UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
777 Sonoma Avenue, Room 325
Santa Rosa, California 95404-4731

February 23, 2024 **Refer to NMFS No:** WCRO-2024-00086

Jessica M. Vargas
Chief, Regulatory Division
San Francisco District, Corps of Engineers
450 Golden Gate Avenue, 4th Floor, Suite 0134
San Francisco, California 94102-3406

Re: Endangered Species Act Section 7(a)(2) Biological Opinion, and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Pillar Point Harbor Dredging and Surfer's Beach Restoration Project (Corps File No. SPN-2012-00207)

Dear Jessica Vargas:

Thank you for the U.S. Army Corps of Engineers' (Corps) letter of October 20, 2022, requesting initiation of consultation with NOAA's National Marine Fisheries Service (NMFS) pursuant to section 7 of the Endangered Species Act of 1973 (ESA) (16 U.S.C. 1531 et seq.) for the Pillar Point Harbor Dredging and Surfer's Beach Restoration Project (Project).

Thank you, also, for your request for consultation pursuant to the essential fish habitat (EFH) provisions in Section 305(b) of the Magnuson–Stevens Fishery Conservation and Management Act [16 U.S.C. 1855(b)] for this action.

The enclosed biological opinion is based on our review of the Corps' proposed Project and describes NMFS' analysis of potential effects on endangered black abalone (*Haliotis cracherodii*) and their critical habitat, threatened North American green sturgeon (*Acipenser medirostris*) southern Distinct Population Segment (DPS) and their critical habitat, threatened Central California Coast (CCC) steelhead (*Oncorhynchus mykiss*), endangered leatherback sea turtle (*Dermochelys coriacea*) and their critical habitat, and sunflower sea star (*Pycnopodia helianthoides*) in accordance with section 7 of the ESA. In the enclosed biological opinion, NMFS concludes the Project is not likely to jeopardize the continued existence of these species, nor is the project likely to result in adverse modification of critical habitat. However, NMFS anticipates take of black abalone will occur due to the Project construction. An incidental take statement with non-discretionary terms and conditions is included with the enclosed biological opinion.

Regarding EFH, NMFS determined the anticipated effects on the EFH of Pacific Coast Salmon, Coastal Pelagic Species, and Pacific Groundfish Fishery Management Plans (FMPs) are significant, primarily due to impacts to existing eelgrass habitat. However, appropriate mitigation measures for eelgrass impacts were agreed to by the Corps and the Applicant. Therefore, we

have no practical EFH Conservation Recommendations to provide and no EFH Conservation Recommendations are included in this document.

If you think there is a potential that marine mammals could be affected by the proposed action, it is good practice to contact a Protected Resources Division Branch Chief as early as possible in the consultation process. PRD will assist with Marine Mammal Protection Act compliance for the proposed action, if necessary.

Please contact Tom Wadsworth of the NMFS North-Central Coast Office in Santa Cruz, at (707) 243-8318 or Thomas.Wadsworth@noaa.gov if you have any questions concerning this consultation, or if you require additional information.

Sincerely,

Alecia Van Atta
Assistant Regional Administrator
California Coastal Office

Enclosure

cc: Jessica Vargas, Corps San Francisco District, Jessica.M.Vargas@usace.army.mil
Brad Damitz, Consultant, brad.damitz@me.com
Copy to ARN File # 151422WCR2023SR00023

Endangered Species Act (ESA) Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response

Pillar Point Harbor Dredging and Surfer's Beach Restoration Project

NMFS Consultation Number: WCRO-2024-00086
Action Agency: U. S. Army Corps of Engineers, Operations and Readiness Division, San Francisco District

Affected Species and NMFS' Determinations:

ESA-Listed Species	Status	Is Action Likely to Adversely Affect Species?	Is Action Likely To Jeopardize the Species?	Is Action Likely to Adversely Affect Critical Habitat?	Is Action Likely To Destroy or Adversely Modify Critical Habitat?
Black abalone (*Haliotis cracherodii*)	Endangered	Yes	No	Yes	No
Central California Coast steelhead DPS (*Oncorhynchus mykiss*)	Threatened	No*	No	N/A	N/A
North American green sturgeon southern DPS (*Acipenser medirostris*)	Threatened	No*	No	No*	N/A
Leatherback Turtle (*Dermochelys coriacea*)	Endangered	No*	No	No*	N/A
Sunflower sea star (*Pycnopodia helianthoides*)	Proposed Threatened	No*	No	N/A	N/A

* Refer to section 2.11 for species and critical habitat that are not likely to be adversely affected.

Essential Fish Habitat and NMFS' Determinations:

Fishery Management Plan That Identifies EFH in the Project Area	Does Action Have an Adverse Effect on EFH?	Are EFH Conservation Recommendations Provided?
Pacific Coast Salmon	Yes	No
Pacific Groundfish	Yes	No
Coastal Pelagic Species	Yes	No

Consultation Conducted By: National Marine Fisheries Service, West Coast Region

Issued By:

Alecia Van Atta
Assistant Regional Administrator

Date: February 23, 2024

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1 INTRODUCTION

This Introduction section provides information relevant to the other sections of this document and is incorporated by reference into Sections 2 and 3 below.

1.1 Background

NOAA's National Marine Fisheries Service (NMFS) prepared the biological opinion (opinion) and incidental take statement (ITS) portions of this document in accordance with section 7(b) of the Endangered Species Act (ESA) of 1973 (16 U.S.C. 1531 et seq.), as amended, and implementing regulations at 50 CFR part 402.

We also completed an essential fish habitat (EFH) consultation on the proposed action, in accordance with section 305(b)(2) of the Magnuson–Stevens Fishery Conservation and Management Act (MSA) (16 U.S.C. 1801 et seq.) and implementing regulations at 50 CFR part 600.

We completed pre-dissemination review of this document using standards for utility, integrity, and objectivity in compliance with applicable guidelines issued under the Data Quality Act (DQA) (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001, Public Law 106-554). The document will be available within two weeks at the NOAA Library Institutional Repository [https://repository.library.noaa.gov/welcome]. A complete record of this consultation is on file at NMFS North-Central Coast Office in Santa Cruz, California.

1.2 Consultation History

On January 13, 2023, NMFS received an email from the U.S. Army Corps of Engineers (Corps) regarding a consultation request from the Corps to NMFS for the Pillar Point Harbor Dredging and Surfer's Beach Restoration Project. The Corps' October 20, 2022 consultation request email was not received by NMFS, apparently due to the file size of attachments. Project materials were received by NMFS on January 13, and included: 1) a letter from the Corps requesting initiation of informal ESA Section 7 and Essential Fish Habitat (EFH) consultation with NMFS; 2) a 2022 Special Status Habitat and Species Analysis, prepared for the San Mateo County Harbor District (SMCHD; Applicant); 3) a 2020 Pillar Point Harbor-Wide Eelgrass Management and Mitigation Plan, prepared for Brad Damitz (consultant to SMCHD); 4) a 2019 Sampling and Analysis Dredge Material Investigation Report, prepared for SMCHD; 5) a 2020 Sampling and Analysis Plan Results Report for the Pillar Point Harbor West Trail Living Shoreline Project - prepared for SMCHD and the Corps.

The Corps letter included determinations that the Project 'may effect, but is not likely to adversely affect': black abalone, green sturgeon southern Distinct Population Segment (DPS), Central California Coast (CCC) coho salmon Evolutionarily Significant Unit (ESU), CCC steelhead DPS, and leatherback turtle as well as critical habitats of each of these species. The Corps requested EFH consultation in their incoming request letter and listed the following

Fishery Management Plans (FMPs) as adversely impacted by the proposed Project: Pacific Groundfish, Pacific Coast Salmon, and Coastal Pelagic Species.

NMFS conducted a site visit on January 23, 2023, to evaluate potential salmonid passage in Denniston Creek, a tributary to the Pillar Point Harbor (Harbor). On January 31, 2023, NMFS met with the Corps to discuss additional information required for NMFS to initiate consultation, including: dredging methods, potential for rock habitats to be impacted by dredging and sediment placement, eelgrass survey and mitigation details/changes, pre-construction black abalone survey plan, steelhead use of tributaries to the Harbor, and explanation for the Corps' determinations of some species and critical habitats. The Corps provided some of the needed information during this meeting. Outstanding information requests were sent by NMFS to the Corps via email on January 31, 2023 and were forwarded to the Applicant. Responses from the Applicant were sent in an email to NMFS on February 10, 2023 via the Corps. On February 10, 2023, the Corps sent an email to NMFS indicating a change in their determinations. The Corps determined the Project would have no effect on the following species: CCC Coho ESU, Steelhead South-Central California Coast DPS, East Pacific DPS Green Sea Turtle, and the North Pacific Ocean DPS Loggerhead Sea Turtle.

An interagency meeting was held on March 6, 2023 to discuss eelgrass mitigation options related to the Project. Representatives from NMFS, Corps, SMCHD (consultant), Environmental Protection Agency (EPA), and the California Coastal Commission (CCC) attended. Discussions included: impacts of 2023 winter storms on eelgrass within the Harbor, proposed timeframe for starting in-water work and conducting pre-construction eelgrass survey, and potential impacts of proposed mitigation plan on habitats, biota and sediment dynamics in the West Harbor Basin. NMFS and CCC agreed to discuss the eelgrass mitigation plan further at a subsequent meeting. On March 30, 2023, NMFS met with the Corps and CDFW regarding options for eelgrass mitigation, topics included: current state of eelgrass in the Harbor following winter 2023 storms, potential changes to the submitted mitigation plan, and out-of-kind mitigation alternatives.

On April 14, 2023, NMFS met with Corps and SMCHD representatives to discuss the Project further. Topics included: recent denial of Regional Water Quality Control Board (RWQCB) permit for the Project, lack of CCC permit, potential Project delays, eelgrass mitigation options and survey plans, dredge methods, potential Project impacts to black abalone and implications for consultation (informal vs. formal). As an action item, NMFS agreed to write a summary of recommendations regarding eelgrass mitigation and to provide this document to the Corps. NMFS met with a representative of the CCC on April 21, 2023 to discuss eelgrass mitigation options. NMFS sent a summary of recommendations regarding eelgrass mitigation for the Project to the Corps, after incorporating suggestions from the CCC, on April 24, 2023. On July 17, a report describing the results of a new eelgrass survey by Marine Taxonomic Services Ltd. (MTS) within the Harbor was provided to NMFS by Project consultants.

On July 18, 2023, NMFS provided a document detailing their recommendations related to the Pillar Point Harbor-Wide Eelgrass Management and Mitigation Plan (Plan) and suggested an interagency meeting. On August 25, relevant agencies and project consultants met to discuss NMFS' recommendations and other questions related to the Plan. The agencies requested a revised Plan and project consultants indicated this would be available in roughly a month.

On October 12, 2023 the consultation was closed as necessary information related to the Plan had not been received. On October 17, a revised version of the Pillar Point Harbor-Wide Eelgrass Management and Mitigation Plan (Plan), written by MTS, was provided to NMFS. Meetings were held among agencies and Project consultants on October 20 and October 30 to discuss this new Plan. Changes to the Plan were requested by agencies and a revised version of the Plan was sent to agencies on December 16, 2023. Agencies met to discuss the Plan on January 11, 2024 and afterwards notified the Applicant that the Plan was acceptable.

The Corps sent an email to NMFS on January 19, 2024, requesting that the NMFS reopen and initiate consultation as the Plan had been finalized. NMFS initiated consultation on January 23, 2024.

On January 31, 2024, the Corps requested consultation for sunflower sea star and provided a determination of "may effect, likely to adversely affect." Although the listing of sunflower sea star under the ESA is currently proposed, it is expected to be listed in 2024, and in-water work for the Project is expected to occur after the listing.

On July 5, 2022, the U.S. District Court for the Northern District of California issued an order vacating the 2019 regulations that were revised or added to 50 CFR part 402 in 2019 ("2019 Regulations," see 84 FR 44976, August 27, 2019) without making a finding on the merits. On September 21, 2022, the U.S. Court of Appeals for the Ninth Circuit granted a temporary stay of the district court's July 5 order. On November 14, 2022, the Northern District of California issued an order granting the government's request for voluntary remand without vacating the 2019 regulations. The District Court issued a slightly amended order two days later on November 16, 2022. As a result, the 2019 regulations remain in effect, and we are applying the 2019 regulations here. For purposes of this consultation and in an abundance of caution, we considered whether the substantive analysis and conclusions articulated in the biological opinion and incidental take statement would be any different under the pre-2019 regulations. We have determined that our analysis and conclusions would not be any different.

1.3 Proposed Federal Action

For ESA consultation, "action" means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies (50 CFR 402.02). Under the MSA, "Federal action" means any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken by a Federal Agency (50 CFR 600.910).

The SMCHD proposes to dredge sediment that has accumulated in recent years to improve navigation and anchorage within the East Harbor Basin of Pillar Point Harbor (Harbor), Half Moon Bay, CA (Figure 1 and Figure 2). Eelgrass (*Zostera marina*) beds have established along the eastern breakwater, due to shoaling in recent decades (Figure 3). Some of the eelgrass will be impacted by proposed dredging; therefore, the Project also includes an eelgrass mitigation plan to translocate eelgrass to the Harbor's West Basin prior to dredging. SMCHD proposes to move dredged material to Surfer's Beach (just east of the Harbor) for beach restoration to address on-going erosion (Figure 3) and to the West Harbor Basin to assist in mitigation for eelgrass impacts

by the Project. In-water Project actions, including Harbor dredging, beach restoration and eelgrass mitigation are proposed to start in late-spring or summer 2024.

Figure 1. Configuration of Pillar Point Harbor in March 2023.

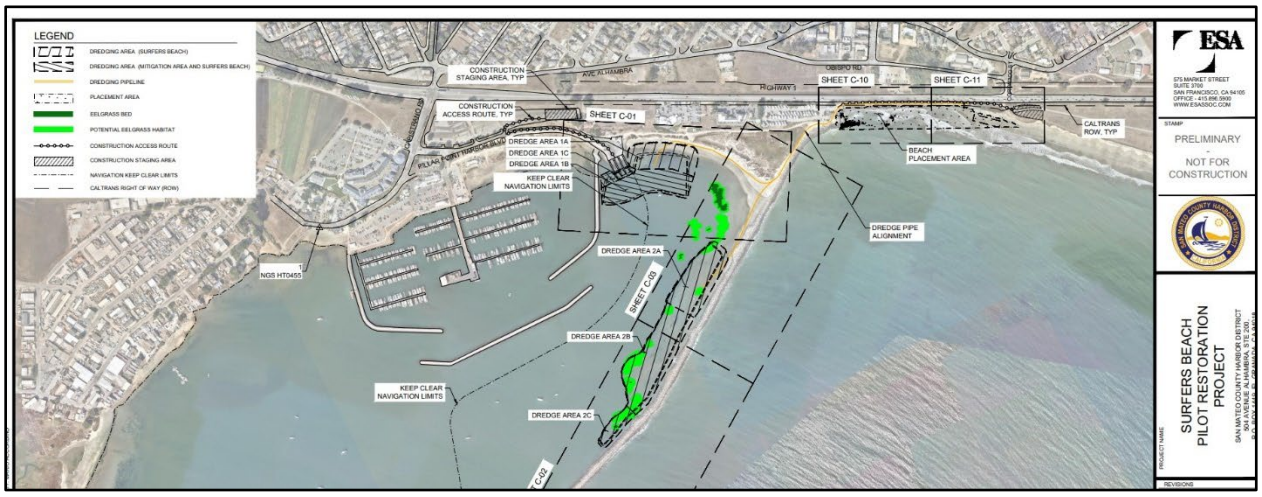

Figure 2. Proposed dredge areas in Pillar Point Harbor and sediment placement area at Surfer's Beach (ESA 2024).

Figure 3. A portion of the eelgrass bed along the Harbor's eastern breakwater at low tide in April 2024, following large winter storms (Photo: Tom Wadsworth).

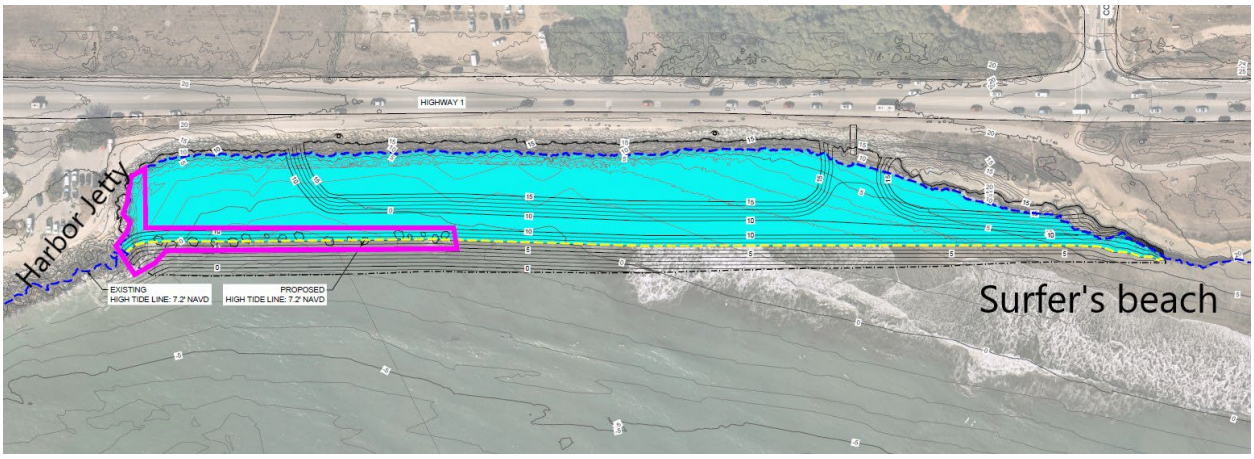

Figure 4. Portion of Surfer's Beach (within dashed black line), just east of Pillar Point Harbor, where dredge spoils are proposed to be placed as fill (ESA 2024).[1]

[1] Placement area includes northwest portion of Surfer's Beach, portions of breakwaters/jetty on north and west sides and areas currently inundated with ocean waters offshore from these breakwaters. Dashed dark blue line is the current high tide line, dashed yellow line is proposed high tide line after fill is complete. Light blue area is below the current high tide line but above the proposed high tide line. Purple outline is the approximate area of intertidal and subtidal rock habitat expected to be buried under fill during beach restoration and where pre-construction black abalone survey will occur.

1.3.1 Construction

Dredging

The Project proposes to dredge approximately 18.77-acres, removing up to 100,000 cubic yards (76,455 cubic meters) of sediment accumulated along the inside of Harbor's eastern breakwater and near the Harbor's boat launch (Figure 2). Proposed dredging methodology options include use of a suction dredge with cutterhead for all sediment below water, and either a suction dredge or a clamshell bucket for removing sediment above water. Sediment in dredge spoils will be transported to: 1) Surfer's Beach for beach restoration, or 2) the Harbor West Basin to be used for eelgrass mitigation.

Beach Restoration

The Project would result in 4.1 acres of fill in waters of the U.S. for beach restoration at the Surfer's Beach Project site (Corps 2023). A one-time placement of dredged sediment is proposed along a 1,000 ft section of Surfers Beach, to form an elevated berm. Sediment will be transported directly to beach via slurry pipeline for suction dredging, and if a clamshell dredge is used sediment will be place it in a hopper that is fed into a slurry pump and through the pipeline to the placement area. The sediment placed on Surfer's Beach will be contained by a sand berm constructed at the east end of the existing beach. The slurry will be discharged landward of the containment berm and allowed to decant. Once sufficient sand is built up, it will be mechanically spread using heavy equipment. This placement is designed to restore beach habitat that existed prior to the construction of the Harbor outer breakwaters lost to erosion resulting from construction of the breakwater disrupting sediment dynamics in the area. Some of the proposed dredging area along the eastern breakwater contains eelgrass that likely became established in the early-2000s.

Eelgrass Mitigation

The eelgrass mitigation component of the Project will follow methods described in the California Eelgrass Mitigation Program (CEMP) guidelines (NMFS 2014a). Mitigation plans are summarized below, with more details available in the Pillar Point Harbor-Wide Eelgrass Management and Mitigation Plan (Plan; MTS 2023). Based on the results from an eelgrass survey of the Harbor by MTS in May 2023, approximately 773 sq. meters of vegetated eelgrass habitat and 4,107 sq. meters of unvegetated eelgrass habitat will be directly impacted due to Project dredge activities in the East Basin. To mitigate for this impact, prior to dredging, eelgrass in the dredge footprint will be transplanted to a mitigation site within the Harbor's West Basin. The mitigation site in the southwest portion of the Harbor was chosen by MTS as the site most likely to be successful in the area, due to the presence of a large and expanding eelgrass bed (Figure 5) and the unsuitability of other sites evaluated.

A pre-construction eelgrass survey will be conducted with groundtruthing to confirm eelgrass extent in the East and West Basins prior to starting in-water work. Results of the pre-construction survey will be provided to NMFS, and appropriate adjustments to the Plan will be made based on changes in eelgrass health and extent.

Initial dredging in the East Basin will focus on sites lacking eelgrass with fine grained sediment, near the boat launch. Approximately 8,580 cu. meters of sediment resulting from this initial dredge operation will be transported for a one-time placement of in the southwest corner of the Harbor. This sediment will serve to create an approximately 9,987 sq. meters eelgrass primary mitigation site (Figure 4 and Figure 5). The purpose of the sediment placement is to reduce depths in the mitigation site to allow for improved growth of transplanted eelgrass. Eelgrass in the West Basin currently grow at depths ranging from 1 to -11 ft Mean Lower Low Water (MLLW); however, most of the eelgrass grows at depths less than -8 ft MLLW, with the highest concentration in -1 to -2 ft MLLW (MTS 2023). The sediment placement will create a planting area primarily -2 to -3 ft MLLW where most eelgrass will be transplanted, as shallower depths may experience shoaling that could impact eelgrass transplants and deeper areas do not receive as much light to maximize growth. The edges of the area will be contoured to meet the existing bathymetry surrounding the area, and this slope area will be planted with eelgrass at a lower density. To the extent practicable, eelgrass transplants will be planted at similar depths as the source location in the East Bain, as research has indicated eelgrass can adapt to depths on microscales (Hays et al. 2020). Before placing sediment, any existing eelgrass in the placement area will be salvaged and transplanted in one or both of the secondary planting areas (Figure 6).

Based on expected extent of eelgrass to be impacted by dredging in the East Basin and impacted by sediment placement in the West Basin (a total of 908 sq. meters), 1,090 sq. meters of vegetated eelgrass are required for mitigation based on the 1.2:1 mitigation ratio outlined in the CEMP. These estimates will be adjusted based on the pre-construction eelgrass survey. The proposed primary planting area in the Plan is 9.2 times larger than the mitigation requirement given the expected eelgrass planting density. The size of the planting area is larger than the eelgrass mitigation requirement to allow for a high likelihood of achieving the mitigation ratio by accounting for higher losses of eelgrass than expected. A similarly conservative approach, with a planting area several times larger than the mitigation requirement, was taken by eelgrass mitigation projects in central California cited in the CEMP. Additionally, the model used by MTS predicted the primary planting site will support 1,846 square meters of eelgrass, which is only 1.7 times larger than the mitigation requirement.

This mitigation plan does not account for impacts to areas of unvegetated habitat between eelgrass patches. The CEMP defines unvegetated eelgrass habitat as a five-meter wide perimeter surrounding eelgrass patches. Although it is noted above that 4,107 sq. meters of unvegetated eelgrass habitat will be lost in the East Basin, MTS (2023) determined it was not advisable to attempt to create this much unvegetated habitat through mitigation. To mitigate for the loss of all unvegetated eelgrass habitat, the mitigation site would need to be designed to create a patchy eelgrass bed that may be of lower habitat value than a contiguous bed due to lower connectivity. The size of the mitigation site, and associated sediment placement area, would also need to be much larger to mitigate for unvegetated eelgrass habitat, which could further impact existing eelgrass and other high-quality habitat in the West Basin through burial and sedimentation. Therefore, the Applicant proposes not to mitigate for loss of unvegetated eelgrass habitat. NMFS agreed with the Corps and Applicant that, in the case of this Project, mitigation for impacts to unvegetated eelgrass habitat is not necessary or advantageous.

Transplanted eelgrass in the West Basin will be monitored for 60 months after the project is complete, as outlined in the CEMP, and growth and extent will be compared to primary and secondary reference sites within the East and West Basins (Figure 7). Reports on the mitigation monitoring results will be provided to NMFS—using the report template in the CEMP—within 30 days after the completion of each monitoring period to allow timely review and feedback from NMFS. If growth of transplanted eelgrass is poor relative to eelgrass present in reference sites, adaptive management will be discussed by relevant regulatory agencies and the Applicant.

Figure 5. A section of the eelgrass bed in the southwest portion of the Harbor at low tide in March 2023, following large winter storms (Photo: Tom Wadsworth).

Equipment

Equipment expected to be used for the Project will include: a suction dredge, a clamshell dredge, a slurry pump, a generator, a floating barge and power boat for moving the dredge and holding sediment, and a large pipe for moving dredged sediment. Low ground pressure bulldozers will be used at the beach placement site.

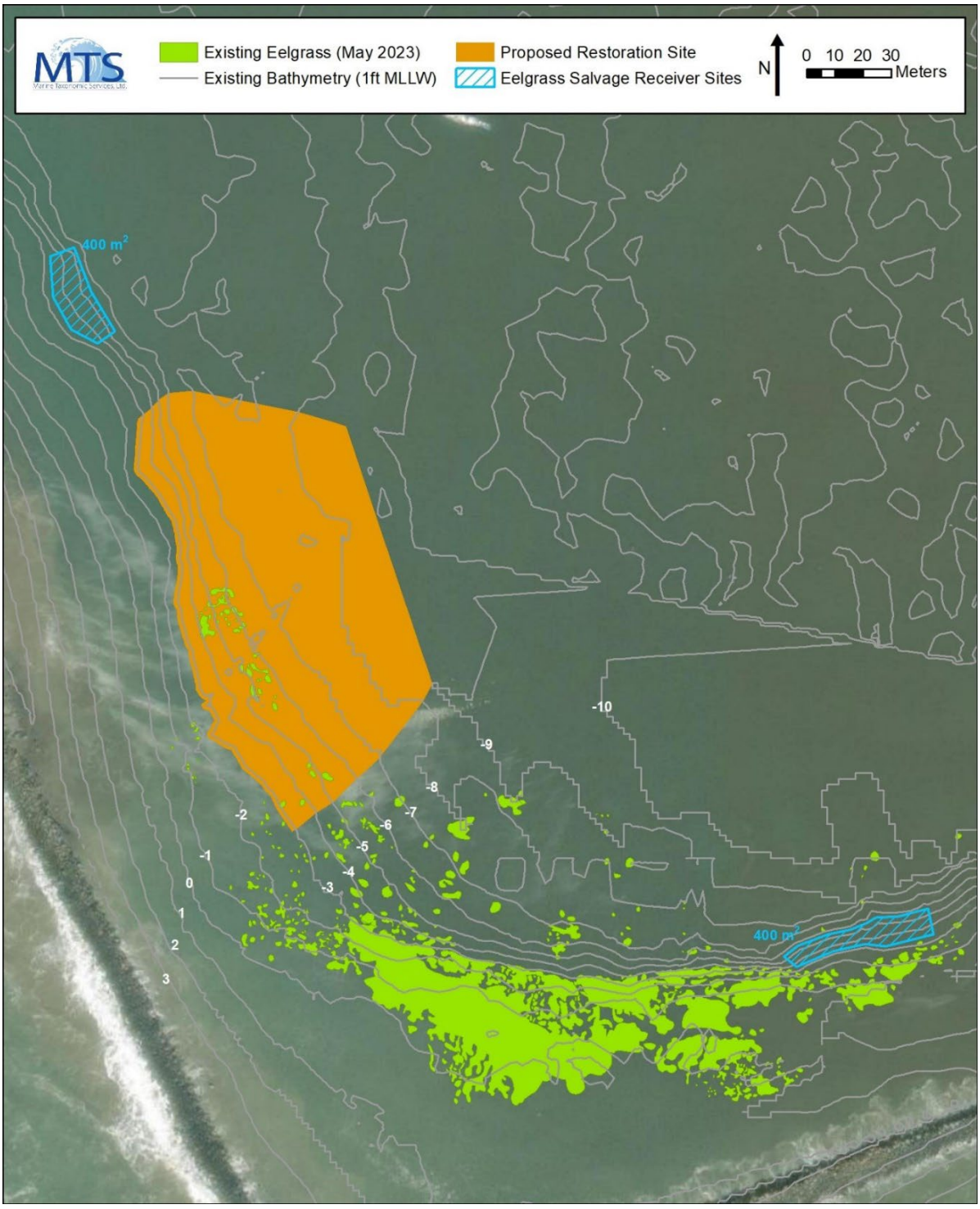

Figure 6. Pillar Point Harbor West Basin eelgrass current extent, primary planting site and secondary (salvage receiver) sites (MTS 2023).

Figure 7. Pillar Point Harbor proposed dredge and eelgrass reference sites (MTS 2023).

1.3.2 Proposed Avoidance and Minimization Measures

As part of the proposed action, SMCHD and contractors plan to use several avoidance and minimization measures (AMMs) to protect aquatic species and habitats during construction and maintenance activities. A list of most proposed AMMs, is provided in the application materials (Zentner Planning and Ecology 2022). Some of the AMMs most relevant to this biological opinion from that document are provided below.

To reduce turbidity and contamination of aquatic habitats in the action area, several Project AMMs and BMPs will be implemented. All construction equipment will be inspected and maintained at an off-site location to prevent leaks and spills of hazardous materials at the Project site. All leaks, drips, and other spills will be cleaned up immediately. Refueling, repair, and lubrication of vehicle and equipment will only occur in designated areas where accidental spills will be contained (Zentner Planning and Ecology 2022). All debris and waste will be covered in wet weather and disposed of properly. Silt fences or straw wattles will be installed at the perimeter of the construction site to prevent construction-related runoff or sediment to coastal waters. All erosion and sediment controls shall be in place prior to the commencement of construction as well as at the end of each workday. Dredge methodology will be limited to suction dredging below the water line to reduce turbidity and other impacts on marine life; clam shell dredging would be allowed above the water line (Corps 2023). Sediment for beach restoration and eelgrass mitigation will be placed at lower tides to reduce turbidity (Corps 2023).

Pre-construction Site Survey for Black Abalone

A pre-construction survey to determine presence of black abalone within the action area will be conducted no sooner than 120 days prior to the start of in-water work on the Project. The survey is intended to focus on rock habitats near Surfer's Beach that may be buried under sediment during the beach nourishment component of the Project. This habitat is within the intertidal/subtidal zones at the northwest end of Surfer's Beach and includes the breakwater/jetty and rocks in just off the breakwater (Figure 3 and Figure 6). Surveys for black abalone will not be needed elsewhere in the action area as SMCHD agreed that dredging within the Harbor will not occur within 20 feet of rocks on the eastern breakwater and that any sediment placement that occurs in the west Harbor will not occur within 20 feet of rock habitat. Some rock rip-rap near Surfer's Beach that is currently above the MHHW line is to be buried during beach restoration, but is not expected to support black abalone so will not be included in the pre-construction survey. Rip-rap areas oriented southeast and paralleling Surfer's Beach, between the beach and Highway 1 that are not in the intertidal zone (Figure 7), will not be surveyed as they are not likely to provide adequate habitat for black abalone. Methodology for the black abalone survey will follow NMFS Protected Resources Division (PRD) guidelines, or will be otherwise approved by NMFS. If black abalone are observed during the survey, NMFS will be contacted to coordinate on AMMs before beginning any in-water work that could impact abalone. These AMMs will likely include relocation of black abalone and/or operation of equipment to avoid contacting abalone.

We considered, under the ESA, whether or not the proposed action would cause any other activities and determined that it would not.

Figure 8. Photo of Northwest corner of Surfer's Beach from above rip-rap area looking south along the eastern breakwater/jetty. The black abalone pre-construction survey will be focused on rocks in the intertidal/subtidal zones within this area that are expected to be buried during beach restoration (Photo: Tom Wadsworth).

Figure 9. Photo of rip-rap area above Surfer's Beach taken from the northwest corner of the beach looking southeast along the eastern breakwater/jetty[2] (Photo: Tom Wadsworth).

2 ENDANGERED SPECIES ACT: BIOLOGICAL OPINION AND INCIDENTAL TAKE STATEMENT

The ESA establishes a national program for conserving threatened and endangered species of fish, wildlife, plants, and the habitat upon which they depend. As required by section 7(a)(2) of the ESA, each Federal agency must ensure that its actions are not likely to jeopardize the continued existence of endangered or threatened species or to adversely modify or destroy their designated critical habitat. Per the requirements of the ESA, Federal action agencies consult with NMFS, and section 7(b)(3) requires that, at the conclusion of consultation, NMFS provide an opinion stating how the agency's actions would affect listed species and their critical habitats. If

[2] This area of rip-rap above MHHW and in the intertidal will not be part of the pre-construction survey for black abalone

incidental take is reasonably certain to occur, section 7(b)(4) requires NMFS to provide an ITS that specifies the impact of any incidental taking and includes reasonable and prudent measures (RPMs) and terms and conditions to minimize such impacts.

The Corps determined the proposed action is not likely to adversely affect CCC steelhead, green sturgeon southern DPS or their critical habitat, leatherback turtle or their critical habitat, or sunflower sea star. Our concurrence is documented in the "Not Likely to Adversely Affect" Determinations section (Section 2.12).

2.1 Analytical Approach

This biological opinion includes both a jeopardy analysis and an adverse modification analysis. The jeopardy analysis relies upon the regulatory definition of "jeopardize the continued existence of" a listed species, which is "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species" (50 CFR 402.02). Therefore, the jeopardy analysis considers both survival and recovery of the species.

This biological opinion also relies on the regulatory definition of "destruction or adverse modification," which "means a direct or indirect alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species" (50 CFR 402.02).

The ESA Section 7 implementing regulations define effects of the action using the term "consequences" (50 CFR 402.02). As explained in the preamble to the final rule revising the definition and adding this term (84 FR 44976, 44977; August 27, 2019), that revision does not change the scope of our analysis, and in this opinion we use the terms "effects" and "consequences" interchangeably.

We use the following approach to determine whether a proposed action is likely to jeopardize listed species or destroy or adversely modify critical habitat:

- Evaluate the rangewide status of the species and critical habitat expected to be adversely affected by the proposed action.
- Evaluate the environmental baseline of the species and critical habitat.
- Evaluate the effects of the proposed action on species and their critical habitat using an exposure–response approach.
- Evaluate cumulative effects.
- In the integration and synthesis, add the effects of the action and cumulative effects to the environmental baseline, and, in light of the status of the species and critical habitat, analyze whether the proposed action is likely to: (1) directly or indirectly reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species; or (2) directly or indirectly result in an alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species.
- If necessary, suggest a reasonable and prudent alternative to the proposed action.

2.2 Rangewide Status of the Species and Critical Habitat

This opinion examines the status of each species that is likely to be adversely affected by the proposed action. The status is determined by the level of extinction risk that the listed species face, based on parameters considered in documents such as recovery plans, status reviews, and listing decisions. This informs the description of the species' likelihood of both survival and recovery. The species status section also helps to inform the description of the species' "reproduction, numbers, or distribution" for the jeopardy analysis. The opinion also examines the condition of critical habitat throughout the designated area, evaluates the conservation value of the various watersheds and coastal and marine environments that make up the designated area, and discusses the function of the PBFs that are essential for the conservation of the species.

2.2.1 Black Abalone Life History and Status

Black abalone occupy rocky intertidal habitats from the upper intertidal to 6 meters depth. The current range is from Point Arena, California, to Bahia Tortugas, Mexico, including offshore islands (74 FR 1937). On January 14, 2009, the species was listed as endangered under the ESA (74 FR 1937). Critical habitat was designated on October 27, 2011 (76 FR 66806).

Black abalone are most commonly observed in the middle and lower intertidal, in habitats with complex surfaces and deep crevices that provide shelter for juvenile recruitment and adult survival (Leighton 2005). They are able to withstand extreme variations in temperature, salinity, moisture, and wave action, and are usually strongly aggregated (Cox 1960, Leighton 2005). As broadcast spawners, black abalone must be in close enough proximity to one another to successfully reproduce. They have a short planktonic larval stage (about 3-10 days) before settlement and metamorphosis (McShane 1992). Genetic studies indicate limited larval dispersal, with populations composed predominately of individuals spawned locally (Chambers et al. 2006). Larval black abalone typically settle on rocky substrate with crustose coralline algae, which serves as a food source for post-metamorphic juveniles (Leighton and Boolootian 1963, Bergen 1971). Adults typically feed on attached and drifting macroalgae, such as *Macrocystis pyrifera* (giant kelp), *Egregia menziesii* (feather boa kelp), and *Eisenia arborea* (southern sea palm), occurring in intertidal or subtidal habitats (NMFS 2020). Spawning has not been observed in the wild, but likely occurs from spring to early autumn (Leighton and Boolootian 1963, Leighton 2005).

Black abalone are believed to be naturally rare at the northern and southern extremes of their range, (Morris 1980, VanBlaricom et al. 2009). The highest abundances historically occurred south of Monterey, particularly at the Channel Islands off southern California (Cox 1960, Karpov et al. 2000). Rogers-Bennett et al. (2002) estimated a baseline abundance of 3.54 million black abalone in California based on landings data from the peak of the commercial and recreational fisheries (1972-1981). However, black abalone abundances in the 1970s to early 1980s had reached extraordinarily high levels, particularly at the Channel Islands, possibly due to lack of subsistence harvests by indigenous peoples and near elimination of sea otter populations. Therefore, our understanding of black abalone abundance and distribution for this time period may not accurately represent conditions prior to commercial and recreational harvest of black abalone in California.

Beginning in the mid-1980s, black abalone populations began to decline dramatically due to withering syndrome (Tissot 1995). The disease is caused by a Rickettsiales-like organism (WS-RLO) that affects the animal's digestion and causes starvation, leading to foot muscle atrophy, lethargy, and death (Friedman et al. 2003, Braid et al. 2005). The first recorded mass mortality associated with the disease was observed at Santa Cruz Island in 1985 (Lafferty and Kuris 1993). Researchers recorded mass mortalities at sites throughout the Channel Islands and along the California mainland by 1998-1999 (Altstatt et al. 1996, Raimondi et al. 2002).

Overall, populations throughout southern California and as far north as Cayucos have declined in abundance by more than 80%; populations south of Point Conception have declined by more than 90% (Neuman et al. 2010). Historical abalone harvest contributed to some degree, but the primary cause of these declines was withering syndrome. Black abalone north of the Monterey/San Luis Obispo County line have not yet experienced mass mortalities associated with the disease, but all are likely infected by the WS-RLO pathogen. Disease transmission and manifestation is intensified when local sea surface temperatures increase by as little as 2.5 ºC above ambient levels and remain elevated over a prolonged period of time (i.e., a few months or more) (Friedman et al. 1997, Raimondi et al. 2002, Harley and Rogers-Bennett 2004, Vilchis et al. 2005). The northward progression of the disease appears to be associated with increasing coastal warming and El Niño events (Tissot 1995, Altstatt et al. 1996, Raimondi et al. 2002), and poses a continuing threat to the remaining healthy populations.

Most black abalone populations affected by withering syndrome remain at low densities, below the estimated levels needed to support successful reproduction and recruitment (0.34 abalone per m^2, Neuman et al. 2010). Data for 2002-2006 (Neuman et al. 2010) indicate that population densities exceed this threshold value in areas not yet affected by the disease (north of Cayucos; densities range from 1.1 to 10.5 abalone per m^2), whereas population densities fall below this threshold value in areas affected by the disease (south of Cayucos; densities range from 0 to 0.5 abalone per m^2). Although abundance in southern California is low, researchers have observed evidence of increases in black abalone at several locations (Richards and Whitaker 2012).

In 2020, California experienced record-breaking wildfires, including the Dolan Fire that burned more than 100,000 acres along the Central Coast. Soon after this fire was extinguished, an extreme rain event resulted in debris flows that buried black abalone under sediment and burned debris, and inundated thousands of meters of the species' critical rocky intertidal habitat. In response to the extensive and extreme impacts resulting from this event, multiple organizations (including NMFS) collaborated on an emergency effort to rescue over 200 black abalone that were buried or under imminent threat of burial (Bragg 2021).

Black abalone populations throughout California face high risk in each of four demographic risk categories: abundance, productivity, spatial structure (and connectivity), and diversity (VanBlaricom et al. 2009). Long-term monitoring data in California indicates that disease-impacted populations remain at low abundance and density, and the disease remains a threat to healthy populations (Raimondi et al. 2002), although a bacteriophage and potential genetic resistance in black abalone have reduced this threat (Friedman and Crosson 2012, Crosson et al. 2014, Friedman et al. 2014a, b). The declines in abundance have potentially resulted in a loss of

genetic diversity, though this needs to be evaluated. Although some sites in southern California have shown evidence of recruitment, natural recovery of severely-reduced abalone populations will likely be a slow process. Recovery will require protection of healthy populations to the north, restoration of disease-impacted populations to the south, continued long-term monitoring throughout the species' range, and research on the species' biology and response to threats (NMFS 2020).

NMFS assesses four population viability parameters to discern the status of the listed black abalone and to assess the species ability to survive and recover. These population viability parameters are: abundance, productivity, spatial structure, and diversity (NMFS 2020). While there are insufficient data to evaluate these population viability parameters quantitatively, NMFS has used existing information to determine the general condition of black abalone. The population viability parameters are used as surrogates for numbers, reproduction, and distribution, which are included in the regulatory definition of "jeopardize the continued existence of" (McElhany 50 CFR 402.02). For example, abundance, productivity, and spatial structure are surrogates for numbers, reproduction, and distribution, respectively. The fourth parameter, diversity, is related to all three regulatory criteria. Numbers, reproduction, and distribution are all affected when genetic or life history variability is lost or constrained, resulting in reduced population resilience to environmental variation at local or landscape-level scales.

2.2.2 Status of Black Abalone Critical Habitat

NMFS designated black abalone critical habitat on October 27, 2011 (76 FR 66806). The designation encompasses rocky intertidal and subtidal habitat (to a depth of 6 m) within five segments of the California coast between Del Mar Landing Ecological Reserve to the Palos Verdes Peninsula, as well as on the Farallon Islands, Año Nuevo Island, San Miguel Island, Santa Rosa Island, Santa Cruz Island, Anacapa Island, Santa Barbara Island, and Santa Catalina Island. Essential habitat features include rocky substrate (e.g., rocky benches formed from consolidated rock or large boulders that provide complex crevice habitat); food resources (e.g., bacterial and diatom films, crustose coralline algae, and detrital macroalgae); juvenile settlement habitat (rocky substrates with crustose coralline algae and crevices or cryptic biogenic structures); suitable water quality (e.g., temperature, salinity, pH) for normal survival, settlement, growth, and behavior; and suitable nearshore circulation patterns to support successful fertilization and larval settlement within appropriate habitat.

Critical habitat areas north of Cayucos (where black abalone have not experienced disease-related mass mortalities) were generally identified by NMFS as areas of high conservation value. These areas serve as a refuge from withering syndrome, support stable populations with evidence of recruitment in some areas, and contain habitat of good to excellent quality that is able to support larger numbers of black abalone. South of Cayucos (where black abalone have experienced disease-related mass mortalities), changes to critical habitat features have occurred. For example, at some sites once dominated by black abalone, the species' decline resulted in a shift in the invertebrate and algal community. Increased growth of encrusting organisms may reduce habitat suitability for adults (e.g., by filling in cracks and crevices) and for larval settlement (e.g., by reducing the surface area for crustose coralline algae to grow) (Toonen and

Pawlik 1994; Miner et al. 2006; VanBlaricom et al. 2009; NMFS 2011). In general, however, these critical habitat areas continue to provide a high conservation value to the species, because they contain habitat of good to excellent quality that is able to support black abalone, with evidence of recruitment observed at a few sites (e.g., on San Nicolas Island and Santa Cruz Island) (VanBlaricom et al. 2009).

Threats to black abalone critical habitat include: coastal development or in-water construction projects (e.g., coastal armoring, pier construction or repair), activities that can increase sedimentation (e.g., sand replenishment, beach nourishment, side-casting), oil or chemical spills and response activities, and entrainment of larval black abalone in ocean intakes at facilities such as coastal power plants, desalination plants, and liquefied natural gas terminals (NMFS 2020). Climate change is also likely to cause range-wide effects on black abalone critical habitat, as discussed below.

2.2.3 Global Climate Change

Climate change has and will continue to affect the range-wide status of ESA-listed species and aquatic habitat at large. Impacts from global climate change are already occurring in California. For example, average annual air temperatures, drought frequency, precipitation variability, severity of wildfires, and sea level increased in California over the last century (Milanes et al. 2018).

Climate change impacts that could affect black abalone and their critical habitat include sea level rise, changes to ocean water chemistry (e.g., ocean acidification), elevated ocean temperatures, landslides caused by wildfires, and changes in food supplies (Brewer and Barry 2008, Feely 2004, Osgood 2008, Turley 2008, Doney et al. 2012). Rising sea levels may shift the distribution of rocky intertidal habitat along the coast, although this is expected to occur over very long time periods during which black abalone may be able to adapt and shift their range. Ocean acidification could result in water quality conditions that reduce larval survival and shell growth and increase shell abnormalities (Feely et al. 2009, Crim et al. 2011, O'Leary et al. 2017). However, studies show that effects of ocean acidification are highly species specific due to differences between species in physiology, adaptability, and exposure to natural variation in ocean pH. Abalone may be able to adapt to ocean acidification because they already experience natural variability in ocean pH, including low pH levels (Hauri et al. 2009). Increasing ocean water temperatures may occur due to global warming and short-term and longer-term oceanographic conditions (e.g., ENSO or PDO events) and may have varying effects on abalone. Changes such as an increased incidence of marine heat waves, are likely already occurring, and are expected to increase (Frölicher et al. 2018). In fall 2014, and again in 2019, a marine heatwave, known as "The Blob"[3], formed throughout the northeast Pacific Ocean, which greatly affected water temperature and upwelling from the Bering Sea off Alaska, south to the coastline of Mexico. Although the implications of these events on black abalone are not fully understood, they are having considerable adverse consequences to the productivity of these ecosystems.

[3] https://www.fisheries.noaa.gov/feature-story/new-marine-heatwave-emerges-west-coast-resembles-blob

Warmer water temperatures may decrease food availability and quality by reducing macroalgal growth (Hobday et al. 2001, Tegner et al. 2001) and increase susceptibility to withering syndrome (Ben-Horin et al. 2013). At the same time, warmer water temperatures may benefit larval survival of some abalone species (Leighton 1972). Studies are underway to evaluate the effects of ocean acidification and increasing water temperatures on abalone, and to assess how other factors (e.g., presence of the disease vectors) may affect these interactions. Additionally, landslides following recent large wildfires in California have affected black abalone and their critical habitat. For example, severe wildfires burned along the central California coast in August 2020, followed by a large rain event in January 2021. These events resulted in massive debris flows that buried large expanses of rocky intertidal habitat as well as black abalone, prompting an emergency response by NMFS and their partners minimize loss by rescuing abalone (NMFS 2022).

2.3 Action Area

"Action area" means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). The action area encompasses outer Pillar Point Harbor, including the East and West Harbor Basins, Surfer's Beach, and nearshore waters in the vicinity of Surfer's Beach.

2.4 Environmental Baseline

The "environmental baseline" refers to the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultations, and the impact of State or private actions which are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline (50 CFR 402.02).

2.4.1 Description of the Action Area

Pillar Point Harbor is comprised of an outer Harbor and an inner Harbor with a marina, together approximately 245 acres (Figure 1). The portion of the outer Harbor to the east of the Harbor entrance is generally referred to as the 'East Harbor Basin', and to the west as the 'West Harbor Basin.' The initial construction of the 'outer breakwater' of boulders (i.e., rip-rap), extending south from Pillar Point (west side of the Harbor) and west from Surfer's Beach (east side), was completed by the Corps in the early-1960s. The original breakwater partially protected from large ocean waves the area where the new Harbor was to be constructed. The breakwater was extended to its current extent in the mid-1960s, and it includes a narrow opening on the south side for boat traffic. In 1982, an additional breakwater was constructed in three sections to surround and further protect Johnson Pier and associated floating docks, thereby creating the 'inner Harbor' of approximately 73 acres. Due to the protection of the inner Harbor provided by

these additional breakwaters, the Project is not expected to affect the inner Harbor, and only the outer Harbor is included in the action area.

Surfer's Beach extends from the outside of the eastern breakwater surrounding the outer Harbor to the southeast for approximately 1 km. The northwest portion of the beach has been eroded over the decades since the breakwater was constructed and is inundated with ocean waters during most tide phases and throughout the year. A primarily coarse-grained sandy beach exists at all but the highest tide phases beginning roughly 200 m to the southeast of the breakwater. The size of the beach varies seasonally as sand is deposited and eroded. The upper portion of the beach is bordered by a line of bluffs; behind the bluffs are a walking path and Highway 1. A recent Corps study concluded that the bluffs along Surfer's Beach eroded at an average rate of 1.64 feet per year between 1993 and 2012 (Corps 2023). This erosion rate was determined to be approximately seven times higher than the rate of erosion at a geologically similar stretch of shoreline farther down the coast. Storms during the 2022-2023 winter removed most of the beach sand, eroded bluffs above the beach, damaged breakwaters, and necessitated emergency repairs to infrastructure near Highway 1. Beach sand deposited in spring/summer 2023 reformed a portion of the beach, but storms in winter 2023-2024 further eroded the beach and bluffs and caused damage in the area. Rip-rap along portions of Surfer's Beach is intended to protect infrastructure above the beach (including Highway 1) from erosion and wave damage. Portions of the rip-rap parallel to the beach is submerged at higher tide cycles on northwest side of the beach, as is the lower portion of the rip-rap forming the outside of the eastern Harbor breakwater. Additionally, a series of boulder-sized rocks remaining from an old revetment are within the intertidal and subtidal zones of the northwest corner of the beach, extending out from the eastern Harbor breakwater (Figures 2 and 3). The old revetment was constructed in the 1970s apparently to protect the shoreline; it failed in the 1980s due to coastal erosion and wave action, and the shoreline has since moved to the next revetment to the north.

The Harbor and Surfer's Beach are a combination of natural and human-influenced habitats. The creation of the breakwaters surrounding the Harbor greatly changed sediment dynamics in the area, causing sediment to build-up within the Harbor rather than being transported southeast and deposited on Surfer's Beach and other beaches to the south. Lack of sand on the beach caused the cliffs above the southeast portion of Surfer's Beach that are not protected by rip-rap to erode much more quickly than other portions of the nearby coastline in recent decades. The breakwaters also serve as habitat for many aquatic species. The outer Harbor is fairly shallow, primarily 0-20 feet, with the exception of much deeper areas near the opening in the outer breakwater and some moderately deep areas in the eastern Harbor where boat traffic enters the inner Harbor (ESA 2021). The outer Harbor seafloor is mostly sand and mud. Eelgrass within the outer Harbor has been observed since the mid-2000s, and is unlikely to have existed in the action area prior to construction of the outer breakwater. Eelgrass currently occurs in the East Harbor basin mainly along the eastern outer breakwater and in the southwest corner of the West Harbor Basin (MTS 2023). Recent surveys indicate eelgrass is declining in health and extent in the East Basin, apparently resulting from sedimentation and freshwater inputs that has accelerated in recent years due to powerful winter storms. Eelgrass extent in the West Basin, however, has expanded in recent years based on MTS surveys. Rocky reef and cobble habitats are interspersed with sand and mud on the west side of the Harbor near Pillar Point.

2.4.2 Status of Black Abalone and Critical Habitat in the Action Area

After the withering syndrome became widespread in the 1980s and 1990s, black abalone have been rare in southern California, but black abalone north of Monterey County (including San Mateo County) had been relatively unaffected by the disease as of 2020 (NMFS 2020). The disease has been detected as far north as Sonoma County, but the colder waters of this region are thought to reduce disease transmission and mortality rates of black abalone (NMFS 2020). The University of California Santa Cruz (UCSC) conducted two surveys for abalone in the vicinity of the action area in 2014/2015 and 2021. Both UCSC surveys found black abalone in the intertidal zone at Pillar Point, outside the Harbor (Raimondi 2015; Christy Bell, personal communication). However, the habitat where abalone were found near Pillar Point (natural rocky intertidal) is quite different than the habitat in the action area (modified rock and sand), and is subject to potential poaching and predation that is unlikely within the action area. Raimondi (2015) noted that, although a small amount of high-quality black abalone habitat was surveyed, the area was primarily moderate- or poor-quality habitat. As the area surveyed in 2014/2015 is immediately adjacent (west) of the Pillar Point Harbor, it is possible that black abalone may have recruited to habitats within the Harbor through openings in breakwaters (or during overtopping events) in recent years. Surveys for black abalone have not been conducted within the Pillar Point Harbor or outside the eastern breakwater near Surfer's Beach, therefore it is uncertain whether or how many black abalone exist inside the Harbor.

Critical habitat for black abalone in the intertidal and subtidal zones of the action area consists of: natural rock habitats near Pillar Point (West Basin), rip-rap composing the Harbor breakwaters (East and West Basins), and the remains of an old revetment (boulder sized rocks) near Surfer's Beach. Water quality is likely sufficient for black abalone at all these areas, although turbidity can be quite high at times due to currents and waves. Rip-rap comprising the outer breakwater in the action area may serve as adequate habitat for black abalone, but is low to moderate quality due to regular sedimentation events from large storm waves overtopping the breakwaters. The Inner Harbor breakwater could also support black abalone, and is less exposed to large storm waves and sedimentation, although food resources (i.e., algae) are not plentiful in these areas. Natural rock and associated macroalgae habitat in the action area has been greatly affected by construction of the Harbor, including altered sediment dynamics, currents and water quality. Natural rock within the Harbor consists of cobbles and boulders along the far western shore near Pillar Point where eelgrass mitigation is proposed. Natural rock habitats could likely sustain black abalone with moderate levels of food resources, but are also susceptible to sedimentation events. Lastly, rock habitat in the outside the Harbor to the east, in the vicinity of Surfer's Beach, includes the eastern breakwater and failed revetment (described earlier). Rock habitat near Surfer's Beach is low to moderate quality due to low levels of food resources, although sedimentation is less of a concern in these areas.

2.4.3 Previous ESA Section 7 Consultations and Section 10(a)(1)(A) Permits in the Action Area

NMFS conducted several previous informal consultations with the Corps between 2006 and 2021 within Pillar Point Harbor. The projects covered by these consultations included habitat

restoration/shoreline stabilization in the West Harbor Basin, dredging of the public boat launch, and removal of Romeo Pier from the outer Harbor.

In 2023, NMFS completed formal consultation with the Corps regarding a project to expand Johnson Pier and replace floating docks in the inner Harbor. NMFS determined this project was likely to adversely affect black abalone, but was not likely to jeopardize the species. NMFS also determined the project was not likely to adversely impact black abalone critical habitat, CCC steelhead, green sturgeon southern DPS, leatherback sea turtle, or sunflower sea star. Lastly, NMFS determined the project would adversely affect EFH for Pacific Groundfish, Coastal Pelagic Species, and Pacific Coast Salmon, but these effects were expected to be minor, temporary and localized.

2.5 Effects of the Action

Under the ESA, "effects of the action" are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action (see 50 CFR 402.02). A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action (see 50 CFR 402.17). In our analysis, which describes the effects of the proposed action, we considered the factors set forth in 50 CFR 402.17(a) and (b).

2.5.1 Black Abalone Mitigation

SMCHD proposes to conduct a pre-construction survey for black abalone (see Section 1.3.3) and, if any are observed in areas where sediment is to be placed, coordinate with NMFS to relocate them. Black abalone will be moved to suitable habitat outside of the construction area (likely outside the Harbor), or to a captive rearing facility until release to the wild is possible, as determined by NMFS. Abalone attached to rock habitat that avoid observation during the survey may be exposed to risks from turbidity or burial impacts described in sections 2.5.2 and 2.5.3.

NMFS assumes that all black abalone present in areas that could be directly impacted by Project activities will be identified during the survey, as the survey will be conducted by qualified biologists following NMFS guidelines. If black abalone are discovered during the proposed action in areas to be buried under sediment, due to abalone entering the action area after the survey or for other reasons, operations will cease and NMFS will be notified to discuss options. If black abalone are observed during the pre-construction survey in areas that are not planned to be buried under sediment, NMFS will be contacted to determine if additional AMMs will be required due to potential Project impacts.

Black abalone collection and relocation activities pose a risk of injury or mortality. Based on recent surveys and observations of black abalone near the action area and the amount of potential habitat to be affected by beach restoration activities (approximately 4.1 acres), we anticipate up to 10 individual black abalone may be encountered during the Project. However, this estimate is highly uncertain as there are no black abalone survey data for the action area. The amount of abalone injured or killed attributable to capture and relocation varies depending on the method

used, the ambient conditions, and the expertise and experience of the personnel. Black abalone relocation activities will be conducted by qualified biologists following NMFS guidelines, which will help minimize injury and mortality of abalone during capture and relocation. Based on prior experience with abalone relocations, we expect up to 15 percent of relocated black abalone (2 individuals of 10 encountered) will be unintentionally killed during the capture and handling process (NMFS 2022). An additional 13 percent of individual black abalone that are relocated will perish after relocation (1 additional individual out of 10 encountered) (NMFS 2022). In sum, 3 of 10 black abalone (30 percent) expected to be observed and relocated from the construction site are expected to die as a result of relocation.

Relocated abalone may have difficulty adapting to the new habitat and finding food. Relocation sites will be pre-approved by NMFS to ensure the sites have adequate habitat to allow for survival of transported abalone. Nonetheless, the stress of adapting to the new environment may temporarily impact abalone growth. Relocated black abalone should benefit from higher-quality habitat at relocation sites relative to habitat near Surfer's Beach.

Post-release monitoring of tagged, relocated black abalone will be conducted immediately following release. In the first two weeks following release, monitoring will occur at least once daily. Thereafter, monitoring would occur monthly for at least six-months post-release. Monitoring would involve recording the location, length, and habitat of tagged abalone and collecting empty, tagged shells to track the health, survival and movements of the released abalone.

2.5.2 Increased Sediment Mobilization (Turbidity)

Plumes of suspended particulates in water, referred to as turbidity, can cause a variety of effects on aquatic species and habitats. While elevated turbidity persists, light penetration into the water column is reduced, which can lower the rate of photosynthesis and primary productivity of an aquatic area. The contents of the suspended material can react with the dissolved oxygen in the water and result in oxygen depletion, or smother submerged aquatic vegetation. If turbidity is high or extends for a long-period, it can also inhibit respiration or cause suffocation in black abalone due to clogging of gills.

The Project will generate turbidity through dredging and placement of sediment. Dredging in the action area will occur over soft substrates within the East Harbor Basin, where black abalone and their critical habitat are not found. AMMs to avoid affects from turbidity and direct impact to individuals by equipment include a provision to not operate a dredge within a 20-foot buffer zone around large rock substrates. This buffer zone will be in place around the Harbor breakwaters and any consolidated rock substrates within the inter- or sub-tidal of either Harbor basin – e.g., boulders and rock benches - where black abalone and their critical habitat can be found. Seafloor sediment at the proposed dredge sites closest to the outer breakwater are primarily composed of coarse sand that should settle back to seafloor fairly quickly after disturbance by the dredging equipment. Sediment at dredge sites near the Harbor boat launch is finer-grained material, but this area is further from rocky habitats where black abalone might be

found. Additionally, dredging below the water line will be accomplished using a suction dredge that should minimize turbidity relative to clam shell dredging.

Turbidity will also be generated by placement of dredge spoils in the nearshore waters adjacent to Surfers Beach. Dredge spoils will be initially placed on Surfer's Beach, which would not cause turbidity, but a portion of the sediment will subsequently be moved into the surrounding nearshore waters to expand the beach. Turbidity caused by this action could affect black abalone and their critical habitat on rocks in the area. A pre-construction survey for black abalone will identify any black abalone present in rock habitats that may be buried by the Project activities. If any black abalone are observed, mitigation will occur as described in Section 1.3.3. This will also reduce turbidity affects to black abalone in the area. However, some black abalone may be present beyond the survey area that could be impacted by turbidity. This turbidity affect is expected to be temporary as dredge spoils placed in the area will be almost exclusively sand that is expected to quickly settle to the seafloor. The small amounts of fine-grained sediment placed off Surfer's Beach will likely be transported southeast along the coast by prevailing currents. Additionally, the rock habitats adjacent to Surfer's Beach are regularly subjected to natural sediment transport processes of sand and fine-grained material and accompanying turbidity. Lastly, fine-grained dredge spoils are expected to be placed in the West Harbor Basin as part of the eelgrass mitigation aspect of the Project. AMMs to reduce turbidity include placing as much of the sediment as possible on low tides, when the seafloor in not inundated with water, as well as using a suction dredge when dredging below the waterline.

If black abalone are exposed to sufficiently high turbidity due to Project activities, respiration could be inhibited or suffocation could occur. Any black abalone located in the Harbor or near Surfer's Beach will be exposed to natural turbidity events regularly due to storms and currents carrying suspended sediment throughout the action area. Black abalone located in the action area will be relocated from the area in which the majority of turbidity plumes would occur. Currents within the action area will likely disperse suspended sediment to ambient levels within several days following turbidity generating events. The concentration and duration of turbidity in which these individuals will be exposed is less than what is expected to cause reductions in fitness. Therefore, NMFS expects turbidity effects from the Project on black abalone and their critical habitat will be insignificant.

2.5.3 Burial and Direct Contact

Impact to black abalone and their critical habitat may occur due to burial under sediment as well as direct contact by Project equipment. Some dredge spoils will be placed for beach restoration near Surfer's Beach on top of large rock habitat where black abalone could occur and where their critical habitat exists. As surveys have not yet been conducted for black abalone in the action area, it is possible that black abalone may be found in this area. If not relocated prior to sediment placement during beach restoration, black abalone could be injured or killed. Pre-construction surveys for abalone in the action area will be conducted prior to beach restoration and surveyors are expected to observe all abalone present. If abalone are observed on rock habitat likely to be buried or nearby, the Applicant will coordinate with NMFS to relocate them to suitable habitat outside of the construction area (see Section 2.5.1) or otherwise mitigate for their presence. These measures are expected to avoid impacts from these Project actions to black abalone.

Proposed AMMs are not expected to avoid loss of black abalone critical habitat due to Project activities. Although the loss of this critical habitat is considered a significant impact, this loss represents a very small portion of the overall critical habitat for black abalone. Additionally, the effect will occur in low to moderate value black abalone habitat. As noted previously, the rock habitat proposed to be buried is primarily rip-rap comprising a portion of the jetty and the remnants of a failed revetment in this area. The area often experiences highly dynamic currents, waves and sediment transport, which limits growth of macroalgae that black abalone depend on. It is also possible portions of the buried rock habitat will become exposed again after Project completion due to natural sediment transport processes in the area. In summary, the loss of this critical habitat is not expected to affect recovery of black abalone.

2.5.4 Construction-related Contaminants

Construction in, over, and near surface water have the potential to release debris, hydrocarbons, concrete/cement, and similar contaminants into surface waters. Potential contaminants that could result from projects like these include wet and dry concrete debris, fuel and lubricant for construction equipment, and various construction materials. If introduced into aquatic habitats, debris and contaminants can impair water quality and harm aquatic organisms by introducing toxic materials such as hydrocarbons or metals into the aquatic habitat (Eisler 2000).

Use of heavy equipment and storage of materials is required for the construction of the Project. As a result, if not properly contained, contaminants (e.g., fuels, lubricants, hydraulic fluids, concrete) could be introduced into the Harbor waters, either directly or through surface runoff. The effects described above for contaminants have the potential to temporarily degrade habitat and harm exposed biota, including black abalone. However, AMMs proposed at the work site will substantially reduce or eliminate the potential for construction materials and debris to enter waterways (Section 1.3.3). Additionally, ocean currents near Surfers Beach would likely quickly carry any contaminants away from rock habitats outside the Harbor where black abalone might be found. Therefore, effects of contaminants from construction equipment on black abalone are expected to be minimal.

Contaminants that may be present in the sediment at the dredge or sediment placement sites prior to construction could cause impacts to black abalone and other aquatic biota if dispersed into the water column by Project activities. Harmful contaminants could include Polycyclic Aromatic Hydrocarbons (PAHs), PCBs, DDT and heavy metals. As noted above, any abalone found in the pre-construction survey near Surfer's Beach will be relocated. Any abalone located within the outer Harbor, such as on the breakwater, would also be exposed to potential contaminants from dredging in the East Harbor Basin and/or placement of sediment in the West Harbor Basin, but the likelihood of impacts is low as sediment in the Harbor is not known to be contaminated at levels that could affect black abalone. Results of sediment chemistry analysis at the proposed dredge sites near the Harbor boat launch in 2017 indicated all samples were below established ERL values for analytes where ERL values were available (GHD 2020). Sediment analysis in 2019 was restricted to grain-size analysis (no chemistry) of the seafloor near the Harbor boat ramp and along the inside of the eastern breakwater, where dredging is proposed (Kinnetic Labs 2019). Sediment with high sand content is unlikely to have elevated levels of contaminants due

to contaminants having a greater affinity for clay and silt than for sand (Corps 2023). Based on these testing results and other information provided by the Applicant, the Environmental Protection Agency (EPA) provided a Tier 1 exemption from further sediment testing for the Project. Based on Project AMMs and sediment testing analysis, impacts to black abalone and their critical habitat from contaminated sediments are expected to be minor.

2.6 Cumulative Effects

"Cumulative effects" are those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation [50 CFR 402.02 and 402.17(a)]. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

Some continuing non-Federal activities are reasonably certain to contribute to climate effects within the action area. However, it is difficult if not impossible to distinguish between the action area's future environmental conditions caused by global climate change that are properly part of the environmental baseline *vs.* cumulative effects. Therefore, all relevant future climate-related environmental conditions in the action area are described earlier in the discussion of environmental baseline (Section 2.4).

2.7 Integration and Synthesis

The Integration and Synthesis section is the final step in assessing the risk that the proposed action poses to species and critical habitat. In this section, we add the effects of the action (Section 2.5) to the environmental baseline (Section 2.4) and the cumulative effects (Section 2.6), taking into account the status of the species and critical habitat (Section 2.2), to formulate the agency's biological opinion as to whether the proposed action is likely to: (1) reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing its numbers, reproduction, or distribution; or (2) appreciably diminish the value of designated or proposed critical habitat as a whole for the conservation of the species.

We provide a general synthesis of our understanding of how the proposed action may affect ESA-listed black abalone and, where appropriate and necessary, we consider and describe any species-specific risks relevant to concluding this biological opinion.

2.7.1 Summary of Effects to black abalone and black abalone critical habitat

As described in Section 2.5, NMFS identified the following components of the project that may result in effects to black abalone: sediment mobilization (turbidity), burial, contaminants, and black abalone mitigation. Increased turbidity or contaminants from construction could affect black abalone; however, proposed AMMs and natural dispersal by currents will minimize these impacts, resulting in only minor effects to black abalone. Burial of rock habitat during Surfer's Beach restoration is not expected to cause impacts to black abalone, as they would be relocated out of the action area prior to these activities. A portion of black abalone critical habitat will be lost as a consequence of beach restoration activities; however, the habitat is not high quality and represents a very small portion of black abalone critical habitat on the central California coast.

NMFS does not expect any of the aforementioned effects to combine with other effects in any significant way.

Regarding capture and relocation (if needed), NMFS estimates up to 10 black abalone may be present on rock habitat near Surfer's Beach to be buried as part of the proposed Project. Anticipated injury or mortality from capture and relocation is expected to be fifteen percent (or less) of the abalone present. NMFS expects no more than 2 black abalone would be injured or killed by capture/relocation at the project site during construction. An additional 13 percent of individual black abalone that are relocated will perish after relocation (1 additional individual out of 10 encountered) (NMFS 2022). In sum, 3 of 10 black abalone (30 percent) expected to be observed and relocated from the construction site are expected to die as a result of relocation.

The decline of black abalone throughout their range, prompting the species ESA-listing, is primarily linked to withering syndrome. Relative to populations in southern California, black abalone in central and northern California have been much less impacted by withering syndrome and protecting populations in these areas is critical to species recovery. Any black abalone within the action area would represent a small portion of black abalone currently found on the central California coast. Habitat within near Surfer's Beach, where most impacts will occur, is not high quality and survival of black abalone within this habitat would likely be marginal due to low food availability. Relocating black abalone in harm's way from the Project to higher quality habitat nearby will reduce risk of mortality for these individuals due to Project activities and potentially improve growth and survival long-term. This benefit could outweigh the loss of up to 30 percent of black abalone in the action area due to collection and relocation.

We do not expect the proposed Project to affect the persistence or recovery of black abalone. We base this conclusion on our findings above which considered the status of the species, the environmental baseline, all of the potential effects of the action, and the cumulative effects.

2.7.2 Climate Change

Future climate change could affect black abalone within the action area. Some potential effects of climate change on the central California coast are increases in water temperatures, changes to chemistry of seawater (e.g., ocean acidification), sea level rise, landslides, as well as more frequent and damaging wildfires. The proposed action is not expected to amplify the effects of climate change in the action area.

After reviewing and analyzing the current status of the black abalone, the environmental baseline within the action area, the effects of the proposed action, the effects of other activities caused by the proposed action, and the cumulative effects, it is NMFS' biological opinion that the proposed action is not likely to jeopardize the continued existence of black abalone.

2.8 Conclusion

After reviewing and analyzing the current status of the listed species and critical habitat, the environmental baseline within the action area, the effects of the proposed action, the effects of other activities caused by the proposed action, and the cumulative effects, it is NMFS' biological

opinion that the proposed action is not likely to jeopardize the continued existence of black abalone or destroy or adversely modify its designated critical habitat.

2.9 Incidental Take Statement

Section 9 of the ESA and Federal regulations pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without a special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. "Harm" is further defined by regulation to include significant habitat modification or degradation that actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including breeding, spawning, rearing, migrating, feeding, or sheltering (50 CFR 222.102). "Harass" is further defined by interim guidance as to "create the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering." "Incidental take" is defined by regulation as takings that result from, but are not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or applicant (50 CFR 402.02). Section 7(b)(4) and section 7(o)(2) provide that taking that is incidental to an otherwise lawful agency action is not considered to be prohibited taking under the ESA if that action is performed in compliance with the terms and conditions of this ITS.

2.9.1 Amount or Extent of Take

In the biological opinion, NMFS determined that incidental take is reasonably certain to occur as follows:

Take of listed black abalone may occur during beach restoration Project activities. NMFS expects that no more than 30 percent of the black abalone observed during pre-construction surveys will be injured, harmed, or killed during or subsequent capture/relocation activities. Because no more than 10 black abalone are expected to be impacted by Project sediment placement activities, NMFS does not expect more than 3 black abalone to be harmed or killed by Project activities.

Incidental take will have been exceeded if:

- more than 10 black abalone are captured and relocated;
- more than 2 black abalone die during collection and relocation activities;
- more than 1 black abalone dies within six months after relocation, based on monitoring.

If any of these incidental take limits are exceeded, reinitiation of consultation may be needed. See Section 2.10 (Reinitiation of Consultation) below.

2.9.2 Effect of the Take

In the biological opinion, NMFS determined that the amount or extent of anticipated take, coupled with other effects of the proposed action, is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

2.9.3 Reasonable and Prudent Measures

"Reasonable and prudent measures" are measures that are necessary or appropriate to minimize the impact of the amount or extent of incidental take (50 CFR 402.02).

NMFS believes the following reasonable and prudent measures are necessary and appropriate to minimize take of black abalone:

1. Undertake measures to minimize harm to black abalone from construction of the Project (i.e., dredging and sediment placement) and degradation of aquatic habitat;
2. Prepare and submit plans and reports to NMFS regarding the black abalone pre-construction survey, black abalone relocation and avoidance methods, and construction activities.

2.9.4 Terms and Conditions

To be exempt from the prohibitions of section 9 of the ESA, the Federal action agency must comply (or must ensure that any applicant complies) with the following terms and conditions. The Corps or any consultant has a continuing duty to monitor the impacts of incidental take and must report the progress of the action and its impact on the species as specified in this ITS (50 CFR 402.14). If the entity to whom a term and condition is directed does not comply with the following terms and conditions, following terms and conditions, protective coverage for the proposed action would likely lapse.

1. The following terms and conditions implement reasonable and prudent measure 1:
    a. Corps or the applicants will allow any NMFS employee(s) or any other person(s) designated by NMFS to accompany field personnel to visit the project site during activities described in this opinion.
    b. Corps or the applicants will retain qualified Project biologist(s) knowledgeable of the needs of aquatic species, including black abalone. The Project biologist(s) will monitor the construction sites during all in-water activities. Monitoring will be performed daily.
    c. Mitigation for black abalone impacts - If black abalone are found during the pre-construction survey or during construction activities, the Corps or applicant must contact NMFS to discuss relocation or avoidance procedures. Mitigation measures must be agreed upon by NMFS before in-water Project work can proceed. All relocation activities will be conducted by qualified personnel with the appropriate expertise and experience, to minimize black abalone injury and mortality. The Applicant or Corps will provide names and experience of proposed personnel to NMFS for review 30 days before relocation efforts commence.
    d. Relocation activities will include a minimum of six-month post-release monitoring to record survival, growth and movement of abalone.
    e. During black abalone mitigation activities, the Project biologist shall contact NMFS staff at the number below, if injury or mortality of black abalone exceeds

fifteen percent of the total collected. If any of these incidental take limits are exceeded, reinitiation of consultation may be needed (see Section 2.11). Tom Wadsworth (707) 243-8318, or Thomas.Wadsworth@noaa.gov

f. Once construction is completed, all Project-introduced material must be removed, leaving the Harbor as it was before construction. Excess construction materials will be disposed of at an appropriate disposal site.

2. The following terms and conditions implement reasonable and prudent measure 2:

   a. Black abalone pre-construction survey plan– The Corps or applicants must submit a black abalone pre-construction survey plan to NMFS for review. The survey plan should follow general abalone survey guidelines provided by NMFS, with adaptation as needed for the Project site. This survey plan shall be submitted electronically to NMFS biologist Tom Wadsworth at Thomas.Wadsworth@noaa.gov at least 30 days prior to the planned start of these activities.

   b. Black abalone avoidance and relocation plan - if black abalone are found during the pre-construction survey, a relocation plan must also be submitted that provides general procedures to avoid effects to individuals, or relocate them from the project area. The relocation plan shall be submitted electronically to NMFS biologist Tom Wadsworth at Thomas.Wadsworth@noaa.gov at least 30 days prior to the planned start of these activities.

   c. Annual Reporting – The Corps or the Applicant must prepare and submit annual reports to NMFS for Project activities as outlined below. Reports for (i) and (ii) below must be submitted by January 15 of the year following completion of relevant in-water Project activities. Report (iii) below, if applicable, should be submitted within six months after monitoring of relocated black abalone is complete. Reports should be submitted electronically to NMFS biologist Tom Wadsworth at Thomas.Wadsworth@noaa.gov. Reports prepared for compliance with other agency requirements that contain the information requested below would be acceptable. Annual reports must contain, at minimum, the following information:

      i. Black abalone capture and relocation – The report(s) must include the names of NMFS-approved biologists involved; a description of the location from which abalone were removed; a description of the release site(s), including any resident black abalone at the site, with photographs; the date and time of the relocation effort; a description of the equipment and methods used to collect, hold, and transport abalone; the number of black abalone relocated; shell length, tags, health, gonad data for each abalone; the number of abalone injured or killed with a brief narrative of the circumstances surrounding injuries or mortalities; final disposition of the black abalone collected (e.g., mortality, released to relocation site, or maintained in captivity); names of captive facilities where animals are held (if applicable) and for what duration; a description of any problems which may have arisen during the relocation activities; a statement as to whether or not the activities had any unforeseen effects.

ii. Construction related activities – The report(s) must include the dates construction began and was completed; a discussion of any unanticipated effects or unanticipated levels of effects on ESA-listed aquatic species, including a description of any and all measures taken to minimize those unanticipated effects and a statement as to whether or not the unanticipated effects had any effect on ESA-listed aquatic species; the number of black abalone killed or injured during the project action (in addition to those killed or injured during capture/relocation activities); and photographs taken before, during, and after the activity from photo reference points.

iii. Black abalone post-relocation monitoring – The report must include information on survival, location, length, and health of relocated black abalone. The report should cover a monitoring period of at least six-months subsequent to relocation.

2.10 Conservation Recommendations

Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Specifically, "conservation recommendations" are suggestions regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information (50 CFR 402.02). NMFS has no conservation recommendations as this time.

2.11 Reinitiation of Consultation

This concludes formal consultation for the Pillar Point Harbor Dredging and Surfer's Beach Restoration Project.

Under 50 CFR 402.16(a): "Reinitiation of consultation is required and shall be requested by the Federal agency or by the Service where discretionary Federal agency involvement or control over the action has been retained or is authorized by law and: (1) If the amount or extent of taking specified in the incidental take statement is exceeded; (2) If new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (3) If the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion or written concurrence; or (4) If a new species is listed or critical habitat designated that may be affected by the identified action."

2.12 "Not Likely to Adversely Affect" Determinations

2.12.1 CCC Steelhead DPS

Steelhead are anadromous forms of *O. mykiss*, spending some time in both fresh- and saltwater. Juveniles migrate to the ocean where they mature. Adult steelhead return to freshwater rivers and streams to reproduce, or spawn. Within the CCC steelhead DPS, adults typically enter freshwater between December and April, with peaks occurring in January through March (Wagner 1983, Fukushima and Lesh 1998). It is during this time that streamflow (depth and velocity) are

suitable for adults to successfully migrate to and from spawning grounds. Once emerged from the gravel, steelhead fry rear in edgewater habitats along the stream and gradually move into pools and riffles as they grow larger. Although variation occurs, CCC juvenile steelhead that exhibit an anadromous life history strategy usually rear in freshwater for 1-2 years (NMFS 2016b). CCC steelhead smolts emigrate episodically from freshwater in late winter and spring, with peak migrations occurring in April and May (Shapovalov and Taft 1954, Fukushima and Lesh 1998, Ohms and Boughton 2019). Steelhead smolts in California range in size from 120 to 280 mm (fork length) (Shapovalov and Taft 1954, Barnhart 1986). Smolts emigrating from the freshwater environment may use estuarine habitats for saltwater acclimation and feeding prior to entering the ocean.

The CCC steelhead DPS includes steelhead in coastal California streams from the Russian River to Aptos Creek, and the drainages of Suisun, San Pablo, and San Francisco Bays eastward to Chipps Island at the confluence of the Sacramento and San Joaquin Rivers. Historically, approximately 70 populations of steelhead existed in the CCC steelhead DPS (Spence et al. 2008, Spence et al. 2012). Many of these populations (about 37) were independent, or potentially independent, meaning they had a high likelihood of surviving for 100 years absent anthropogenic impacts (Bjorkstedt et al. 2005). The remaining populations were dependent upon immigration from nearby CCC steelhead DPS populations to ensure their viability (McElhany et al. 2000, Bjorkstedt et al. 2005). While historical and present data on abundance are limited, CCC steelhead numbers are substantially reduced from historical levels. Abundance estimates for smaller coastal streams in the DPS indicate low but stable levels with recent estimates for several streams (Lagunitas, Waddell, Scott, San Vicente, Pudding, and Caspar creeks) of individual run sizes of 500 fish or less (62 FR 43937; August 18, 1997).

CCC steelhead long-term population trends suggest a negative growth rate. Populations that historically provided enough steelhead immigrants to support dependent populations may no longer be able to do so, placing dependent populations at increased risk of extirpation. However, because CCC steelhead remain present in most streams throughout the DPS, roughly approximating the known historical range, CCC steelhead likely possess a resilience that has slowed their rate of decline relative to other salmonid species. The 2005 status review concluded that steelhead in the CCC steelhead DPS remain "likely to become endangered in the foreseeable future" (Good et al. 2005). On January 5, 2006, NMFS issued a final determination that the CCC steelhead DPS is a threatened species, as previously listed (71 FR 834). The most recent status update concludes that steelhead in the CCC DPS remains "likely to become endangered in the foreseeable future", as available information does not suggest a change in extinction risk (Williams et al. 2016). In the most recent status review, NMFS concluded that the CCC steelhead DPS should remain listed as threatened (NMFS 2016b).

Within Pillar Point Harbor, one perennial stream (Denniston Creek) and two seasonal streams (Deer Creek and the outflow from Pillar Point Marsh) exist. The two seasonal streams likely do not provide habitat for salmonids and will not be impacted by Project activities. Denniston Creek enters the outer Harbor just to the west of the inner Harbor breakwater, but is not likely to be impacted by Project actions. Denniston Creek contains habitat suitable for salmonids and the

lower reaches are likely accessible to CCC steelhead at higher flows. Surveys of Denniston Creek from the 1940s through 2006 consistently observed juvenile *O. mykiss* throughout the lower 1.2 miles of the creek, below an impassable dam (Becker and Reining 2008, Becker et al. 2010). Steelhead presence in the Harbor is expected to be rare, due to the extent of suitable habitat, and limited to the outer Harbor. Adults and juveniles could migrate through the West Harbor Basin, to and from Denniston Creek. Juvenile steelhead may forage throughout the outer Harbor before migrating to the ocean through the opening in the outer breakwater on the south side of the Harbor.

Eelgrass transplanting and sediment placement for eelgrass mitigation will occur in the southwest portion of West Harbor Basin near the existing eelgrass bed. Adult and juvenile steelhead migration routes may pass near this work area; however, these activities expected to occur in late spring and summer when only juveniles are expected in the action area and after most outmigration of juveniles has occurred. Limited data from central California indicate juvenile CCC steelhead may quickly move offshore after exiting freshwater systems (Hayes et al. 2011). Turbidity and habitat loss, primarily due to dredging and sediment placement, could affect small numbers of juvenile steelhead foraging in the West and East Harbor basins during the Project. However, proposed AMMs will greatly reduce potential for turbidity impacts or entrainment in the dredge (see Section 1.3.3). Additionally, sediment placement will occur mainly outside of existing eelgrass habitat and will not cover rocky habitat where steelhead are most likely to forage in the area. Project impacts are expected to be insignificant for CCC steelhead.

2.12.2 Southern DPS Green Sturgeon and Critical Habitat

The green sturgeon is an anadromous, demersal fish species that includes a northern DPS and southern DPS. Peak spawning likely occurs mid-April to mid-June in large rivers (Adams et al. 2002). After rearing in freshwater or the estuary of their natal origin for 1-4 years, green sturgeon transition to the subadult stage and move from estuarine to coastal marine waters. Subadult and adult green sturgeon have a marine and coastal range that extends from the Bering Sea, Alaska (Colway and Stevenson 2007) to El Socorro, Baja California, Mexico (Rosales-Casian and Almeda-Juaregui 2009). Subadults range from 65-150 cm total length from first ocean entry to size at sexual maturity. Adults range from 150-250 cm total length. Subadult and adult green sturgeon inhabit estuaries along the west coast during the summer and fall months, presumably for feeding (Dumbauld et al. 2008); and likely spend spring and winter months in nearshore marine habitats (Erickson and Hightower 2007, Lindley et al. 2011).

In 2006, NMFS listed the Southern DPS as threatened under the ESA, while the northern DPS is not listed under the ESA. The main threats to the Southern DPS are the loss of access to historical spawning habitat in the upper Sacramento and upper Feather Rivers due to impassable barriers (Mora et al. 2009), impaired spawning and rearing habitats in rivers and estuaries in the Central Valley, California, and historical and ongoing bycatch in fisheries (NMFS 2021). The most recent status report determined green sturgeon southern DPS should remain listed as threatened (NMFS 2021).

Subadult and adult green sturgeon are occasionally reported as bycatch in federally managed ground fisheries (Richerson et al. 2021). There is bycatch of green sturgeon in the California halibut fishery, primarily in nearshore areas close to San Francisco (including off Pillar Point Harbor), which encountered an estimated 288-664 green sturgeon annually in 2015-2019 (Richerson et al. 2021). These green sturgeon were likely from the southern DPS due to the location of catches and genetic data (Anderson et al. 2017, Richerson et al. 2021). Although this bycatch information indicates green sturgeon are using the nearshore marine habitat in the vicinity of Pillar Point Harbor, it is still unclear whether or how often they enter the Harbor.

In coastal bays and estuaries, adult and subadult green sturgeon are generally believed to feed on shrimp, clams, crabs, and benthic fish (Dumbauld et al. 2008). Green sturgeon captured in the nearshore California halibut trawl fishery had a similar diet, including flatfish, followed by shrimp, bivalves, and crab (Cancer spp.) (R. Bellmer, CDFW, unpublished). Prey items of this type are likely available within Pillar Point Harbor, but will be more common in the outer Harbor than the inner Harbor, due to higher quality habitat. Green sturgeon would be expected to rarely forage within the inner Harbor.

Mora et al. (2018) estimated the total population size to be 17,548 and in 2021 the NOAA SWFSC updated the total population estimate to 17,723 (Dudley 2021). Abundance of Southern DPS adults was estimated at 2,106 individuals and a conceptual demographic structure applied to the adult population estimate resulted in a subadult population estimate of 11,055 (Mora 2016, Mora et al. 2018). Data and associated modeling that informed these estimates will eventually provide population trend data, but trends are currently unknown. Nevertheless, the relatively small population size indicates the likelihood of green sturgeon occurring in the Pillar Point Harbor during Project activities is small.

If green sturgeon were to occur in the Harbor or near Surfer's Beach during Project activities, they may be impacted by dredging or sediment placement activities. However, due to the overall low abundance of the DPS, and the absence of any spawning or rearing areas nearby, they are unlikely to be found in the action area. Effects on water quality (turbidity, contamination from equipment etc.) associated with the Project that may impact green sturgeon will be moderated by AMMs (see Section 1.3.3). Green sturgeon are unlikely to be entrained in the suction dredge due to their size. Therefore, NMFS considers the effects of the project to green sturgeon will be discountable.

The marine waters outside the boundaries of Pillar Point Harbor are designated as green sturgeon critical habitat from the 60-fathom depth bathymetry contour shoreward to mean lower low water (MLLW), or to the COLREGS demarcation lines. Because the waters located inside the boundaries of the Harbor are shoreward of the COLREGS lines, this area is not designated green sturgeon critical habitat. However, the marine waters below MLLW off Surfer's Beach are green sturgeon critical habitat that could be impacted by the Project. Impacts to green sturgeon critical habitat due to turbidity from beach restoration are expected to be minor and temporary (see Section 2.5.1 for discussion of turbidity effects). No other impacts to this critical habitat are expected.

2.12.3 Leatherback turtle

The leatherback turtle is listed as endangered under the ESA throughout its global range. Leatherback turtles are found throughout the world and populations and trends vary in different regions and nesting beaches. In 1980, the global leatherback population was estimated at approximately 115,000 adult females (Pritchard 1982). By 1995, one estimate found adult females had declined to 34,500 (Spotila et al. 1996). The most recent status report found leatherback nesting female abundance has declined rapidly in several populations, especially in the Pacific Ocean (NMFS and USFWS 2020). The primary threats identified by NMFS and USFWS (2020) for leatherbacks are: 1) fishery bycatch on the high seas or in coastal areas throughout the species' range, especially the high seas driftnet and pelagic longline fisheries, 2) impacts at nesting beaches, including nesting habitat, direct harvest and predation, and 3) marine debris that is ingested and or causing lethal entanglements.

Satellite tracking and genetic analyses of leatherback turtles caught or stranded along the U.S. West Coast indicate they are from the western Pacific summer nesting populations, all belonging to the western Pacific DPS (Dutton et al. 2007, NMFS and USFWS 2020). Nesting for this DPS occurs in Indonesia, Papua New Guinea, Vanuatu and the Soloman Islands. Most leatherback found in California likely nest in an area known as Bird's Head, comprised of beaches at Jamursba-Medi and Wermon in Papua Barat, Indonesia. The Jamursba-Medi nesting population generally exhibits site fidelity to the central California foraging area (Benson et al. 2011, Seminoff et al. 2012). NMFS (2014b) estimated 2,600 nesting females remaining in the DPS and NMFS and USFWS (2020) indicated abundance of the DPS is declining. The greatest densities of leatherback off California are found feeding on jellyfish in the nearshore marine waters in the summer and fall seasons (Benson et al. 2007).

Pillar Point Harbor is within the range for leatherback turtle and foraging could occur in the action area. If leatherback turtles were to occur in the Harbor during Project activities, they may be impacted by dredging or sediment placement activities. However, due to expected low prey availability, high vessel traffic, and the overall low abundance of the DPS, leatherback are unlikely to be found in the Harbor. Effects on water quality (turbidity, contamination etc.) associated with the Project that may impact leatherback will be moderated by AMMs (see Section 1.3.3). Based on the analysis above, NMFS considers the effects of the project to leatherback turtles discountable.

The marine waters outside the boundaries of Pillar Point Harbor are designated as leatherback sea turtle critical habitat from 80-meters depth shoreward to the line of extreme low water, or to the COLREGS demarcation lines. Because the waters located inside the boundaries of the Harbor are shoreward of the COLREGS lines, this area is not designated leatherback sea turtle critical habitat. However, the marine waters below the line of extreme low water off Surfer's Beach are leatherback sea turtle critical habitat and could be impacted by the Project. Impacts to leatherback sea turtle critical habitat due to turbidity from beach restoration are expected to be minor and temporary (see Section 2.5.1 for discussion of turbidity effects). Impacts to leatherback critical habitat due to turbidity from beach restoration are expected to be minor and temporary. No other impacts to critical habitat are expected. Therefore, NMFS considers the effects of the project to leatherback sea turtle critical habitat insignificant.

2.12.4 Sunflower Sea Star

Sunflower sea star is a large, mobile, many-armed sea star native to the west coast of North America. The species occupies nearshore intertidal and subtidal marine waters shallower than 450 m (~1400 ft) deep from Adak Island, AK, to Bahia Asunción, Baja California Sur, MX. They are occasionally found in the deep parts of tide pools. The species is a habitat generalist, occurring over sand, mud, and rock bottoms both with and without appreciable vegetation. Critical habitat is currently indeterminable because information does not exist to clearly define primary biological features. Prey include a variety of epibenthic and infaunal invertebrates, and the species also digs in soft substrate to excavate clams. It is a well-known urchin predator and plays a key ecological role in control of these kelp consumers. More information about sea star biology, ecology, and their life history cycle is found in the proposed listing (88 FR 2023).

From 2013 to 2017, the sunflower sea star experienced a range-wide epidemic of sea star wasting syndrome (SSWS) (Gravem et al. 2021; Hamilton et al. 2021; Lowry et al. 2022). While the cause of this disease remains unknown, prevalence of the outbreak has been linked to a variety of environmental factors, including temperature change, sustained elevated temperature, low dissolved oxygen, and decreased pH (Hewson et al. 2018; Aquino et al. 2021; Heady et al. 2022; Oulhen et al. 2022). As noted above, changes in physiochemical attributes of nearshore waters are expected to change in coming decades as a consequence of anthropogenic climate change, but the specific consequences of such changes on SSWS prevalence and severity are currently impossible to accurately predict. Documented species declines described above prompted a proposed listing of sunflower sea star under the ESA on March 26, 2023. At the time this consultation was completed, no decision had been made to finalize the listing, though currently a decision on whether to finalize the proposed listing is expected by March 26, 2024. Critical habitat was not defined or included in the proposed listing.

It is unknown whether sunflower sea stars are currently within the action area (Pillar Point Harbor and near Surfer's Beach). Records from the Multi-Agency Rocky Intertidal Network (MARINe 2024) near Pillar Point, just northwest of the Harbor, indicate the last sunflower sea star observed was in 2013. Other species of sea stars were recorded near Pillar Point in 2014-2015 and in 2023, some of which were affected by SSWS (MARINe 2024). Although dredging, beach restoration, and eelgrass mitigation actions could impact sunflower sea star, these actions related to the Project will disturb a relatively small amount of benthic habitat. Given regionally documented low sea star density, we conclude it is extremely unlikely that any sunflower sea star would be exposed to the construction disturbance based on their sparse distribution and, therefore, the construction effects would be discountable. Furthermore, as habitat generalists, we expect sea stars would be able to successfully use much of the habitat that is disturbed by the project. Thus, any long-term effects on sunflower sea stars from project-induced changes in habitat would be insignificant.

2.12.5 Summary of Not Likely to Adversely Affect Determinations

Based on the analysis described in the sections above, NMFS' concurs with the Corps that the Project is not likely to adversely affect black abalone critical habitat, CCC steelhead, green

sturgeon southern DPS and their critical habitat, leatherback sea turtle and their critical habitat, or sunflower sea stars.

3 MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT ESSENTIAL FISH HABITAT RESPONSE

Section 305(b) of the MSA directs Federal agencies to consult with NMFS on all actions or proposed actions that may adversely affect EFH. Under the MSA, this consultation is intended to promote the conservation of EFH as necessary to support sustainable fisheries and the managed species' contribution to a healthy ecosystem. For the purposes of the MSA, EFH means "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity", and includes the physical, biological, and chemical properties that are used by fish (50 CFR 600.10). Adverse effect means any impact that reduces quality or quantity of EFH, and may include direct or indirect physical, chemical, or biological alteration of the waters or substrate and loss of (or injury to) benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality or quantity of EFH. Adverse effects on EFH may result from actions occurring within EFH or outside of it and may include site-specific or EFH-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810). Section 305(b) of the MSA also requires NMFS to recommend measures that can be taken by the action agency to conserve EFH. Such recommendations may include measures to avoid, minimize, mitigate, or otherwise offset the adverse effects of the action on EFH [CFR 600.905(b)].

This analysis is based, in part, on the EFH assessment provided by the Corps (SMHCD 2022) and descriptions of EFH for Pacific Coast groundfish (PFMC 2005), coastal pelagic species (PFMC 1998), and Pacific Coast salmon (PFMC 2014); contained in the fishery management plans developed by the PFMC and approved by the Secretary of Commerce.

3.1 Essential Fish Habitat Affected by the Project

The proposed project occurs within EFH for various federally managed fish species within the Pacific Coast Salmon, Pacific Coast Groundfish and Coastal Pelagic Species FMPs. Eelgrass is found in the West and East Basins of Pillar Point Harbor and will be impacted by the project. Eelgrass is a seagrass/submerged aquatic vegetation (SAV) Habitat Area of Particular Concern (HAPC)[4] for various federally-managed fish species within Pacific Coast Salmon and Pacific Coast Groundfish FMPs.

[4] HAPC are described in the regulations as subsets of EFH that are rare, particularly susceptible to human-induced degradation, especially ecologically important, or located in an environmentally stressed area. Designated HAPC are not afforded any additional regulatory protection under MSA, however, federal projects with potential adverse impacts to HAPC are more carefully scrutinized during the consultation process.

3.2 Adverse Effects on Essential Fish Habitat

NMFS determined the Project would adversely affect EFH for Pacific Groundfish, Coastal Pelagic Species, and Pacific Coast Salmon. The potential adverse effects of the Project on EFH have been described in the preceding opinion and include noise from pile driving, degraded water quality, benthic disturbance, and additional overwater cover. Effects to EFH are expected to be minor, temporary and localized, and are discussed in detail below.

As described in the opinion above, degraded water quality is expected to be temporary. Turbidity produced by dredging and sediment placement may impair the ability of fish species to feed within the action area or smother benthic invertebrates. Turbidity effects will be high within the outer Harbor at times during Project activities, but will be temporary, as suspended sediment will eventually settle or be dispersed by currents after Project in-water work is complete. Turbidity effects to eelgrass within the Harbor should be minor and temporary due to proposed AMMs (see Section 1.3.3).

Benthic disturbance will include temporary impacts from dredging and sediment placement, as well as potentially permanent effects from sediment placement. The benthic habitat within the area to be dredged is primarily sand and mud with eelgrass in some locations. NMFS expects the benthic community in the outer Harbor and near Surfer's Beach to recover within several months after dredging and dredge spoil deposition, based on a relevant scientific study of benthic disturbance within a Harbor on the central California coast (Oliver et al. 1977). Black abalone, a benthic species, will be relocated (if present) prior to dredge spoil placement near Surfer's Beach (see Section 2.5.1). Although benthic prey resources may be temporarily reduced in the dredging and sediment placement areas, large areas of prey resources in the outer Harbor will not be impacted by Project activities and will remain available for foraging.

The Project will cause impacts to eelgrass in the Harbor through dredging and sediment placement. Eelgrass is important to fish habitat and for fish foraging, and also provides a number of important ecosystem functions, including improvement to water quality by filtering polluted runoff, absorption of excess nutrients, storage of greenhouse gases like carbon dioxide, and protection from shoreline erosion by sediment and substrate stabilization. Through these many functions eelgrass also provides physical, chemical and biological services that extend outside of the area in which it occurs (Orth et al. 2012, Nordlund et al. 2016). Eelgrass present in the dredge footprint of the East Harbor Basin is unlikely to recover after dredging, as turions (i.e., rooting structures) will be removed for transplant to the West Basin as mitigation for Project impacts (see Section 1.3.3). Not all eelgrass in the East Basin will be removed, as dredging will not occur in all locations where it is currently growing. It is possible eelgrass remaining in the East Basin after dredging may recolonize the areas where eelgrass was removed prior to dredging. Regardless, mitigation efforts will relocate the eelgrass habitat lost in the East Basin to the West Harbor, with a goal of creating more (1.2x) vegetated eelgrass habitat than in the East Basin, following guidance in the CEMP. A portion of the existing eelgrass bed in the West Basin will likely be impacted by sediment placement as part of the mitigation plan, either through direct burial or subsequent sedimentation. Any eelgrass in the West Basin expected to be buried during

sediment placement will be salvaged beforehand and transplanted into nearby habitats (see Section 1.3.3).

If transplanted eelgrass does not grow and survive well, adaptive management measures to improve mitigation success will be discussed, including potentially transplanting additional eelgrass from the East Basin. Therefore, it is expected that vegetated eelgrass habitat will not be lost within the Harbor as a result of the project. As discussed in Section 1.3.3, mitigation for unvegetated eelgrass habitat lost due to dredging will not be required in this case, as this was determined not to be advantageous for the health of existing Harbor habitats. Because eelgrass in the East Basin declined in recent years while eelgrass expanded in the West Basin, it is possible the Project's mitigation component will result in more extensive and healthier vegetated eelgrass habitat within the Harbor than currently exists.

3.3 Essential Fish Habitat Conservation Recommendations

Based on information developed in our effects analysis (see preceding opinion), NMFS has determined that the proposed action would adversely affect EFH. Although adverse effects are anticipated as a result of the Project, the proposed minimization and avoidance measures, and best management practices described in the accompanying biological opinion are sufficient to avoid, minimize, and/or mitigate for the anticipated effects. Therefore, no additional EFH Conservation Recommendations are necessary at this time that would otherwise offset the adverse effects to EFH.

3.4 Supplemental Consultation

The Corps must reinitiate EFH consultation with NMFS if the proposed action is substantially revised in a way that may adversely affect EFH, or if new information becomes available that affects the basis for NMFS' EFH Conservation Recommendations (50 CFR 600.920(l)). This concludes the MSA portion of this consultation.

4 DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW

The Data Quality Act (DQA) specifies three components contributing to the quality of a document. They are utility, integrity, and objectivity. This section of the opinion addresses these DQA components, documents compliance with the DQA, and certifies that this opinion has undergone pre-dissemination review.

4.1 Utility

Utility principally refers to ensuring that the information contained in this consultation is helpful, serviceable, and beneficial to the intended users. The intended users of this opinion are the Corps. Other interested users could include SMCHD and other local stakeholders. Individual copies of this opinion were provided to the Corps and SMCHD. The document will be available within two weeks at the NOAA Library Institutional Repository [https://repository.library.noaa.gov/welcome]. The format and naming adheres to conventional standards for style.

4.2 Integrity

This consultation was completed on a computer system managed by NMFS in accordance with relevant information technology security policies and standards set out in Appendix III, 'Security of Automated Information Resources,' Office of Management and Budget Circular A-130; the Computer Security Act; and the Government Information Security Reform Act.

4.3 Objectivity

Information Product Category: Natural Resource Plan

Standards: This consultation and supporting documents are clear, concise, complete, and unbiased; and were developed using commonly accepted scientific research methods. They adhere to published standards including the NMFS ESA Consultation Handbook, ESA regulations, 50 CFR 402.01 et seq., and the MSA implementing regulations regarding EFH, 50 CFR 600.

Best Available Information: This consultation and supporting documents use the best available information, as referenced in the References section. The analyses in this opinion and EFH consultation contain more background on information sources and quality.

Referencing: All supporting materials, information, data and analyses are properly referenced, consistent with standard scientific referencing style.

Review Process: This consultation was drafted by NMFS staff with training in ESA and MSA implementation, and reviewed in accordance with West Coast Region ESA quality control and assurance processes.

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