels may be around 130 dB normally which would be expected to be reached within 100m from dredging operations. Given the mobility of marine mammals and fish, the minimal level by which ambient conditions are likely to be exceeded, the short dredging duration likely to be associated with the proposed action, and the abundance of similar habitat conditions around the dredging site, significant adverse effects from dredge noise and movement are not expected.

Aquatic habitat effects associated with placement and removal of the hydraulic pipeline and with beach nourishment are also expected to be temporary and minor. Organisms in the entire footprint of the beach nourishment area would be temporarily affected by placement activities. Among the infaunal community of the beach, the larger and mobile organisms have the ability to leave the area during beach nourishment, while less mobile organisms may be smothered by

pipeline placement, nourishment, or induced turbidity. This smothering of organisms could also indirectly affect marine and avian predators by temporarily disrupting foraging patterns. However, studies documenting the impacts of beach nourishment activities on the invertebrate community have shown that community recovery in sandy beach and intertidal habitat generally takes place on the order of a few weeks to months (National Research Council, 1995). Additionally given the relatively high energy of the sandy intertidal and nearshore subtidal environments, turbidity levels would likely be only slightly increased above ambient conditions, which would recover as the site adjusts to natural hydrodynamic conditions. Sensitive fish eggs and smolts are also not expected to be present in these habitats due to their high energy.

This analysis assumes minimization measures and BMPs would be employed to further mitigate any adverse effects of the proposed action. Timing of construction would be planned to avoid spawning and nesting seasons when organisms are most sensitive to impacts and weekday work schedules would be used, limiting impact exposure to daytime and exclude overnight and weekend periods during which direct impacts would cease. Pre-construction surveys would be used to finalize anchoring and hydraulic pipeline routes to avoid sensitive aquatic habitat and organisms. Temporary dikes and/or swales would be constructed from sand and native sediments near the onset of pipeline delivery of sediment slurry as a means to control turbidity during beach placement.

Based on the existing conditions in the proposed action area, the BMPs and minimization measures this analysis assumes will be implemented as part of the proposed project, and the temporary, short term nature of any anticipated effects associated with dredging and placement of material at the site, the proposed action is not anticipated to have a significant adverse impact on aquatic habitat or organisms. The no-action alternative would have no effect on existing aquatic habitat conditions or organisms at the project site.

(X) Terrestrial Habitat: Terrestrial habitat in the project area includes sandy beach, coastal strand, and man-made surface areas.

Sandy Beach

The majority of the terrestrial habitat in the proposed action area is sandy beach habitat that includes dry backshore areas as well as the intertidal foreshore between MHHW and MLLW (the intertidal zone is discussed above under aquatic habitat). The sandy backshore is characterized by lower productivity than the adjacent intertidal habitat but provides primary habitat for a variety of species (discussed below). This habitat can also support a variety of recreational values, including sunbathing, wading, surfing, swimming, recreational clamming, and fishing (CSMW, 2015). Sandy beach habitat in the project area is located along Surfer's, Vallejo, and Miramar Beaches and along the inner shore of Pillar Point Harbor between the East Breakwater and the boat launch ramp.

Coastal Strand

Coastal strand habitat is characterized by vegetation that grows on beach backshore or foredune areas. This vegetation is adapted to areas affected by strong winds, waves, and salt spray. Native coastal strand habitat is considered rare in California and non-native vegetation often outcompetes and reduces the native plant diversity in coastal strands. Strands are particularly vulnerable to human impact, including beach recreation, beach grooming, development, and

hardened shoreline protection (CSMW, 2015). Coastal strand habitat at the project site is located in a fenced off area just inside Pillar Point Harbor in the sandy backbeach near the base of the East Breakwater (Figure 10).



Figure 10. Fenced-off Coastal Strand Habitat at Pillar Point Harbor (Left) and Aerial View of Habitat Location (Right)

Rocky Habitat: Rocky terrestrial habitat in the project area includes the rocks on the top and land-side of the East Breakwater of Pillar Point Harbor that are high enough to remain dry even when the tide comes in.

Terrestrial Organisms

Sandy beach habitat supports species of invertebrates (described under aquatic organisms for intertidal zone), provides forage, resting, and nesting habitat for birds (described under aquatic organisms above); and spawning habitat for California grunion (which spawn between March and September) (CSMW, 2015). Long-tailed weasel (*Mustela frenata*), broad-handed mole (*Scapanus latimanus*), and California meadow vole (*Microtus californicus*) may also inhabit this habitat. Coastal strand habitat at the project site supports a variety of vegetation such as beach bur (*Ambrosia chamissonis*), gumweed (*Grindelia Willd.*), sealavender (*Limonium P. Mill*), and wild radish (*raphanus sativa*), as well as non-native plants like iceplant (*Carpobrotus chilensis*) and sea rocket (*Cakile maritime*). Terrestrial inhabitants of the rocky habitat along the East Breakwater may include common pill bugs (*A. vulgare*) and crabs and birds (described in the “Aquatic habitat and organisms” section above) resting on the rocks. Marine mammals such as harbor seals may rest on the rocky breakwaters and could potentially haul out on the sandy beaches in the project area.

Potential for Impacts

In general, dredging activities would not be expected to impact terrestrial habitat and organisms but beach nourishment activities may. Potential impacts to terrestrial habitat and organisms from beach nourishment activities include burial of invertebrates or vegetation within the receiving site footprint; disturbance of terrestrial habitat from hydraulic pipeline placement; displacement of birds and other mobile animals from sand placement or equipment operation/noise; disturbance of foraging regimes from sand placement; damage to spawning fish eggs (e.g. grunion) or bird nests/eggs; and effects to movement of some species associated with the shape of beach slopes (SAIC, 2007). In the case of the proposed action, temporary, minor impacts to sandy beach habitat and organisms in the action area would occur, but these would be minimized through construction timing and BMPs, and no significant, irrecoverable effects are expected.

Placement and shaping of material would largely occur in sandy beach habitat which could bury invertebrates; damage spawning fish eggs (e.g. grunion) or bird nests/eggs, and disturb mobile species. However, California sandy beaches generally display seasonality, with recruitment and development of invertebrate populations during spring-summer, use as spawning and/or nesting habitat by California grunion and birds in spring-summer, and seasonal peaks in bird use of beaches between summer-winter. Thus, studies have suggested that these impacts can be largely avoided by timing placement and shaping activities to avoid the spring through summer season that represents the peak period of biological resource use of sandy beach habitat (Peterson et al., 2000a; Greene, 2002 as cited in SAIC, 2007). Surveys, cessation of activities, and/or buffer zone establishment could further be used to identify the presence of biological resources, such as nesting birds, and prevent any effects from the proposed action. Furthermore, available information suggest that beach scraping effects are temporary and recovery from such disturbances generally occurs rapidly in sandy beach habitat (e.g. within 60 days) (SAIC, 2007).

Noise levels associated with earth moving equipment used to shape sand placed on the beach and with diesel engines used to operate hydraulic pumps (if required for the proposed action) could temporarily disturb birds or marine mammals using terrestrial habitat in the project action area. However, in many cases noise from placement activities has been shown to have only minor effects on these species in the terrestrial environment. Noise activities during beach nourishment appeared to have minor influence on sandpipers, godwits, curlews at a receiver in San Diego (AMEC, 2002 as cited in SAIC, 2007) and little reaction was observed for pelicans within 328 ft (100 m) of heavy equipment operation at Mugu Lagoon, Ventura County (Jaques et al., 1996 as cited in SAIC, 2007). Snowy plovers have also been observed foraging adjacent to, but outside immediate areas where discharge activities were occurring (Chambers Group, 2001, 2005 as cited in SAIC 2007). Given the high recreational use of Surfer's, Vallejo, and Miramar Beaches, ambient conditions may have desensitized species to noise and movement disturbances as well.

Activities associated with the proposed action would be conducted outside of the fenced-off, coastal-strand habitat given its environmental sensitivity, and this analysis assumes BMPs would be undertaken to ensure that no effects to coastal strand habitat occur from equipment staging, placement, movement, or use. For example, pipeline alignment and equipment transportation corridors would likely be restricted to remain a specific buffer distance from vegetated areas, as well as nesting bird species. Similarly, spill prevention and hazardous material plans would be in place to ensure no accidental discharges effect sensitive terrestrial habits and organisms.

Finally, the creation of a berm as part of the beach nourishment associated with the proposed action would be at a slope gradual enough to prevent degradation of terrestrial habitat quality associated with adverse effects to movement of some wildlife species. For example, SAIC (2007) suggests that beach slopes of 1:10 or greater should be used to minimize short-term impacts to biological resource habitat suitability (especially for foraging plovers). The design of the proposed action includes a gradual 1:12 slope. Thus impacts to movement of species are not anticipated.

Given the mobility of most terrestrial organisms, the availability of similar or higher-quality habitat along the adjacent shoreline, implementation of the described BMPs and minimization measures to avoid impacts, and the short-term nature of the proposed placement activities, only temporary, minor terrestrial impacts are expected from the proposed action. No significant

impact on terrestrial habitat or organisms would occur. In fact, beach nourishment has been shown to enhance habitat functions for biological resources in areas with erosive beach conditions by protecting sandy beach habitat that may be used for nesting, spawning, resting, and foraging (SAIC, 2007). In comparison, the no-action alternative would involve no potential for change, adverse or beneficial, to existing terrestrial habitat conditions at the project site.

(X) Special aquatic sites (wetlands, mudflats, coral reefs, pool and riffle areas, shallows, sanctuaries and refuges, other): There are no wetlands, mudflats, coral reefs, salt marshes, tidal marshes, or tidal flats within the proposed action area or surrounding vicinity. Pillar Point State Marine Conservation Area and the James V. Fitzgerald Marine Reserve are located up the coast from Pillar Point Harbor but the proposed action will have no impact on these sites. The portion of the project area outside of Pillar Point Harbor falls within the northern part of the MBNMS (Figure 11). Designated in 1993, the MBNMS stretches from Marin to Cambria, encompassing a shoreline length of 276 miles and extending an average distance of 30 miles offshore. The GFNMS, which lies north of the project area off the coast of San Francisco, manages the northern part of the MBNMS (from the Santa Cruz-San Mateo County line to Marin County). NOAA has jurisdiction over these national sanctuaries. A discussion of the proposed action in the context of existing sanctuary policies and regulations is provided in the “Conflict with other use plans, policies or controls” section of this document.



Figure 11. Proposed Location of the Project (yellow outline) in Relation to the MBNMS

(X) Special Status Species and Critical Habitat: This section focuses on species and habitats regulated under the state and federal Endangered Species Acts (ESA), the Magnuson-Stevens Fisheries Conservation and Management Act (MSFCMA), the Marine Mammal Protection Act (MMPA), and the Migratory Bird Treaty Act (MBTA).

Federal and State Listed Species and Critical Habitats

The USACE conducted a preliminary review to investigate the potential presence of listed, proposed, and candidate species and their critical habitats within the project action area. Sources – including the United States Fish and Wildlife Service (USFWS) Information, Planning, and Conservation System (IPaC) mapping system (USFWS, 2015), the California Natural Diversity Database (CNDDDB) (California Department of Fish and Wildlife (CDFW), 2015), and National Marine Fisheries Service (NMFS) lists of protected species and essential fish habitat (EFH) in the west coast region (NOAA, 2015) – were used to generate a master list of species potentially present in the project region (Appendix A, Section 2.0). The resulting list was then refined to identify only those species that could reasonably be expected to occur in the project action area given its habitat constraints and the species' known ranges and life histories (Table 3). Those listed species and critical habitats were found to reasonably have the potential to occur in the project action area and are discussed further below. Figure 12 illustrates designated critical habitats in the project region.

Table 3 - Listed species With the Potential to Occur in the Proposed Action Area

COMMON NAME	SCIENTIFIC NAME	FEDERAL ¹	STATE ¹	POTENTIAL FOR PRESENCE WITHIN THE PROJECT VICINITY
Fish				
Southern DPS green sturgeon	<i>Acipenser medirostris</i>	FT, CH	SSC	Found in nearshore waters. CH includes all coastal marine waters, bays, and estuaries from Vancouver Island, British Columbia to Monterey Bay, California.
Central California Coast coho salmon ESU	<i>Oncorhynchus kisutch</i>	FE, CH	SE	Found in coastal waters, estuaries, and freshwater streams. CH includes all water, substrate and adjacent riparian zones of all accessible river reaches and estuarine habitat from Punta Gorda in northern California to the San Lorenzo River, which empties into Monterey Bay at Santa Cruz.
Central California coastal steelhead ESU	<i>Oncorhynchus mykiss</i>	FT, CH	--	Found in coastal waters, estuaries, and freshwater streams. CH includes many accessible river reaches and estuarine areas from the Russian River to Aptos Creek in Monterey Bay (inclusive). Denniston Creek which drains into Pillar Point Harbor 1km north of the project site is designated as critical habitat.
South Central California coastal steelhead ESU	<i>Oncorhynchus mykiss</i>	FT, CH	--	Found in coastal waters, estuaries, and freshwater streams.. CH includes all accessible river reaches and coastal river basins from the Pajaro River (inclusive), Santa Cruz County, south to the Santa Maria River.
Marine Invertebrates				
Black abalone	<i>Halitoes cracherodii</i>	FE, CH	--	A portion of the project action area falls within designated Black abalone critical habitat.
Marine Reptiles				
Leatherback sea turtle	<i>Dermochelys coriacea</i>	FE, CH	--	Critical habitat includes the California Coast from Point Arena to Point Arguello. The project action area falls within this critical habitat and the species has been spotted off the coast by recreational tour groups.
Green turtle	<i>Chelonia mydas</i>	FT	--	Have been sighted from Baja California to southern Alaska but most commonly occur from San Diego south.
Loggerhead sea turtle	<i>Caretta caretta</i>	FT	--	Individuals reported as far north as Alaska and as far south as Chile, with numerous records off the coast of California.
Marine Mammals				
Southern sea otter	<i>Enhydra lutris nereis</i>	FT	FP	current range is from Half Moon Bay, San Mateo County, south to Point Conception, Santa Barbara County. Sea otters have been observed in Pillar Point Harbor previously.
Birds				
Western snowy plover	<i>Charadrius alexandrinus nivosus</i>	FT, CH	--	Critical habitat is present at Half Moon Bay State Beach south of the proposed action area.
Marbled murrelet	<i>Brachyramphus marmoratus</i>	FT, CH	E	Critical habitat is present in Half Moon Bay.
California brown pelican	<i>Pelecanus occidentalis californicus</i>	Delisted	FP	This species has been observed within Pillar Point Harbor.

¹FT= Federal Threatened; FE= Federal Endangered; CH= Critical Habitat; ST= State Threatened; SE= State Endangered; SSC= State Species of Special Concern; FP= State Fully Protected.

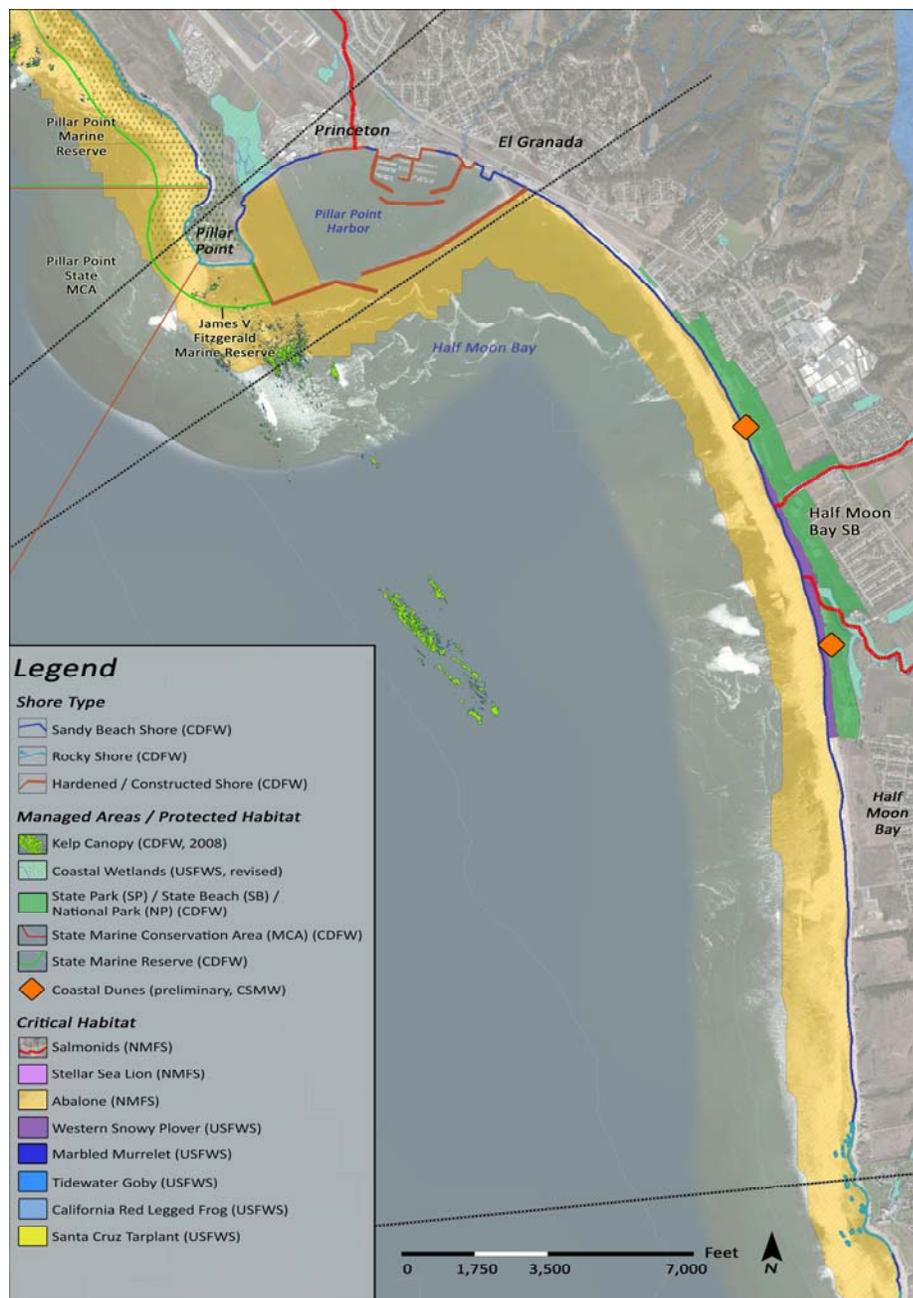


Figure 12. Critical Habitat in the Proposed Project Region.

Green sturgeon. Green sturgeon are found in nearshore marine waters ranging from Mexico to the Bering Sea. They are common in bays and estuaries along the west coast of the Americas. The project action area falls within designated critical habitat for the Southern distinct population segment (DPS) green sturgeon, which includes all coastal marine waters north of Monterey Bay between MLLW and (360 ft. Although San Francisco Bay and its tributaries are thought to contain a majority of the Southern DPS green sturgeon population, coastal marine waters along the coast are important for seasonal migration of adults and sub-adult green sturgeon from Southern California to Alaska. Thus, this species could forage and occupy waters in or near the project action area.

Potential effects on green sturgeon and their critical habitat from the proposed project would be the same as those discussed in the “aquatic habitat and organisms” section above, primarily including temporarily altered water quality (e.g. turbidity, suspended sediment), which could lead to reduced visibility, foraging or clogging of gills; impacts to substrate, benthic prey, or individual sturgeon from removal activities and anchors; and disturbance of individuals from dredge movement and noise. Smolts and juvenile green sturgeon are not likely to be present and susceptible to these impacts because the species typically spawns in estuarine freshwaters where juveniles remain for approximately one to three years before migrating to the ocean (CSMW, 2015). Turbidity from dredging or suspension of beach-placed sand in the nearshore zone would be temporary, localized, and unlikely to significantly impair visibility during foraging or clog gills. Additionally, the benthic prey community is expected to recover quickly enough following dredging that there would be no long-term effect on potential food sources. Given that any potential effects to water quality and prey communities would be localized and temporary (i.e., during active dredging), as well as the mobility of adult sturgeon, and the availability of significant amounts of quality habitat outside of the action area, no affect to green sturgeon and their critical habitat is expected.

Salmonids. Salmonids are anadromous fish that migrate from ocean waters to freshwater rivers and streams to spawn. Three salmonid runs (Table 3) – south-central California coastal (SCCC) steelhead, central California coastal (CCC) steelhead, and central California coastal (CCC) coho – are known to be present in the central coast region. The SCCC and CCC steelhead are winter-run salmonids, meaning that adults enter freshwater between November and April to spawn. The CCC coho spend the first half of their lives in freshwater habitats, spawning once then rearing and feeding before migrating to the ocean. Critical habitat for CCC steelhead has been designated in Denniston Creek, which flows into Pillar Point Harbor on the opposite side of the inner harbor from the project area, approximately a half nautical mile from the shoaled material next to the East Breakwater (Figure 12). While a ten-foot-high in-stream impoundment at about stream mile 1.2 (from the mouth) is a total barrier to fish passage (“Steelhead/rainbow trout resources of San Mateo County,” Undated) surveys downstream of the dam in 2006 revealed fry and individuals to about six inches in length (“Steelhead/rainbow trout resources of San Mateo County,” Undated). The CCC coho are not known to spawn in any streams at Pillar Point Harbor and SCCC steelhead are known to spawn in critical habitat in creeks and rivers well south of the project location (approximately 50 nautical miles) in Monterey Bay to southern San Luis Obispo County. While spawning habitat for these species is not located at the project action area, they could transit through waters in or near the project action area.

The potential for effects on salmonids from the proposed action would be similar to that described for green sturgeon. No activities associated with the proposed project would occur in or directly adjacent to salmonid critical habitat. But, given the location of CCC steelhead critical spawning habitat on the opposite side of the inner harbor from the project action area, this analysis assumes that the timing of activities associated with the proposed project would be coordinated to occur when CCC steelhead smolts are not likely to be present in marine waters. Any potential effects on aquatic habitat associated with the proposed action will be temporary and short in duration. Given this, the mobility of adult salmonids, and the availability of significant amounts of quality habitat in the vicinity of the action area, no significant effects on salmonids are expected from the proposed action.

Black Abalone. Designated black abalone critical habitat exists in the project action area along the shorelines of the three beaches and the southern edge of the East Breakwater (Figure 12). This designated habitat includes rocky intertidal and subtidal habitat and all waters from MHHW to a depth of 20 ft (CSMW, 2015). Black abalones are mobile but normally sedentary, clinging to rocky surfaces in the low intertidal zone up to 20 ft deep and generally in areas of moderate to high surf. Abalones are broadcast spawners, and spawning occurs in spring and early summer (SAIC, 2007). Larvae are free-swimming for between 5 and 14 days before they settle onto hard substrate (CSMW, 2015). They feed on drifting pieces of kelp or rock-encrusted bacteria and algae.

Potential effects to black abalone and their critical habitat could stem from dislodgement or damage of individuals during anchoring of vessels or placement or removal of pipelines to convey sands to the beach if individuals are present in the area of these activities; indirect sedimentation of rocky intertidal habitat from dredging, sand placement in the nearshore zone, or sand transport from beach nourishment sites; and alteration of marine vegetation food supply with prolonged turbidity (SAIC, 2007). This analysis assumes pre-construction environmental surveys would be conducted as part of the proposed action to finalize pipeline and vessel routes that avoid sensitive abalone habitat and individuals. While minor amounts of indirect sedimentation from sediment suspended in the water column during dredging and sand transport from the proposed beach nourishment would occur, some studies suggest that abalones are capable of tolerating some partial or temporary burial and recover rapidly (Cox, 1962 and CDFG, 2001 as cited in SAIC, 2007). Additionally, this analysis assumes the proposed activities would be excluded from abalone spawning season to avoid effects on larval settlement or small juvenile abalones. Moreover, any increases in turbidity or suspended sediment would be temporary, short in duration, and not expected to affect the marine vegetation food supply. No significant effects to black abalone and their critical habitat from the proposed action are expected.

Sea Turtles. While leatherback, loggerhead, and green sea turtles are not likely in the project action area, they do have the possibility to transit in the vicinity. Leatherback turtles utilize much of the world's marine habitat, and the project area falls within designated Leatherback critical habitat that stretches along the California Coast from Point Arena to Point Arguello. They forage widely in deep temperate and tropical waters (> 55 ft below MLLW). Because nesting only occurs in tropical and subtropical regions, juveniles and eggs would not occur in the project vicinity. Loggerheads have been reported as far north as Alaska, and as far south as Chile with numerous records off the coast of California (NOAA Fisheries, 2015a). Green turtles are generally found in tropical and subtropical waters along continental coasts and islands, and while they have been sighted from Baja California to southern Alaska, they most commonly occur from San Diego south (NOAA Fisheries, 2015a).

Beach nourishment activities associated with the proposed project are not expected to affect turtle species because nesting adults, eggs, and hatchlings would not occur within the vicinity of placement activities. Dredging activities could potentially disturb turtles in or immediately around the project action area because of noise, movement, or anchors associated with dredging equipment. But it is extremely unlikely that these species would be present at the shallow depths where dredging activity is proposed to occur under this action, or in Pillar Point Harbor itself given the amount of vessel traffic common to the area. Given that these species are unlikely to be

present at the project site; that they are highly mobile and could move away from any disturbance if present; and that there is ample, better suited habitat off the coast of California, no effects to turtle species or critical habitat are anticipated.

Southern Sea Otter. Sea otters are typically found in shallow nearshore marine environments, especially rocky marine habitats where kelp forests grow. Kelp beds serve as vital resting, foraging, and nursery sites for the species (NOAA, 1992 as cited in SAIC, 2007). They forage on kelp and invertebrates such as crabs, clams, barnacles, abalone, and sea urchins. Sea otter breeding peaks between September and November and they most often birth pups between late-February and early-April. Sea otters have been observed in Pillar Point Harbor (USACE, 2006).

Potential effects to the southern sea otter could arise from dredging noise and activity, dredging vessel strikes, damage to their kelp bed habitat, or reduction in their prey. Dredging noise levels expected from the proposed action are discussed in the “aquatic habitat and organisms” section. Observations cited by SAIC (2007) suggest that sea otters would not be sensitive to noise disturbance from dredges or other offshore equipment beyond attenuation of the level B harassment sound pressure for continuous noise (120 dB_{rms} re 1 μPa). Assuming use of a cutterhead dredge and the sandy material at the project site, sound pressures below this level would be expected to occur approximately 650 ft from dredging activity. Additionally, slow-moving cutterhead dredge vessels are not likely to strike otters. Burial or sedimentation of rocky subtidal and kelp forest habitat could indirectly result in forage reduction for sea otters. However, the closest kelp habitat to the project site is located seaward of the west breakwater, and any burial or sedimentation of rocky subtidal habitat along the East Breakwater would be minimal and temporary. Given their high mobility, the small area proposed for dredging, the lack of kelp habitat near the project action area, and the abundance of suitable habitat in the region of the project area, no effects to sea otters are anticipated from the proposed action.

Western Snowy Plover.

Western snowy plovers nest on barren or sparsely vegetated sandy beaches near coastal lagoons, lakes, rivers, bays, and estuaries. They breed during spring and summer in California and forage on coastal beaches above the MHW line. Critical habitat for this species is located approximately 1-mile south of the proposed action area, occupying approximately 1.25 miles of Half Moon Bay State Beach. In the year 2000, eighteen snowy plovers were known to occupy dune land in this critical habitat (USACE, 2006). Snowy plovers are not known to be present or nest on the sand or in the dunes in the vicinity of the action area. Given the erosion of much of the sand habitat within the action area and the fact that the species is sensitive to disturbances caused by frequent human and dog access, plovers likely avoid the minimal remaining beach in the highly-recreated project area.

Generally, beach nourishment activities have the potential to affect snowy plover. Potential impacts may include damage to adults or eggs from equipment and personnel during placement or removal of the sand delivery pipeline or dune shaping activities, nest abandonment because of disturbance from activities or noise, or interference with foraging by burial of invertebrate prey and wrack vegetation (SAIC, 2007). Given the absence of plovers in the action area, adverse impacts to snowy plovers from the proposed action are not expected. Moreover, this analysis assumes that if plovers were found to be present in the action area, best management practices such as appropriate timing of nourishment to avoid plovers, restriction of vehicle corridors,

temporary fencing, or material discharge to avoid or minimize interference with plover foraging would be implemented. Beach nourishment associated with the project would likely also benefit plovers by providing additional suitable sand habitat in the project action area.

Marbled Murrelet.

Marbled murrelets spend the majority of their time on the ocean and head inland to nest primarily in old growth and mature forests with large trees, multi-storied vegetation, and moderate to high canopy closure (CSMW, 2015). The proposed action area lacks suitable stands of old growth trees for nesting, but murrelets could transit and forage in the surface waters within the area. The proposed action primarily has the potential to affect marbled murrelets during waterborne activities such as dredging. Marbled murrelets exhibit high sensitivity to vessels (Strong, 2005 as cited in SAIC, 2007) and thus might avoid the immediate area of a dredge. Given that the Pillar Point Harbor has a relatively high level of recreational and commercial vessel traffic in general, the presence of a dredge is unlikely to significantly change background conditions in this respect. Because murrelets are mobile, they could easily avoid the project action area and use the ample surrounding habitat in the region. Thus, no effects on marbled murrelets are expected.

California Brown Pelican.

California brown pelicans are year-round residents of the harbor area. They generally nest and breed at offshore Islands in Southern California but forage, rest, and roost up and down the State's coast on islands, offshore rocks, breakwaters and other structures, rocky intertidal areas, mudflats, and beaches (SAIC, 2007). Pelicans disperse to central and northern California beginning in May with peak numbers in these regions from July through September (Small, 1994 as cited in SAIC, 2007).

The proposed action primarily has the potential to affect brown pelicans by disturbing roosting sites, startling individuals because of noise or activity or creating turbidity that could interfere with their foraging. While brown pelicans are present within Pillar Point Harbor and could occupy the project action area, the species is generally tolerant of high levels of human activity. Consequently, turbidity from dredging and sand placement in a small portion of their non-breeding, foraging habitat is unlikely to have a significant adverse impact. Varanus (1999, as cited in SAIC, 2007) reported that pelicans displayed startle reaction to sudden or close approach disturbances during dredging but otherwise were tolerant of dredging activities near a breakwater in Marina del Rey. These startle responses to dredging activities included shifting of birds along the breakwater or brief departures (minutes). Given the mobility of the species, their tolerance of high-activity environments, the temporary nature of the proposed dredging and placement activities, and the relatively small portion of pelican foraging habitat that could be affected by these actions, no impacts to brown pelicans are expected.

Under the federal and state ESAs, given the presence of critical habitat and potential for presence of listed species within the project action area, informal consultation with USFWS, NMFS, and CDFW to request concurrence with the above determinations would be required prior to project implementation. This draft environmental assessment is being prepared for USACE's feasibility review process, during which federal interest in the project will be evaluated. Consultation with the resource agencies has not been initiated at this time. If it is determined that USACE has federal interest in the project and will serve as the lead Federal agency, USACE would undertake

any consultation with the USFWS and NMFS determined to be necessary. The non-federal lead agency for the project would conduct any necessary consultation with CDFW.

Essential Fish Habitat (EFH)

Essential Fish Habitat is defined under the MSFCMA as waters and substrate necessary for spawning, breeding, feeding or growth to maturity for certain fish species. The central California coast region contains EFH designated for three Fishery Management Plans (FMPs): the Pacific Coast Salmon Plan, the Coastal Pelagics Plan, and Pacific Groundfish Management Plan. Many of the species managed under these three plans are known to occur in the project region.

Pacific Salmonid Fishery Management Plan: The current Pacific Salmon FMP provides management protection for natural and hatchery salmon species off the coasts of Washington, Oregon, and California. These species include Chinook (*Oncorhynchus tshawytscha*), coho (*Oncorhynchus kisutch*), pink (*Oncorhynchus gorbuscha*) (in odd-numbered years), and all salmon protected under the ESA except steelhead. The EFH designated for these species includes marine waters from the shoreline to the boundary of the exclusive economic zone (EEZ; 200 miles offshore) and estuarine and freshwater habitat within Washington, Oregon, California, and Idaho. Coho salmon are the only Pacific Salmon FMP salmonid that occur in the project region.

Pacific Groundfish Fishery Management Plan: The Pacific Coast Groundfish FMP provides protection for 83 groundfish species throughout the Pacific Coast of the United States. Because groundfish species are widely dispersed during certain life stages, EFH for groundfish species is correspondingly large (CSMW, 2015). Designated EFH for Pacific Coast Groundfish includes all waters from depths less than or equal to 3,500 m to MHHW or the upriver extent of saltwater intrusion in river mouths along the coasts of Washington, Oregon, and California. The Pacific Coast Groundfish FMP describes seven habitat units that comprise Pacific groundfish EFH: estuarine, rocky shelf, non-rocky shelf, canyon, continental slope and basin, neritic zone, and oceanic zone. Habitat areas of particular concern include estuary, sea grass, kelp canopy, and rocky habitats.

Coastal Pelagic Fishery Management Plan: The Coastal Pelagic FMP provides protection for commercial pelagic species, including four finfish: Pacific sardine (*Sardinops sagax*), Pacific mackerel (*Scomber japonicus*), northern anchovy (*Engraulis mordax*), and Jack Mackerel (*Trachurus symmetricus*); market squid (*Loligo opalescens*); and various species of krill and euphausiids. The EFH for the finfish species and squid includes all marine and estuarine waters from the shoreline along the coasts of California, Oregon, and Washington, offshore to the limits of the EEZ where sea surface temperatures range between 50 and 78 degrees Fahrenheit (i.e. above the thermocline). The EFH for krill extends the length of the West Coast from the shoreline to a depth of approximately 1,300 feet (CSMW, 2015).

Effects of the proposed project on EFH and EFH managed species would be the same as those described in the “Aquatic habitat and organisms” section above. Temporary, minor, adverse effects could include benthic habitat disturbance and temporary increases in turbidity from dredging and placement activities that could lead to minor reductions in visibility, burial of prey, and movement of EFH-managed species out of the vicinity of increased suspended sediments; temporary disturbance of water column habitat from dredging vessel movement and noise which could displace EFH-managed species over short distances; and alternation of substrate habitat from vessel anchors and placement and removal of hydraulic pipelines. These impacts would be

temporary and are expected to be only minor increases above ambient conditions at the project site.

In compliance with the MSFMCA, an EFH assessment and consultation with NMFS regarding adverse effects to EFH from the proposed action would need to be conducted before the project is implemented to obtain EFH conservation recommendations to avoid, minimize, mitigate, or otherwise offset the potential adverse effects to EFH. This draft environmental assessment is being prepared for USACE's feasibility review process, during which federal interest in the project will be evaluated. If it is determined that USACE has federal interest in the project and will serve as the lead Federal agency, USACE would conduct an EFH consultation with NMFS and implement resulting conservation recommendations.

Given the temporary, minor nature of the anticipated effects and with implementation of any EFH conservation recommendations provided by NMFS, no significant impacts to EFH would be expected from the proposed action. Under the no-action alternative, no impacts to EFH would occur.

Protected Marine Mammals

Marine mammals protected under the MMPA include species of pinnipeds (seals and sea lions), fissipeds (otters); and cetaceans (whales, dolphins, and porpoises). Protected marine mammals that may occur in the vicinity of the project action area include Pacific harbor seals (*Phoca vitulina*), northern elephant seals (*Mirounga angustirostris*), California sea lions (*Zalophus californianus*), stellar sea lions (*Euetopias jubatus*), and southern sea otters (*Enhydra lutris nereis*). Seals and sea lions utilize offshore waters for foraging and haul out on beaches, rocks, and jetties, breakwaters, and docks. As discussed in the "Aquatic habitat and organisms" section, harbor seals are the most common marine mammal in Pillar Point Harbor. Rookeries and haulout sites are considered some of the most important pinniped habitat, particularly because reproduction, rest, and molting occur at these sites (MBNMS, 2014 cited in CSMW, 2015). The potential for occurrence of (and impacts to) southern sea otters is discussed above in this section under "Federal and State Listed Species and Critical Habitats." Several species of cetaceans migrate through and forage in the offshore waters of California's central coast but are unlikely to be found near the shoreline adjacent to Pillar Point Harbor's East Breakwater where the project action area is located.

Typical effects of dredging and beach nourishment activities on seals and sea lions are discussed in the "Aquatic habitat and organisms" section. These can include underwater noise disturbance of individuals transiting near dredging activities, impacts to visibility and foraging associated with increased turbidity, injury or mortality from direct collisions with dredging vessels and disruption of individuals that have hauled out in the vicinity of such activities because of noise or movement from equipment.

As described in the "Aquatic habitat and organisms" section, sound levels given off by the cutterhead dredge in the proposed action would remain below injury thresholds for marine mammals but could exceed the behavioral disturbance threshold within 660 ft of the dredge. Given the location is a port with frequent vessel traffic, ambient noise levels may be around 130 dB normally which would be reached within 330 ft from dredging operations. Given the mobility of marine mammals, the minimal level by which ambient conditions are likely to be exceeded,

the short dredging duration likely to be associated with the proposed action, and the abundance of similar habitat conditions around the dredging site, significant adverse effects from underwater dredge noise are not expected. Similarly, the turbidity effects of the proposed dredging and placement activities are expected to be minor, localized, and temporary with turbidity levels decreasing within one hour after dredging operations or beach nourishment activities cease and ambient conditions returning within one tide cycle (“Turbidity” section). Moreover cutterhead dredges are slow moving and unlikely to increase the risk to marine mammals of vessel collisions in the proposed action area.

Disturbance of individuals caused by dredging or placement activities associated with the proposed action could occur if seals or sea lions haul out in the vicinity of the project action area during construction. Because these species are highly mobile and there is ample equivalent or higher-quality haulout habitat in the region of the action area, it is expected that individuals would avoid hauling out near the dredging or receiving site during construction. The closest known rookery areas for species such as the harbor seal (Fitzgerald Marine reserve north of Pillar Point Harbor) and stellar sea lions and northern elephant seals (point Año Nuevo, south of project site) are located far from the proposed action area and any noise or movement from dredging and placement activities would not affect individuals hauled out in these areas. Additionally, this analysis assumes the potential for disturbance to individuals would be avoided through measures such as fencing off of nourishment areas prior to placement and shaping activities, surveys for the presence of marine mammals in the project vicinity prior to initiating daily construction activities, and cessation of work or implementation of activity buffer zones if a marine mammal is encountered in or around the project action area.

Given the potential for presence of protected marine mammals in the project action area, coordination with NMFS would be necessary prior to project implementation to ensure the proposed activities and avoidance measures would avoid harassment of marine mammals and to obtain any further recommended avoidance measures. This draft EA is being prepared for USACE’s feasibility review process, during which federal interest in the project will be evaluated. If it is determined that USACE has federal interest in the project and will serve as the lead Federal agency, USACE would coordinate with NMFS as necessary to comply with the MMPA.

Because of the temporary, minor nature of any potential noise and turbidity from the proposed action, the availability of other high quality habitat in the region of the project, the ability of marine mammals to avoid construction areas, and assuming implementation of measures to avoid harassment, no impacts to protected marine mammals are expected from the proposed action. Similarly, under the no-action alternative, no impacts to marine mammals would occur.

Migratory Birds

Many species of birds are protected under the MBTA, which makes it illegal to “...pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess...at any time, or in any manner, any migratory bird...or any part, nest, or egg of such bird.” (16 U.S.C. § 703). Bird species that commonly occur in the vicinity of Pillar Point Harbor and the potential for impacts to these species are described in the “aquatic habitat and organisms section.”

This analysis assumes avoidance measures and best management practices will be implemented

to prevent any impacts to birds protected under the MBTA. Pre-construction surveys by a qualified biologist would be conducted to determine if any migratory birds or their nests are present and appropriate buffer zones would be established to avoid activity near these locations if necessary. Additionally, hydraulic pipeline and heavy equipment and worker access routes would be designed to avoid any MBTA protected individuals or nests, and timing of material placement activities would be scheduled to avoid nesting periods whenever possible. This analysis further assumes that coordination with the USFWS would be initiated to discuss the potential for presence of any MBTA species at the project site and additional avoidance measures that could be implemented to prevent impacts to such species. Given that this draft environmental assessment is being prepared for USACE's feasibility review process, during which federal interest in the project will be evaluated, no coordination with resource agencies has been initiated at this time. If it is determined that USACE has federal interest in the project and will serve as the lead Federal agency, USACE will coordinate with the USFWS for input regarding MBTA species and avoidance measures.

Based on the proposed avoidance measures and the assumption that any additional measures recommended by the USFWS would be implemented if feasible, no impacts to bird species protected under the MBTA are expected from the proposed action. Under the no-action alternative, there would be no change in conditions for migratory birds and thus no impact.

4.3 Physical Environment

(X) Air Quality: The Pillar Point Harbor project area lies within the nine-county San Francisco Bay Area Air Basin (SFBAAB). The Bay Area Air Quality Management District (BAAQMD) regulates onshore (stationary) air pollution sources in the SFBAAB, including San Mateo County. Presently, BAAQMD is in "attainment" of all National Ambient Air Quality Standards (NAAQS) except the 8-hour ozone standard and the 24-hour particulate matter 2.5 micron (PM_{2.5}) (BAAQMD, 2015). The 1-hour carbon monoxide and particulate matter 10 micron (PM₁₀) standards are unclassified because of a lack of data for the EPA to form a basis on attainment status.

The Clean Air Act (CAA) requires that any federally funded project must conform with the air quality standards and regulations that have been established by federal, state, and local regulatory agencies, unless an exemption is applicable to that proposed action. This draft environmental assessment is being prepared for USACE's feasibility review process, during which federal interest in the project will be evaluated. If it is determined that USACE has federal interest in the project and will federally fund the project, compliance with this provision of the CAA would be required unless an exemption exists.

All emissions associated with the proposed project are from maintenance dredging to existing authorized depths and associated placement of material. In accordance with 40 CFR § 51.853(c)(2)(ix), requirements for preparation of conformity determination under the CAA do not apply to maintenance dredging and debris disposal where no new depths are required, applicable permits are secured, and placement will be at an approved site. This analysis assumes that all applicable permits for the project will be secured and the placement of material at Surfer's and Vallejo Beaches for nourishment will be approved. Therefore, the proposed

dredging and placement activities are considered exempt from conformity determination requirements and in compliance with the CAA.

(X) Geology and Soils: The project site is located on the Half Moon Bay coastal terrace, which extends from Montara to Seal Rock, at varying widths between the ocean and the Santa Cruz mountain range (Dyett & Bhatia, 2014). The Pillar Point region is underlain by a wide variety of soils, ranging from beach sand to clay loam and sandy loam. Most soil in the area of the harbor is Denison loam, which is considered deep and well-drained. No changes or impacts to geology or soils are expected from the proposed action or the no-action alternative.

(X) Seismicity: There are several significant faults that could be the source of a seismic event in the vicinity of the project action area. The San Andreas Fault system is considered the most likely source of a major earthquake in California's future; however, the closest fault to the project action area is the San Gregorio Fault system, which crosses the Fitzgerald Marine Reserve and trends northwest to southeast (dashed line in Figure 13). The San Gregorio Fault is a mapped Alquist-Priolo Special Studies Zone and is considered an active fault with a potential earthquake moment magnitude of 7 or greater.

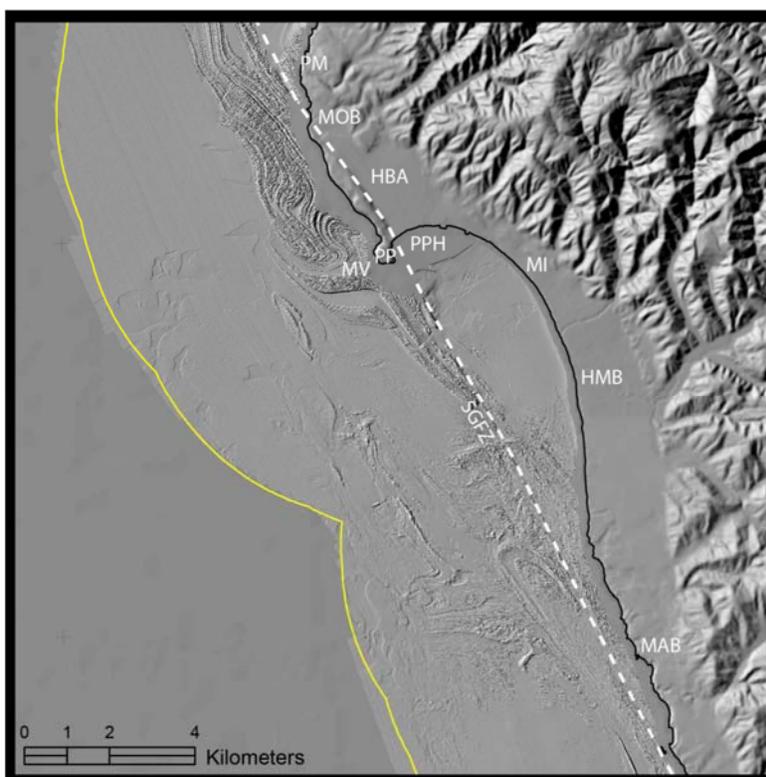


Figure 13. Coastal geography of Offshore of Half Moon Bay Area (Source: Cochrane et al., 2014). The yellow line shows limit of California's State Waters, the dashed white line shows trace of San Gregorio Fault Zone (SGFZ), and the abbreviation PPH, represents the location of Pillar Point Harbor.

(X) Mineral Resources: There are no known mineral resources existing within the project action area, and therefore neither the proposed action nor the no-action alternative would have any impact on mineral resources.

4.4 Human Environment

(X) Noise: Ambient sources of noise in the vicinity of the project action area include Pillar Point Harbor vessel traffic and operations and recreation activities along Surfer's, Vallejo, and Miramar Beaches, breaking waves along the shoreline, air traffic from the Half Moon Bay Airport, and vehicular traffic noise from the adjacent Highway 1.

Noise levels associated with the proposed dredging and beach nourishment activities would be temporary and are not expected to significantly exceed ambient noise levels in the project area. Generally, noise levels above 70 decibels (dB) produce the following human responses: 80 to 90 dB (annoying), 90 to 110 dB (very loud), 110 to 120 dB (extremely loud), 130 to 140 dB (painfully loud) (SAIC, 2007). Reported airborne noise levels of dredges range from 76 to 88 dBA at 50 ft from the source while average noise levels during beach nourishment have been estimated to be around 85 to 90 dBA (SANDAG, 2000 as cited in SAIC, 2007). This analysis assumes the berm to be constructed from the placed material would be shaped with equipment including a small lightweight dozer and low ground pressure scraper. The Washington Department of Transportation (2006, as cited in SAIC 2007) suggests that the airborne noise associated with a bulldozer can range from 85 to 103 dB at 50 ft and that of a grader can range from 79 to 93 dB at 50 ft. Given these noise levels, both the proposed dredging and placement activities would remain at or below levels that could annoy people who are more than 50 ft from the activities. Noise levels would be lower at greater distances from the activities.

This analysis assumes that all construction equipment would be professionally maintained and fitted with standard manufacturers' mufflers and silencing devices. Additionally, construction activities would be scheduled to comply with City of Half Moon Bay noise ordinances that restrict construction hours to weekdays from 7:00 a.m. to 6:00 p.m., Saturdays 8:00 a.m. to 6:00 p.m., and Sundays 10:00 a.m. to 6:00 p.m. (City of Half Moon Bay, 2009). In light of these measures along with the relatively noisy ambient conditions at the project site and the temporary nature of the proposed construction activities, any potential increase in noise levels created by the proposed action are expected to be less than significant.

(X) Transportation and traffic: State Highway 1, which runs along the coast adjacent to the project site, is a vital traffic artery. A paid parking area is located north of the East Breakwater between the breakwater and the highway. Dredging activities associated with the proposed action are not expected to affect ground transportation or traffic volumes as the dredging vessel will access the project site from the ocean. During beach nourishment activities, heavy machinery will require staging and access to Surfer's and Vallejo Beaches. Worker vehicles will also make trips to and from the project site and require parking areas. Because the project is currently in the feasibility stage, construction activity details such as the location of staging areas and equipment access route to the beaches have not yet been identified. This analysis assumes a portion of the paid parking area would be temporarily used for construction equipment staging and worker vehicle parking because the area has been used for staging in the past (e.g. USACE, 2006). The remainder of the parking area, including the driveway that provides access to Highway 1, would remain open for public use. A minimal number of worker vehicle trips along Highway 1 are anticipated in association with the proposed action and would be an insignificant addition to existing traffic levels on the highway. Therefore any effects on transportation and traffic from the proposed action would be minor, temporary, and less than significant.

The proposed action would also benefit transportation in the long term by providing added protection against erosion of the shoreline and material supporting Highway 1. The USACE projected current bluff erosion rates 10 and 50 years into the future and determined that infrastructure, such as Highway 1 and coastal pedestrian paths leading to the beach, would be significantly threatened without action (Figure 4). While the California Department of Transportation (CalTrans) has placed some riprap to protect portions of the highway behind Surfer's beach and has plans to expand the riprap, the proposed beach nourishment will also help protect the highway into the future thus benefiting transportation in the region.

The no-action alternative would have no potential for impacts to transportation, nor would it confer any erosion mitigation benefits to protect Highway 1.

(X) Navigation: Pillar Point Harbor comprises an inner harbor and outer harbor. The inner harbor, which berths 180 commercial fishing vessels and approximately 200 recreational boats, is encompassed within the much larger outer harbor area. Between the inner harbor and the East Breakwater there is a small boat launch. The harbor is heavily used by recreational, fishing, and small commercial vessels. These vessels often transit near or through the portion of the project action area inside the outer harbor and adjacent to the East Breakwater. Safe navigation is maintained by well-marked channels and the presence and activity of various enforcement agencies (i.e. the U.S. Coast Guard).

The proposed action would involve dredging of material shoaled along the East Breakwater inside the outer harbor and pumping the material to shore via hydraulic pipeline. The presence of the dredge vessel in the project action area would temporarily increase vessel traffic in the harbor but is unlikely to significantly interfere with navigation in the harbor. The dredging area is located in the far east corner of the harbor and the dredge would not block access for vessels traveling between the open ocean, outer harbor, and inner harbor. Similarly, the dredge is not expected to prevent normal usage of the small boat launch. Dredge operators would follow all navigational procedures required inside the harbor to ensure continued navigational safety. No adverse effects on navigation are anticipated from the proposed action. Additionally, the proposed action would directly benefit navigation inside the harbor by removing the shoaled material along the East Breakwater which currently presents a navigation hazard for vessels transiting the area because they could run aground on the sandy shoal.

The no-action alternative would not affect navigation nor would it benefit navigation by removing sand shoaled within the harbor.

() Air Traffic: N/A

(X) Recreation (boating, fisheries, other): The project vicinity supports a variety of recreational activities including boating, swimming, surfing, fishing, kayaking, windsurfing, walking, bird watching, and beach going. The small boat launch and portion of the outer harbor adjacent to the East Breakwater are used for recreational boating, kayaking, and fishing; the public access beach area on the eastern shore of the harbor is popular for picnicking, jogging, cycling, and bird watching; Surfer's, Vallejo, and Miramar Beaches are popular sites for surfing; and the California Coastal Trail on the bluffs behind Vallejo Beach is used by pedestrians as a

walking and hiking trail. While signs posted on the East Breakwater prohibit the public from climbing on the revetment rocks, in practice, visitors climb on the breakwater for a variety of recreational uses.

The proposed action would have minor and temporary effects on recreational activities within and around the proposed action area during construction but would provide benefits to recreation in the longer term. During construction, the dredge would occupy a portion of the outer harbor adjacent to the East Breakwater that is currently available for recreational activities such as boating and kayaking. The dredge would not prevent normal usage of the small boat launch but boaters and others utilizing that region of the outer harbor would need to remain a safe distance from the dredging vessel. Given the large size of the outer harbor, this impact would be minor and would cease once dredging is completed. Beach nourishment activities along Surfer's and Vallejo Beaches would require temporary closure of portions of those beaches to recreational activities. This analysis assumes fencing, barricades, and associated warning signs would be erected to warn and prevent the public from accessing work areas. Impacts on visitors who use these beaches for recreational activities would be temporary and localized. Visitors would be able to use other parts of the beach for recreational activities. The proposed project would not result in any permanent beach closures. Temporary closure of a portion of the paid parking area north of the East Breakwater for construction staging, if utilized, could also affect recreational users wishing to park in the lot. This potential impact is discussed in the "transportation and traffic" section. Overall, impacts to recreation during construction would be temporary and less than significant.

In the long term the proposed action would benefit recreation by creating more usable beach area along Surfer's, Vallejo, and Miramar Beaches and facilitate continued recreational surfing at the popular Surfer's beach break. By providing erosion mitigation to protect the bluffs behind these beaches, the proposed action would also benefit pedestrian recreational activities along the California Coastal Trail located on the bluffs. Moreover, the removal of shoaled material along the East Breakwater inside Pillar Point Harbor would benefit recreational boaters, kayakers, and others who use the area by removing the navigational hazard posed by the built up sediment.

The no-action alternative would have no temporary impacts to recreation but also would not benefit recreational uses in the vicinity of the project site in the long term, potentially leading to greater impacts to recreation as the beaches continually narrow, the bluff at Vallejo Beach continues to erode, and sand continues to build up along the East Breakwater in the harbor.

(X) Aesthetics/visual impact: The overall aesthetic character of the project area is comprised primarily of ocean, beaches, and harbor facilities bordered by Highway 1 and residential neighborhoods to the north (Figure 3). The natural resources in the area provide a visually attractive setting with commercial fishing and recreational boating and vessel traffic, which are common scenes in the harbor. The temporary presence of a dredge in the harbor could affect the aesthetics of the region, but given the common vessel traffic and operations, this impact would be negligible. The staging and use of beach nourishment equipment such as the hydraulic pumping pipeline, bulldozer, and scraper would be inconsistent with the existing visual character of the region and would likely result in short-term aesthetic impacts. But these would be temporary and are expected to be less than significant. In the long-term, the proposed action would provide beneficial aesthetic impacts by creating more beach area to add to the natural

visual characteristics of the region. The no-action alternative would result in no change to existing aesthetics in the region.

(X) Land use classification: The Pillar Point Harbor facilities in and adjacent to the project action area are Marina/Recreation land uses (Dyett & Bhatia, 2014). The public access beach within the harbor as well as Surfer's, Vallejo, and Miramar Beaches are open space (Dyett & Bhatia, 2014). Neither the proposed action nor the no-action alternatives would affect land use classification in the region.

() Prime and unique farmland: N/A

(X) Public facilities, utilities and services: Public facilities in the vicinity of the project action area include Pillar Point Harbor, the small boat launch and adjacent public access beach inside the harbor, and Surfer's, Vallejo, and Miramar Beaches. Utilities and services common in the region include electrical lines, water and sewer, and waste management services. Neither the proposed action nor the no-action alternative would result in any change to public facilities, utilities or services.

(X) Public health and safety: The proposed action would involve use of marine vessels as well as heavy construction equipment. Vessels used for dredging would follow the appropriate navigational safety measures to ensure public safety during dredging operations. As discussed in the "water quality" section, a spill-prevention plan would be developed prior to project implementation and spill-response equipment would be onsite for immediate implementation. These practices would minimize the possibility of any accidental spills affecting public health and safety. During beach nourishment activities, fencing, barricades, and associated warning signs would be erected to warn and prevent the public from accessing work or staging areas. Given these measures, no significant adverse effects to public health and safety are expected from the proposed action. Additionally, the proposed action would benefit public safety, once complete, by removing the navigational hazard posed by the shoaled sediment adjacent to the East Breakwater inside the harbor and by reducing erosion threats to public infrastructure behind Surfer's and Vallejo Beaches including Highway 1 and the coastal trail.

The no-action alternative would not have an effect on existing public health and safety conditions in the region of the project.

(X) Hazardous and toxic materials: Only uncontaminated sandy material would be utilized as part of the proposed beach nourishment activities ("Contaminants in dredge or fill material" section). Additionally, as described in the "Water quality" section, this analysis assumes that BMPs such as a spill prevention plan and marine and terrestrial equipment fueling best practices will be applied to prevent water-quality impacts from hazardous or toxic pollution such as debris, fuels, oils, lubricants, and other harmful materials. Therefore, no significant impacts from hazardous or toxic materials are expected from the proposed action or the no-action alternative.

() Energy consumption or generation: N/A

(X) Cultural and historical resources: In general a project would have significant effects on cultural resources if it would disturb, remove from original context, or introduce incompatible elements out of character with any property considered eligible for the National Register of Historic Places. In 1996, USACE conducted a literature and records search for any existing or eligible cultural and archaeological resources in the vicinity of the Pillar Point marina to analyze the potential for impacts from a breakwater repair project proposed at the time (USACE, 1996; USACE, 2006). This survey included review of archaeological site records, maps, and project files from the Northwest Information Center located at Sonoma State University in Rohnert Park, California; the National Register of Historic Places; California Historical Landmarks; California Inventory of Historical Resources; and the Minerals Management underwater surveys of California, Oregon, and Washington. Archaeological resource studies were also investigated for any cultural resources which might be present in the project area, but were not recorded with the Northwest Information Center. A site visit which included interviews with local citizens was undertaken to obtain information on historic and prehistoric resources within the general project area. In 2006, an updated records search was conducted for an area of potential effects in the vicinity of the East Breakwater using in-house USACE records and maps (USACE, 2006).

Based on the results from these analyses, no resources listed on or eligible for the National Register of Historic Places are known to occur within the vicinity of the proposed action area. The proposed project area consists only of areas previously disturbed by construction activities (e.g. Pillar Point Harbor) and beach sites that are not known to contain listed cultural resources. If previously unknown cultural resources are identified during project implementation, all activity will cease until requirements of 36 CFR 800.11, *Discovery of Properties During Implementation of an Undertaking*, are met. Moreover, the proposed action involves dredging to existing authorized depths and nourishment of existing beach areas and thus would not introduce elements out of character with the regional surroundings. Thus, the proposed action would not have the potential to cause effects to National Register listed or eligible properties. The no-action alternative would result in no change in the project area and thus no effects to cultural resources.

(X) Archaeological sites: As described in the “cultural and historic resources” section, literature and records searches to identify any archaeological sites within the vicinity of the proposed action area were conducted in 1996 and 2006. These searches identified no archaeological resources in the proposed action area (USACE, 2006). Moreover, the proposed dredging activities will take place inside the harbor to previously authorized depths and include only areas that have been previously dredged so no new archaeological resources are expected to be encountered. Similarly, beach nourishment activities are not anticipated to result in any affects to archaeological resources as none are known to occur in the receiver site footprint. In the event that any archaeological resources are encountered during the proposed action, the vicinity would be avoided and the State Historic Preservation Office (SHPO) will be notified for further action. Thus, no significant impacts to archaeological resources or sites are expected from the proposed action. The no-action alternative would result in no changes in the project region and thus no effects to archaeological sites.

(X) Historic monuments, national parks, national seashores, wild and scenic rivers, wilderness area, research sites, etc: Based on review of historic monuments, wild and scenic rivers, national parks, national seashores, and designated wilderness areas within California, the proposed action area and immediate vicinity do not contain any such resources. Furthermore, no

known research sites currently exist in or around the proposed action area. As discussed in the “Special aquatic sites” section, the portion of the proposed action area outside Pillar Point Harbor falls within the MBNMS, and the Pillar Point State Marine Conservation Area and James V. Fitzgerald Marine Reserve are located immediately up the coast from Pillar Point Harbor (Figure 12). Neither the proposed action nor no-action alternative would affect historic monuments, parks, national seashores, wild and scenic rivers, wilderness areas, or research sites.

(X) Socio-economic conditions: Socio-economic conditions in communities around the project site – i.e., Princeton, El Granada, and Half Moon Bay – would remain unchanged under the Proposed and no-action alternatives.

(X) Environmental justice: Environmental Justice conditions in the region of the project would remain unchanged under the Proposed and no-action alternatives.

(X) Growth inducing impacts - community growth, regional growth: Neither the proposed action nor the no-action alternative would result in changes to community structure or additional growth either regionally or locally.

(X) Conflict with other use plans, policies or controls:

Plans and policies considered under the Coastal Zone Management Act

The proposed action falls within the jurisdiction of the California Coastal Commission (CCC), a state agency that implements the Coastal Zone Management Act (CZMA) with authority over coastal areas of the state. The CZMA requires that federal actions be consistent, to the maximum extent practicable, with federally approved state coastal plans. The federally approved state coastal plan applicable to the project location is the California Coastal Management Program (CCMP)². The CCC’s standard of review for Federal Consistency Determinations is the policies of Chapter 3 of the California Coastal Act of 1976, as amended, including applicable policies related to public access, recreation, the marine environment, land resources, development, and industrial development.

This draft EA is being prepared for USACE’s feasibility review process, during which federal interest in the project will be evaluated. If it is determined that USACE has federal interest in the project and will serve as the lead Federal agency, USACE will prepare and submit to the CCC a consistency determination describing how the proposed action is consistent, to the maximum extent practicable, with the applicable plans and policies. The project would not be implemented until concurrence from CCC on the determination is received. Therefore, the proposed action will not significantly conflict with the CCC’s CZMA plans and policies.

Monterey Bay National Marine Sanctuary (MBNMS) policies and regulations

The portion of the proposed action area outside of Pillar Point Harbor is located in the MBNMS and is regulated under the National Marine Sanctuaries Act (NMSA). The MBNMS enforces thirteen federal regulatory prohibitions designed to preserve and protect the natural and cultural

² The California Coastal Management Program is a combination of Federal, State, and local planning and regulatory authorities for controlling the uses of land, air, and water resources along the coast.

resources and qualities of the ocean and estuarine areas within its boundaries; the four of these prohibitions that are potentially applicable to the proposed project are:³

1. Drilling into, dredging, or otherwise altering the submerged lands of the sanctuary; or constructing, placing, or abandoning any structure, material, or other matter on or in the submerged lands of the sanctuary (with the exception of several activities, such as boat anchoring and harbor maintenance projects);
2. Discharging or depositing, from within or into the sanctuary, any material or other matter (with the exception of several activities, such as dredged material disposal at designated sites);
3. Discharging or depositing, from beyond the boundary of the sanctuary, any material or other matter that subsequently enters the sanctuary and injures a sanctuary resource or quality; and
4. Taking (disturbing or injuring) any marine mammal, sea turtle, or bird within or above the sanctuary, except as authorized by the MMPA, ESA, or MBTA (regardless of intent);

While dredging activities associated with the proposed action would occur in Pillar Point Harbor and thus outside the jurisdiction of the MBNMS, the proposed beach nourishment would involve placement of material in the sanctuaries boundaries (i.e. below the mean high water mark). This type of action conflicts with the first two prohibitions listed above. While the third prohibition addresses placement of material that may enter the sanctuary and harm or degrade resources, the material used for the proposed beach nourishment action will be predominantly sand and tested to ensure it is safe for beach nourishment. While it may enter the sanctuary, this process would mimic natural beach erosion and would not harm sanctuary resources. Therefore, the proposed action would comply with this regulation. The proposed action would also comply with the fourth prohibition through implementation of the avoidance measures assumed in this analysis and obtained through any necessary consultation with the USFWS and NMFS. These steps are expected to prevent associated taking of any marine mammal, sea turtle, or bird within or above the sanctuary, except as authorized by the MMPA, ESA, or MBTA.

Under the NMSA, the MBNMS has the ability to grant permits for prohibited activities, provided that the activities meet certain criteria such as having, at most, short-term and negligible adverse effects on sanctuary resources and qualities (15 C.F.R. § 922.133) (CSMW, 2015). Alternatively, authorizations may be issued under special circumstances for activities otherwise prohibited by MBNMS regulations if: an activity has been authorized by a valid lease, permit, license, approval or other authorization issued after the effective date of MBNMS designation by any federal, state, or local authority; the Superintendent finds that the activity will not harm sanctuary resources and qualities; and the applicant complies with all applicable regulations and any specific conditions or terms specified by the Superintendent (CSMW, 2015). Such an authorization may be issued in conjunction with a valid lease, permit, license, approval or other authorization issued by any federal, state, or local authority of competent jurisdiction (CSMW, 2015). For example, if a project requires a CCC permit (or another relevant permit issued by a state or federal agency), MBNMS staff could review and potentially authorize that permit. CSMW (2015) also notes that the MBNMS Coastal Armoring Action Plan (Activity 2.8) directs the sanctuary to pursue a pilot program to evaluate environmentally sound alternatives to coastal

³ The included summary of prohibited actions was adapted from a summary included in USACE (2015).

armorings (including beach nourishment), while the MBNMS Harbors and Dredge Disposal Action Plan (activity 5.1) directs the MBNMS to examine the potential beneficial use of dredged material in the sanctuary.

The USACE is actively coordinating with the MBNMS to evaluate potential mechanisms for carrying out the proposed project in light of the sanctuary prohibitions. On May 19, 2015 USACE and the MBNMS participated in a Beach Replenishment Committee Meeting hosted by the SMCHD to discuss the proposed action and alternatives. The MBNMS staff suggested that the project could potentially be carried forward by either limiting placement of material to outside the sanctuary boundaries (above MHW), which would not require a sanctuary permit, or by obtaining a permit and conducting the proposed beach nourishment such that only dry material obtained by means other than dredging is placed in the sanctuary boundaries (i.e. below MHW) and any material dredged from within the harbor is placed outside of the sanctuary boundaries.

Given that USACE and the MBNMS are working together to determine acceptable ways to implement the proposed action in accordance with the policies of the sanctuary, the proposed project is not expected to have a significant conflict with sanctuary regulations. While this draft environmental assessment is being prepared for USACE's feasibility review process, during which federal interest in the project will be evaluated, if it is determined that USACE has federal interest in the project and will serve as the lead Federal agency, USACE will continue to coordinate with the MBNMS on the project. The USACE will obtain any permits or authorizations necessary to implement the project and will comply with any specific conditions or terms specified by the MBNMS.

The no-action alternative would not involve any change at the project site and thus would not conflict with any existing plans, policies, or controls.

4.5 Irreversible Changes and Cumulative Effects

(X) Irreversible changes, irretrievable commitment of resources: The proposed action includes the use of a dredging vessel and heavy construction equipment, both of which consume fossil fuels to operate. Consuming fossil fuels would be considered an irretrievable commitment of resources but would be minor and less than significant. Dredging and beach nourishment activities are not considered an irreversible change or irretrievable commitment of resources as the processes that cause sediment deposition along the East Breakwater of Pillar Point Harbor and erosion along Surfer's, Vallejo, and Miramar Beaches would remain unaltered. The sediment resources would continue to remain in the littoral cell system and the changes from the dredging and nourishment activities would return to be similar to the existing state in the future. Thus, no significant irreversible changes or irretrievable commitment of resources would occur under the proposed action. The no-action alternative would not involve any changes or commitment of resources.

(X) Other Cumulative effects not related to the proposed action:

1. Occurred on-site historically: Harbor construction and expansion activities in the project region have occurred since the late 1950's. The East and West outer breakwaters were built by USACE between 1959 and 1961. Additional extensions to the West

Breakwater were constructed in 1967 and 1996. The Pillar Point Harbor became operational in 1968 when a two-lane boat launching ramp was constructed for recreational boaters and commercial fishermen. Since then, the area has been heavily used for recreational and commercial boating activities. In 1985, the SMCHD built an inner breakwater system and 369 berths. In 2006, USACE undertook a revetment repair project on the East Breakwater. Maintenance dredging has occurred at various locations in the Harbor throughout its existence. Additionally, CalTrans and San Mateo County have constructed rock revetments fronting approximately 900 ft of the bluff behind Surfer's Beach and 1,400 ft of the bluff behind Miramar Beach (respectively) to protect Highway 1 infrastructure.

2. Likely to occur within the foreseeable future: In the foreseeable future, CalTrans plans to expand the rock revetment placed along the bluff behind Surfer's Beach by approximately 300 feet to respond to the continued erosion threat to Highway 1. It is also reasonably foreseeable that maintenance dredging at locations throughout the harbor will occur in the future.

3. Contextual relationship between the proposed action and (1) and (2) above: In the context of the past and foreseeable future actions in the vicinity of the proposed project, it is not expected that the proposed action will have significant incremental cumulative effects. In fact, the proposed action would mitigate potential negative cumulative effects of erosion along Surfer's, Vallejo, and Miramar Beaches and accumulation of sediment in Pillar Point Harbor associated with the past construction of the East Breakwater. The no-action alternative would not result in any changes from current conditions at the project site and thus would not help to alleviate any negative effects from the construction of the East Breakwater.

5.0 Summary of indirect and cumulative effects from the proposed action

The proposed action would not have significant adverse indirect or cumulative impacts on the physical, biological, and human environment. Temporary and minor direct adverse effects associated with the proposed action are expected to be short in duration, ending with the completion of construction activities, and would be less than significant given the assumed avoidance measures and BMPs described in this assessment. Long-term impacts of the proposed action would be beneficial in terms of minimizing erosion, removing navigational hazards, and improving recreation and habitat at the project site.

6.0 Environmental Compliance

As noted throughout this document, this draft environmental assessment and 404(b)(1) analysis are being prepared for USACE's feasibility review process during which federal interest in the project will be evaluated. Because federal interest in this project has yet to be determined, this document has not been released for public and agency review and comment and is not accompanied by a draft Finding of No Significant Impact (FONSI) or environmental compliance permits. If it is determined that USACE has federal interest in the project and will serve as the lead Federal agency, USACE will prepare and coordinate the necessary environmental

compliance permits to applicable resource agencies, prepare a draft FONSI, and release this environmental assessment for agency and public review. A final FONSI is anticipated and would be signed once all environmental compliance permits are acquired and any comments on the draft environmental assessment have been addressed.

A summary of the environmental compliance necessary for the proposed project is presented in Table 4. Supporting documentation for the listed species analysis presented in this draft EA is presented in Appendix A.

<p>Endangered Species Act as amended (16 USC 1531 <i>et seq</i>)</p>	<p>USACE has determined that critical habitat is present at the proposed project site and that there is the potential for presence of listed species within the project action area. If it is determined that USACE has federal interest in the project and will serve as the lead Federal agency, USACE would undertake consultation with the USFWS and NMFS as required by Section 7 of the ESA. If necessary, formal consultation would be conducted and a Biological Assessment (BA) would be prepared to analyze any effects of the proposed action on ESA-listed species and/or their critical habitats.</p>
<p>Fish and Wildlife Coordination Act (16 USC 661<i>et seq</i>)</p>	<p>If it is determined that USACE has federal interest in the project and will serve as the lead Federal agency, USACE will initiate a Coordination Act Reepport request with USFWS and request the USFWS, NMFS, and CDFW review and comment on the Draft EA as coordination under the the Fish and Wildlife Coordination Act.</p>
<p>Magnuson-Stevens Fishery Conservation and Management Act - Fishery Conservation Amendments of 1996, (16 USC 1801 <i>et seq</i>) – Essential Fish Habitat (EFH)</p>	<p>The proposed action area includes EFH for three Fishery Management Plans. In compliance with the MSFMCA, an EFH assessment and consultation with NMFS regarding adverse effects to EFH from the proposed action would need to be conducted before the project is implemented. If it is determined that USACE has federal interest in the project and will serve as the lead Federal agency, USACE would prepare the assessment and conduct an EFH consultation with NMFS in order to obtain EFH conservation recommendations to avoid, minimize, mitigate, or otherwise offset any potential adverse effects to EFH.</p>
<p>Migratory Bird Treaty Act (16 USC 703-711)</p>	<p>Based on the avoidance measures proposed in this EA, no impacts to migratory birds are expected from the proposed action. If it is determined that USACE has federal interest in the project and will serve as the lead Federal agency, USACE will coordinate with the USFWS to ensure appropriate measures are undertaken to avoid impacts to MBTA species.</p>
<p>Marine Mammal Protection Act (16 USC 1361 <i>et seq</i>)</p>	<p>Based on the avoidance measures proposed in this EA, no disturbance or harassment of marine mammals is expected from the proposed action. . If it is determined that USACE has federal interest in the project and will serve as the lead Federal agency, USACE would coordinate with NMFS prior to project implementation to ensure the proposed activities and avoidance measures would avoid harassment of marine mammals and to obtain any further recommended avoidance measures.</p>
<p>National Marine Sanctuaries Act (16 USC 1431 <i>et seq</i>) Marine Protection Research and Sanctuaries Act of 1972 (33 USC 1401 <i>et seq</i>)</p>	<p>The portion of the proposed action area outside of Pillar Point Harbor is located in the MBNMS and is regulated under the National Marine Sanctuaries</p>

	<p>Act (NMSA). Proposed beach nourishment activities would involve placement of material in the sanctuaries boundaries which conflicts with two of the Federal prohibitions enforced by the MBNMS. Under the NMSA, the MBNMS has the ability to grant permits or authorizations for prohibited activities. The USACE is actively coordinating with the MBNMS to evaluate potential mechanisms for carrying out the proposed project in light of the sanctuary prohibitions. If it is determined that USACE has federal interest in the project and will serve as the lead Federal agency, USACE will obtain any permits or authorizations necessary to implement the project and will comply with any specific conditions or terms specified by the MBNMS.</p>
<p>National Historic Preservation Act (16 USC 470 and 36 CFR 800): Protection of Historic Properties</p> <p>Executive Order 11593: Protection and Enhancement of the Cultural Environment</p> <p>Archaeological and Historic Preservation Act of 1974, (16 USC 469 <i>et seq</i>)</p> <p>Federal Water Project Recreation Act (16 USC 4601 <i>et seq</i>)</p> <p>Abandoned Shipwreck Act of 1987, (43 USC 2101 <i>et seq</i>)</p> <p>Submerged Lands Act, (Public Law 82-3167; 43 USC 1301 <i>et seq</i>)</p>	<p>The proposed action will not affect any historical and cultural resources as none are known to occur within the proposed action area.</p> <p>See above.</p> <p>The proposed action will not affect any archaeological resources as none are known to occur within the proposed action area.</p> <p>If it is determined that USACE has federal interest in the project and will serve as the lead Federal agency, public notice of availability of the Draft EA will be sent to the National Park Service and Office of Statewide Planning, in compliance with this Act.</p> <p>The proposed action will not affect any abandoned shipwrecks as none are known to occur within the proposed action area.</p> <p>If it is determined that USACE has federal interest in the project and will serve as the lead Federal agency, notice of the availability of the Draft EA will be sent to the California State Lands Commission and they will have the opportunity to comment on the proposed action’s potential impacts to submerged lands. This would result in compliance with the Submerged Lands Act.</p>

7.0 Agencies Consulted and Public Notification

Stakeholder engagement

A variety of stakeholder and public engagement activities have been conducted as a part of this project. At the beginning of project planning, a public meeting was held (November 8, 2013) to provide a forum for the USACE project team and the public to exchange ideas on potential alternatives. The Coastal Sediment Management Workgroup (CSMW) of which USACE is a member, held a site visit at Surfers' Beach in March 2015 with representatives from the MBNMS and the GFNMS to discuss mutually acceptable opportunities for solutions to the erosion issues found there. The CSMW offered technical assistance to the sanctuary to identify options for dealing with erosion at Surfers' Beach in a manner that restores beach habitat and minimizes the use of coastal armoring structures. Additionally, a stakeholder meeting regarding the proposed project was held by the San Mateo County Harbor District (SMCHD) on May 18, 2015 that included participants from the Harbor District, USACE, MBNMS, San Mateo County, the Surfrider foundation, Coastal Commission, and the general public. The project was discussed in detail and the status of the USACE feasibility study was reported. Potential mechanisms for implementing the project in light of the MBNMS regulations prohibiting placement of material in the Sanctuary boundaries were discussed as well.

Agency review and public involvement

As noted throughout this document, this draft EA and Section 404(b)(1) analysis are being prepared for USACE's feasibility review process during which federal interest in the project will be evaluated. Because federal interest in this project has yet to be determined, this document has not been released for public and agency review and comment. If it is determined that USACE has federal interest in the project and will serve as the lead federal agency, release this draft EA for agency consultation and public review. The agencies listed below would be provided with a copy of the draft document. Any agency or public comments received and USACE responses would be summarized below and detailed in an appendix to this document.

7.1 Summary of comments and Responses

A. Federal agencies:

- 1) U.S. Environmental Protection Agency (EPA Region 9)
- 2) U.S. Coast Guard (USCG)
- 3) Advisory Council – Historic Preservation
- 4) U.S. Fish and Wildlife Service
- 5) National Marine Fisheries Service
- 6) MBNMS
- 7) GFNMS

B. State and local agencies:

- 1) California Coastal Commission (CCC)
- 2) State Lands Commission
- 3) State Historic Preservation Officer
- 4) Regional Water Quality Control Board (RWQCB)
- 5) Bay Area Air Quality Management District (BAAQMD)
- 6) California Department of Fish and Wildlife (CDFW)

C. Other organizations and individuals

- 1) CSMW

8.0 Determinations and Statement of Findings

This draft EA and Section 404(b)(1) analysis are being prepared for USACE's feasibility review process during which federal interest in the project will be evaluated. Because federal interest in this project has yet to be determined, this is not accompanied by a draft Finding of No Significant Impact (FONSI). If it is determined that USACE has federal interest in the project and will serve as the lead Federal agency, USACE will prepare a draft FONSI for inclusion in this section. A final FONSI is anticipated and would be signed once all environmental compliance permits are acquired and any comments on the draft environmental assessment have been addressed.

9.0 References

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Appendix A – Assessment of Potential for Listed Species to Occur in the Proposed Project Area

This appendix documents federal and state endangered, threatened, or candidate species and their potential for presence in the project action area. Lists of species that could potentially occur in the project region were obtained from the following sources:

- United States Fish and Wildlife Service (USFWS) Information, Planning, and Conservation System (IPaC) mapping system (USFWS, 2015b)
- National Marine Fisheries Service (NMFS) listing of endangered species in the west coast region (NOAA, 2015c).
- The California Natural Diversity Database (CNDDDB) species lists for the Half Moon Bay and Montera Mountain USGS 7.5 Minute Quadrangles (CDFW, 2015)

The below table summarizes all the state or federal endangered, threatened, or candidate species derived from these three sources. Following the table is a species by species explanation of whether the species is expected to be present in the project action area. The potential for impact to those species that may be present in the project action area are discussed in the body of the EA document. For those not expected to be present in the action area, an explanation of why not is given below, and no potential for impact is anticipated.

	Could Occur in Project Area	Common Name	Scientific Name	Federal Status	State Status
Amphibians		California Red-legged Frog	<i>Rana draytonii</i>	T	--
Birds		Bald Eagle	<i>Haliaeetus leucocephalus</i>	D	E
		California Clapper Rail	<i>Rallus longirostris obsoletus</i>	E	E
		California Least Tern	<i>Sterna antillarum (=albifrons) browni</i>	E	E
	X	Marbled Murrelet	<i>Brachyramphus marmoratus</i>	T	E
		Short-tailed Albatross	<i>Diomedea albatrus</i>	E	--
		Swainson's Hawk	<i>Buteo swainsoni</i>	--	T
Fish	X	Western Snowy Plover	<i>Charadrius alexandrinus nivosus</i>	T	--
		California Coastal Chinook	<i>Oncorhynchus tshawytscha</i>	T	--
	X	Central California Coastal Coho	<i>Oncorhynchus kisutch</i>	E	E
	X	Central California Coastal Steelhead	<i>Oncorhynchus mykiss irideus</i>	T	--
		Delta smelt	<i>Hypomesus transpacificus</i>	T	E
	X	Green Sturgeon Southern DPS	<i>Acipenser medirostris</i>	T	--
		Longfin smelt	<i>Spirinchus thaleichthys</i>	C	T
		Northern California Steelhead	<i>Oncorhynchus mykiss</i>	T	--
	X	South-central California Coastal Steelhead	<i>Oncorhynchus mykiss</i>	T	--
		Southern California Steelhead	<i>Oncorhynchus mykiss</i>	E	--
	Southern Oregon and Northern California Coastal Coho	<i>Oncorhynchus kisutch</i>	T	T	
	Tidewater Goby	<i>Eucyclogobius newberryi</i>	E	--	

	Could Occur in Project Area	Common Name	Scientific Name	Federal Status	State Status
Insects		San Bruno Elfin Butterfly	<i>Callophrys mossii bayensis</i>	E	--
		Mission Blue Butterfly	<i>Plebejus icarioides missionensis</i>	E	--
		Myrtle's Silverspot Butterfly	<i>Speyeria zerene myrtleae</i>	E	--
Invertebrates	X	Black Abalone	<i>Haliotis cracherodii</i>	E	--
Mammals		Townsend's Big-eared Bat	<i>Corynorhinus townsendii</i>	--	C
		Salt Marsh Harvest Mouse	<i>Reithrodontomys raviventris</i>	E	--
	X	Southern Sea Otter	<i>Enhydra lutris nereis</i>	T	--
Marine Mammals		Blue Whale	<i>Balaenoptera musculus</i>	E	--
		Fin Whale	<i>Balaenoptera physalus</i>	E	--
		Guadalupe Fur Seal	<i>Arctocephalus townsendi</i>	T	--
		Humpback Whale	<i>Megaptera novaeangliae</i>	E	--
		Northern Pacific Right Whale	<i>Eubalaena glacialis</i>	E	--
		Sei Whale	<i>Balaenoptera borealis</i>	E	--
		Southern Resident Killer Whale	<i>Orcinus orca</i>	E	--
		Sperm whale	<i>Physeter catodon (=macrocephalus)</i>	E	--
Reptiles	X	Green Turtle	<i>Chelonia mydas</i>	T	--
	X	Leatherback Sea Turtle	<i>Dermochelys coriacea</i>	E	--
	X	Loggerhead Sea Turtle	<i>Caretta caretta</i>	T	--
		Olive Ridley Sea Turtle	<i>Lepidochelys olivacea</i>	E	--
		San Francisco Garter Snake	<i>Thamnophis sirtalis tetrataenia</i>	E	E
Plants		Hickman's Cinquefoil	<i>Potentilla hickmanii</i>	E	E
		San Mateo Woolly Sunflower	<i>Eriophyllum latilobum</i>	E	E
		White-rayed Pentachaeta	<i>Pentachaeta bellidiflora</i>	E	E

Amphibians

California red-legged frog (*Rana draytonii*)– California red-legged frogs utilize a variety of habitats with adjacent aquatic breeding sites, riparian forest, and upland dispersal habitat. Adults typically prefer areas with dense emergent riparian vegetation and are associated with still or slow moving water in pools that are greater than 2 feet deep. No such habitat exists in the immediate vicinity of the project action area. Red-legged frogs have designated critical habitat approximately 1-mile to east of Pillar Point Harbor, but the project area is not located in or near this critical habitat. No presence of this species is expected because of the lack of suitable habitat in the action area.

Birds

Bald eagle (*Haliaeetus leucocephalus*) - Bald eagles nest in large, old growth trees or other high perches, and prey upon fish, waterfowl, and animals on land. The Pillar Point area is in the bald eagle's winter range, but eagles have a high level of mobility and lack of nesting habitat nearby. They are not expected to occur in the project action area.

California clapper rail (*Rallus longirostris obsoletus*) - California clapper rails reside in marshes dominated by pickleweed and Pacific cordgrass. Pillar Point is not in the California clapper rail's summer or winter range, and there is no vegetation providing suitable cover for clapper rails in project action area. Clapper rails may fly over as they move to territory to the east, but they are not expected to occur in the project action area.

California least tern (*Sterna antillarum (=albifrons) browni*) - California least terns forage, roost, and nest in colonies of about 25 pairs on open beaches free of vegetation. They also forage in nearshore waters up to 2 miles from shore and estuaries. In California, nesting sites are documented in the San Francisco Bay Area and Sacramento-San Joaquin River Delta, as well as along the coast of San Luis Obispo, Santa Barbara, Ventura, Orange, and San Diego Counties (CSMW, 2015). The closest known nesting site to the project action area is approximately 20 miles away in Alameda County. Breeding season begins in mid to late April and ends by late August. According to the USFWS' 2006 5-year review (USFWS, 2006 as cited in CSMW, 2015), nesting birds have not been documented in the Santa Cruz littoral cell which contains the Pillar Point Region. Least terns also avoid areas that are disturbed by humans, and would most likely avoid the Pillar Point area because of the high traffic from recreational users. No presence of this species is expected in the project action area.

Marbled murrelet (*Brachyramphus marmoratus*) - Could occur in the project area. See Special Status Species Section in EA.

Short-tailed albatross (*Diomedea albatrus*) - Short-tailed albatross nest on steep open slopes in coastal areas. Breeding season begins in October. Birds have very rarely been sighted in the northern Pacific after breeding season ends in summer, and no landings have been reported in California. Presence of this species is expected in the project action area due to the rare occurrence of short-tailed albatross in areas south of Alaska, and their ability to avoid the site.

Swainson's hawk (*Buteo swainsoni*) - Swainson's hawk nest primarily in valley oak, cottonwood, eucalyptus, and willow trees. In California, known breeding pairs are located in the Central Valley between Modesto and Sacramento. Historically, Swainson's hawks nested throughout the California lowlands, including coastal valleys where they no longer occur today (Bloom 1980 as cited in IFC, 2012). Given that there is no tree habitat in the proposed project area and the project site is outside the current range of the species in California, Swainson's hawk are not expected to be present at the project site.

Western snowy plover (*Charadrius alexandrinus nivosus*) - Could occur in the project area. See Special Status Species Section in EA.

Fish

Central California Coastal Coho (*Oncorhynchus kisutch*) – Could occur in the project area. See Special Status Species Section in EA.

Central California Coastal Steelhead (*Oncorhynchus mykiss*) – Could occur in the project area. See Special Status Species Section in EA.

South-central California Coastal Steelhead (*Oncorhynchus mykiss*) – Could occur in the project area. See Special Status Species Section in EA.

The following species share similar characteristics regarding their prevalence in project action area so they are discussed as a group below:

- California Coastal Chinook (*Oncorhynchus tshawytscha*)
- Northern California Steelhead (*Oncorhynchus mykiss*)
- Southern California Coast Steelhead (*Oncorhynchus mykiss*)
- Southern Oregon and Northern California Coastal Coho (*Oncorhynchus kisutch*)

Salmon are anadromous species that spend part of their lives in the ocean and part in freshwater streams. While some species of salmonids may occupy the area of the California coast that includes the project vicinity, the coastal ranges of the four evolutionarily significant units (ESUs) listed above do not include the project region. The California coastal Chinook ESU ranges along the California coast from Humboldt County down to just north of the San Francisco Bay Area and occupies fresh water streams as far south as Santa Rosa County's Russian River. The Southern Oregon and Northern California Coastal Coho ESU includes fall-run salmon in coastal streams from Cape Blanco, Oregon south to Punta Gorda in Humboldt County, California (NOAA Fisheries, 2015b). Northern California Steelhead range from Redwood Creek in northern Humboldt County to Guala Creek in Santa Rosa County (NMFS, 2011). These species range well north of the central coast and their presence is not expected in the project action area. Southern California Coast Steelhead range from the Santa Maria River south to the U.S.-Mexico border. Because the northernmost portion of their range is well south of the Pillar Point region, this species is also not expected to be present in the action area (NMFS, 2011).

Delta Smelt (*Hypomesus transpacificus*) – Delta smelt inhabit brackish, estuarine waters with salinity up to 14 parts per thousand (PPT). They tend to be found near the fresh and salt water mixing zone between the confluence of the Sacramento River and San Joaquin Delta, and the San Pablo Bay (USACE, 2006). According to the USFWS (2013) Delta smelt are found only from the Suisun Bay upstream through the Delta in Contra Costa, Sacramento, San Joaquin, Solano and Yolo counties. Given that the project area includes marine waters with salinities higher than the tolerable range for Delta smelt, and that Delta smelt are not found at or near the proposed project area, presence of this species is not expected in the action area.

Green Sturgeon (*Acipenser medirostris*) – Could occur in the project area. See Special Status Species Section in EA.

Longfin Smelt (*Spirinchus thaleichthys*) – The known range of the longfin smelt extends from the San Francisco Bay-Delta in California northward to the Cook Inlet in Alaska (USFWS,

2015a). Given that the project area is outside of this known range, longfin smelt are not expected to occur in the proposed action areas.

Tidewater Goby (*Eucyclogobius newberryi*) - Tidewater goby inhabit low salinity environments such as coastal freshwater estuaries, lagoons, and creeks. Although they can tolerate a wide range of salinity and water-quality conditions, they flourish in calm waters closed off from the ocean by sandbars (CSMW, 2015). They are found in Pescadero Creek in San Mateo County and their designated critical habitat includes San Gregorio, Pomponio, Pescadero-Butano, and Bean Hollow Creek, all of which are in the Southern portion of the County. Neither of the creeks that drain into Pillar Point Harbor (Denniston and Deer) are known to be inhabited by the Tidewater goby nor are they designated as critical habitat for the species. Given that the species prefers low salinity environments and no critical habitat or occurrences of the species have been documented in the project area, presence of this species is not expected in the action area.

Insects

The following species share similar characteristics regarding their prevalence in project action area so they are discussed as a group below:

- Mission Blue Butterfly (*Icaricia icarioides missionensis*)
- San Bruno Elfin Butterfly (*Incisalia mossii bayensis*)
- Myrtle's Silverspot Butterfly (*Speyeria zerene myrtleae*)

The closest habitat for the Mission blue and San Bruno Elfin butterfly species is on hilltops and high crests in the area of San Bruno Mountain, located approximately 10 miles northeast of the project area. The Mission blue and San Bruno butterflies migrate less than one mile from their territory during their adult life and no occurrences of these species have been recorded near the project site (USACE, 2006). Myrtle's silverspot butterfly is restricted to foredune and dune scrub communities adjacent to sandy habitats, typically in coastal scrub or coastal prairie habitat. It inhabits areas in coastal grasslands and scrub in marine terraces and stabilized coastal sand dunes, where its host plant, western dog violet (*Viola adunca*), is present (USFWS 1998, as cited in CSMW, 2015). No foredune, dune scrub or coastal grasslands with western dog violet occur at or near the project site. Given the lack of suitable habitat for these butterfly species in the project area and their limited range from suitable habitat, these species are not anticipated to occur in the action area.

Invertebrates

Black Abalone (*Haliotis cracherodii*) – Could occur in the project area. See Special Status Species Section in EA.

Mammals

Townsend's Big-eared Bat (*Corynorhinus townsendii*) – Townsend's big-eared bats primarily roost in and occupy caves, mines, abandoned dwellings, and large basal hollows of trees. Surveys have shown that they remain relatively close to their roosts, with marked individuals not traveling more than a few kilometers from the roosts they occupy (Pierson and Rainey, 1998).

Given that there is no roosting habitat at or near the project site, this species is not expected to be present in the action area

Salt Marsh Harvest Mouse (*Reithrodontomys raviventris*)– Pillar Point Harbor and the surrounding area does not contain pickleweed or grasses of suitable habitat for the salt marsh harvest mouse. Therefore, no presence of these species is expected in the action area.

Southern Sea Otter (*Enhydra lutris nereis*)– Could occur in the project area. See Special Status Species Section in EA.

Marine Mammals

The following species share similar characteristics regarding their prevalence in project action area so they are discussed as a group below:

- Blue Whale (*Balaenoptera musculus*)
- Fin Whale (*Balaenoptera physalus*)
- Humpback Whale (*Megaptera novaeangliae*)
- Northern Pacific Right Whale (*Eubalaena glacialis*)
- Sei Whale (*Balaenoptera borealis*)
- Southern Resident Killer Whale (*Orcinus orca*)
- Sperm Whale (*Physeter catodon (macrocephalus)*)

While commercial whale watching tours embark from Pillar Point Harbor, whale species are expected to remain in water that is deeper than that in the project action areas (i.e. in the shoaled area of Pillar Point Harbor and the nearshore zone of Surfer's and Vallejo Beaches). Generally these species remain in deeper waters away from the harbor and off the continental slope. For example, blue whales are known to migrate and forage along the CA coastline and in Monterey Bay. They are occasionally seen in shallower waters. Monterey Bay and areas south of it are also known as humpback whale hotspots (CSMW, 2015), however humpback whales have been spotted close to the surf line at Rockaway Beach, approximately 9 miles north of Pillar Point Harbor (USACE, 2006). Killer whales usually occur 9 miles or more offshore, but also visit coastal waters and occasionally enter protected inshore waters (CSMW, 2015). They have been observed feeding and attacking juvenile gray whales in Monterey Bay (NMFS 2008 as cited in CSMW, 2015). Given that the project areas include activities inside Pillar Point Harbor to a maximum depth of only -10ft (NAVD88), on the beach, and in the very nearshore zone, no whale species are anticipated to occur in the action area.

Guadalupe fur seal (*Arctocephalus townsendi*)– Guadalupe fur seals are rarely observed in California, although seals are sometimes seen at the Farallon Islands and at Point Reyes. Guadalupe fur seals prefer cool, sheltered, rocky shores with bluffs, rock platforms and tidepools. Given its rarity in California and especially central to southern California, as well as the fact that the project areas are primarily sandy beach shoreline, this species is not anticipated to occur in the project action areas.

Reptiles

Green turtle (*Chelonia mydas incl. agassizi*) – Could occur in the project area. See Special Status Species Section in EA.

Leatherback turtle (*Dermochelys coriacea*) – Could occur in the project area. See Special Status Species Section in EA.

Loggerhead turtle (*Caretta caretta*) – Could occur in the project area. See Special Status Species Section in EA.

Olive (=Pacific) ridley sea turtle (*Lepidochelys olivacea*) – This species of sea turtles is distributed in the tropical latitudes and are known to occur from Southern California down to Northern Chile (NOAA Fisheries, 2015a). Given that the project area is outside of its range, this species is not anticipated to occur in the project action area.

San Francisco garter snake (*Thamnophis sirtalis tetrataenia*) – The San Francisco garter snake occurs in the northern parts of San Mateo County in permanent ponds, reservoirs, and vegetated artificial waterways (USACE, 2006). There is no suitable habitat in the vicinity of the project action area and thus the species is not expected to be present.

Plants

Hickman's potentilla (or cinquefoil) (*Potentilla hickmanii*) - Hickman's potentilla grows in two types of habitat: wet freshwater areas in coastal prairies, and open forested areas along California's central coast (USACE, 2006). A population was found 22 miles to the north of the project area, on Highway 1, in 1995, but no sightings have been recorded at Pillar Point Harbor or in the close vicinity. The proposed project area contains neither of the two preferred habitat types and no known occurrences of cinquefoil, so it is not believed to be present in the action area.

San Mateo woolly sunflower (*Eriophyllum latilobum*) - This species is found only in serpentine-influenced soil. The only known occurrences in San Mateo County are in the Crystal Springs area (USACE, 2006). Given that no serpentine habitat is available at the project site, This species is not expected to be present within the action area.

White-rayed pentachaeta (*Pentachaeta bellidiflora*) – White-rayed pentachaeta grows with serpentine bunchgrass in serpentine soils, flowering between March and May. The pentachaeta is only known to grow in two locations in San Mateo County, and neither of them are located near the proposed project area. Thus this species is not believed to be present in the action area.

Appendix B – Preparers

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