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

October 3, 2023 **Refer to NMFS No:** WCRO-2022-02142

James Mazza
Regulatory Division Chief
Chief, South Branch, Regulatory Division
U.S. Army Corps of Engineers, San Francisco District
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 Johnson Pier Expansion and Dock Replacement Project (Corps File No. SPN-2019-00212S)

Dear Mr. Mazza;

Thank you for your letter of July 12, 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 Johnson Pier Expansion and Dock Replacement Project (Project) within Pillar Point Harbor in San Mateo County, California. The Corps of Engineers (Corps) proposes to provide authorization pursuant to Section 404 of the Clean Water Act of 1972, as amended (33 U.S.C. § 1344 et seq.), to San Mateo County Harbor District for the 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' description of the proposed Project and describes NMFS' analysis of potential effects on endangered black abalone (*Haliotis cracherodii*) and their critical habitat, threatened Central California Coast (CCC) steelhead (*Oncorhynchus mykiss*), endangered leatherback sea turtle (*Dermochelys coriacea*), threatened southern Distinct Population Segment (DPS) North American green sturgeon (*Acipenser medirostris*), 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 are minor,

temporary, or localized. 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 Supervisor 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, California at (831) 713-7620, 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: Caroline Frentzen, Corps San Francisco District, Caroline.A.Frentzen@usace.army.mil
Taylor Meyers, Moffatt and Nichol, tmeyers@moffattnichol.com
Copy to ARN File # 151422WCR2022SR00172

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

Johnson Pier Expansion and Dock Replacement Project
NMFS Consultation Number: WCRO-2022-02142
Action Agency: U. S. Army Corps of Engineers, Regulatory 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	No*	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	N/A	N/A
Leatherback Turtle (*Dermochelys coriacea*)	Endangered	No*	No	N/A	N/A
Sunflower sea star (*Pycnopodia helianthoides*)	Proposed Threatened	No*	No	N/A	N/A

* Please 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
California Coastal Office

Date: October 3, 2023

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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 July 12, 2022, NMFS received an email from the U.S. Army Corps of Engineers (Corps) that included 1) a letter requesting initiation of formal section 7 consultation with NMFS for potential impacts to CCC steelhead (*Onchorhynchus mykiss*), due to implementation of the proposed Project; and 2) a June 2022 application for Corps permit for the Project, including a Project Description and Biological Resources Assessment, submitted by the San Mateo County Harbor District (SMCHD; Applicant).

The Corps' letter included a determination that Project activities 'may effect, likely to adversely affect' CCC steelhead DPS. Additionally, the Corps determinations were: 'may effect, not likely to adversely affect' for black abalone, green sturgeon southern DPS, CCC coho salmon DPS, loggerhead sea turtle (*Caretta caretta*), green sea turtle (*Chelonia mydas*), and leatherback turtle as well as for critical habitats of green sturgeon southern DPS, CCC steelhead DPS, and leatherback turtle. The Corps requested EFH consultation in their incoming request letter; however, the only Fishery Management Plans (FMPs) listed as adversely impacted by the proposed Project were Pacific Groundfish and Coastal Pelagic Species. Because EFH for Pacific Salmon exists in the action area and may be impacted by the Project, affects to Pacific Salmon EFH were included in the biological opinion.

On September 1, 2022, NMFS requested additional information from the Corps regarding: clarification of methods proposed for pile driving and a recommendation to use a vibratory hammer; analysis of hydroacoustic impacts from pile driving on fish species; any existing fish surveys in the action area; agreement that pre-construction surveys for black abalone will be conducted; and explanation for the Corps determinations of some species and critical habitats. The Corps responded to NMFS' request via email on September 13, 2022, which provided some of the requested information and changed their determination for CCC steelhead to 'may effect, not likely to adversely affect' based on information provided by NMFS. On September 16, 2022, NMFS sent an email to the Corps requesting clarification of several of NMFS's original requests. The Corps replied by email on September 16 and provided more information, including a change in determination to 'may effect, likely to adversely affect' for green sturgeon.

On September 29, 2022, a meeting was held to discuss the Project. Representatives from NMFS, the Corps, and Moffett and Nichol (a Project consultant representing SMCHD) were in attendance. At the meeting, attendees discussed details about pile driving methods, the likely range of noise impacts for fish species, and whether mitigation was warranted. NMFS explained the potential impact to black abalone from Project activities and again requested a pre-construction survey to confirm presence. NMFS also again requested either a silt curtain to prevent potentially contaminated sediment from escaping the vicinity of the Johnson Pier (Pier) where hydraulic jetting would occur, or sediment testing to confirm sediment is not contaminated. To confirm the needed information, Moffett and Nichol agreed to follow-up with SMCHD after the meeting.

In October and November 2022, a series of emails from Moffett and Nichol confirmed some information about the Project including: that a pre-construction survey for black abalone on pilings and docks will be conducted, that either a silt curtain would be used during pile removal/hydraulic jetting or that sediment sampling would occur followed by appropriate mitigation measures as needed, and that construction is proposed to begin within the next six months but in-water work would not occur until approximately fall 2023.

On December 16, 2022, the Corps sent an email requesting formal consultation based on expected Project impacts on black abalone. In this email they included a determination for black abalone of 'may effect, likely to adversely affect.' The Corps also confirmed a change in their determination for green sturgeon to 'may effect, not likely to adversely affect' based on information provided by NMFS.

NMFS initiated consultation on December 19, 2022. On December 29, the Corps confirmed by email a change in determination to 'no effect' for CCC coho salmon, green sea turtle, and loggerhead sea turtle as well as for all critical habitats of ESA-listed aquatic species. NMFS conducted a site visit on January 23, 2023 to evaluate potential salmonid passage in Denniston Creek, a tributary to Pillar Point Harbor. In March 2023, NMFS Protected Resources Division (PRD) confirmed that black abalone critical habitat exists in the action area and may be impacted by Project activities. On March 29, 2023, the Corps sent an email to NMFS containing a determination that the Project was 'not likely to adversely affect' black abalone critical habitat. On April 2, 2023, the Applicant sent NMFS an email stating the California Coastal Commission had indicated they would require mitigation for additional overwater coverage proposed by the

Project. The details of the mitigation to be required were not provided and the consultation was paused until this information could be provided. Because of this delay, the due date for the consultation was extended to July 3, 2023 by agreement between NMFS and the Corps. On June 28, 2023, the Applicant notified NMFS that the California Coastal Commission would not require additional mitigation for the Project, but did provide some additional Best Management Practices. To allow for updating and reviewing the biological opinion, the due date for consultation was extended to September 1, 2023 by agreement among NMFS, the Corps, and the Applicant. On July 27, 2023, 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 repair, replace or expand portions of Johnson Pier and associated docks in Pillar Point Harbor, Half Moon Bay, CA. The proposal includes: removal of up to 190 concrete piles and wood piles, installation of up to 360 concrete piles, and replacement and expansion of seven floating docks. Work is proposed to start in 2023, but the timeframe for in-water work is unknown and is expected to extend multiple years through 2024 and beyond. Whenever feasible, Project activities will occur during September 16 to January 31 to minimize impacts to seabirds. The Project is expected to take multiple years to complete.

1.3.1 Demolition and Construction

The Project proposes to replace 1.12 acres of sunlight-permeable wooden dock with 1.54 acres of solid concrete dock within Pillar Point Marina (Marina). Johnson Pier (Pier) is currently supported by 12 to 14-inch-in-diameter by 50-feet long wood and concrete pilings. The Project proposes to remove 190 concrete guide pilings at docks D-H and 7 concrete square pilings at the

North Floats using vibratory extraction. All of the 55 creosote treated wood pilings at the North Timber Pier and 20 creosote-treated wood pilings at the East Pier will be removed using vibratory extraction or direct pull. Pilings will be removed fully if possible; however, if a piling breaks during removal it will be cut below the seafloor and the portion above the seafloor will be removed.

The Project proposes the replace six existing wooden docks, including five docks with boat slips and a fuel dock, along with the guide piles used to secure them in place. Guide piles will be removed with a vibratory hammer for approximately 40 days, with approximately 10 piles extracted per day, and placed on a floating barge for disposal. Removed dock material will be transported to the existing launch ramp, and a land-based crane will hoist them onto trucks for disposal off-site. The installation of pre-stressed concrete piles is proposed to be completed by impact pile driving using an impact hammer attached to a crane positioned on a crane barge or on the pier. Equipment and materials will be staged in the upper Marina parking lot and on Johnson Pier Road near the Marina. Materials for construction of new pilings, docks and fuel pumping facilities will be delivered with a floating barge or by utilizing the existing Pillar Point launch ramp.

Installation of new pilings for the Pier and docks will likely include a combination of impact hammer and hydraulic jetting. Due to the consistency of the substrate (mainly compacted mud), hydraulic jetting may be used to assist in pile installation, and to reduce the number of blows required to install each pile. Each of the 230 55-feet long, 16-inch-in-diameter, concrete or fiberglass piles (for docks) could take up to 3,000 strikes, and each of the 130 55-feet long, 24-inch-in-diameter, concrete piles (for pier) could take up to 4,000 strikes. Pile driving could occur for up to approximately 80 days, with approximately 5 pilings driven per day. Construction will take place over many months or years, so will not be completed within a single work season.

Construction equipment expected to be used for the Project includes: impact pile driver, vibratory pile driver/extractor, hydraulic jet for pile driving, jackhammer, power (electric and gas) saws, other power tools, land- and barge-based cranes, small powerboat, SCUBA equipment, trucks, and a floating barge.

1.3.2 Maintenance

SMCHD has not proposed maintenance for this Project after construction is complete. The current docks in Pillar Point Harbor have not needed any removal of encrusting invertebrates or algal growth, as this has not been significant enough to negatively impact the system (Taylor Meyers, personal communication, March 17, 2023). If maintenance is needed at a later date, reinitiation of this consultation or a separate consultation may be needed (see Section 262.10, Reinitiation of Consultation).

1.3.3 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 of the proposed AMMs, is provided in the application

materials (Moffatt and Nichol 2022), while others were agreed to by emails between NMFS, the Corps and the Applicant. Some of the AMMs most relevant to this biological opinion from that document are provided below.

To reduce contaminants from equipment entering the ocean during construction, AMMs will include: staging/storing/refueling equipment at least 100 feet from the Pacific Ocean and any freshwater stream/drainage channels; storing materials/chemicals where they cannot spill into the ocean; positioning stationary equipment at the Project site over drip pans; checking and maintaining equipment on a daily basis to prevent leaks; construction materials and spoils will be protected from stormwater runoff using temporary perimeter sediment barriers; and locating site washout areas at least 50 feet from a storm drain or surface water to prevent runoff flows entering water bodies. Prior to the onset of work, SMCHD will ensure a plan is in place for prompt and effective response to any accidental spills that do occur.

The Project contractor responsible for pile driving will be required to post and maintain the pile driving schedule onsite (Moffett and Nichol 2022). The contractor will update the schedule at least every two weeks for posting on the SMCHD's website. To reduce noise impacts on sea turtles and marine mammals related to pile driving, the following AMMs will be used:

- A "soft-" or "slow-start" technique will be used to allow sea turtles and marine mammals to vacate the impact area before the pile driver reaches full power (Moffett and Nichol 2022). When there has been downtime of 30 minutes or more during vibratory pile driving or extraction, the contractor will initiate the driving for 15 seconds at reduced energy, followed by a 1-minute waiting period, and repeat the procedure two additional times, before continuous driving is started. For impact driving, an initial set of three strikes would be made by the hammer at 40 percent energy, followed by a 1-minute waiting period, then two subsequent three-strike sets before initiating continuous driving.

- A 50-foot underwater "exclusion zone" for all sea turtles will be established during pile driving activities to minimize impacts of pile driving equipment on sea turtles. Visual monitoring of the monitoring zone by Project biologists will commence at least 30 minutes prior to the beginning of pile driving activities each day and after each break of more than 30 minutes. If a sea turtle is observed within the monitoring zone, all in-water project activities will cease. Project activities will not commence until the or sea turtle has either been observed having left the monitoring zone, or at least 15 minutes have passed since the last sighting whereby it is assumed the sea turtle has voluntarily left the monitoring zone. Pile installation activities will not occur if any part of the exclusion zones is obscured by weather or sea conditions.

To reduce turbidity and contamination of aquatic habitats in the action area, Project AMMs will include:

- For any work on or beneath fixed decks, heavy-duty mesh containment netting will be maintained below all work areas where construction discards or other materials could fall

into the water.

- A floating boom will be installed to contain any floating material falling into the water and the debris will be removed on a daily basis. Any floating debris will be retrieved immediately by small boat.
- Sections of the timber decking removed during construction will be cut at the beams and lifted as a unit to minimize cutting over the water.
- Demolished decking will be placed on the barge and transported to a licensed disposal site.
- Silt fences or equivalent devices will be installed above the waterline at the perimeter of the staging and equipment areas to prevent demolition and removal-related runoff and or sediment from entering adjacent coastal waters, to maximum extent feasible.
- Construction work or equipment operations shall be conducted at low tide, to the extent feasible.
- If hydraulic jetting is used during pile installation, a silt curtain would be installed to limit impacts from disturbed sediment on aquatic species and habitats, and/or testing of seafloor substrate for contaminants would be completed, to limit impacts from disturbed sediment on aquatic species and habitats (T. Meyers, personal communication, October 24, 2022).
    - The silt curtain would be deployed to the seafloor surface, likely using a barge. It would be deployed in the immediate vicinity of the construction activities, allowing for enough space around infrastructure that the contractor can work within the silt curtain. During expansion of Johnson Pier, the silt curtain will be installed around the expansion area. During floating dock installation/removal, the silt curtain will be deployed around the docks being installed/removed.
    - If sediment sampling is proposed by the applicant instead of a silt curtain, sediment will be collected to the depth expected to be disturbed, and will be analyzed using an effluent elutriate test. The elutriates would be used to estimate temporary water quality impacts due to the resuspension of sediments. The Dredging Elutriate Test (DRET) will be used to predict the concentration of contaminants in the water column at the point of disturbance. Samples will be prepared for analysis in accordance with procedures outlined in the DRET development (DiGiano et al. 1995). Elutriate samples will be analyzed for dissolved metals, polynuclear aromatic hydrocarbons (PAHs), chlorinated pesticides, Polychlorinated Biphenyls (PCBs), Dichlorodiphenyltrichloroethane (DDT), and other contaminants. All analytical methods will follow U.S. Environmental Protection Agency (EPA) protocols.
    - If analysis indicates sediment in the action area is contaminated at a level that could impact aquatic life or habitats (based on EPA established thresholds), additional mitigation measures will be used for the Project, including a silt curtain as described above (Taylor Meyers, personal communication, October 24, 2022).

Pre-construction Site Survey for Black Abalone

A pre-construction survey to determine presence of black abalone 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 pilings, docks and other subsurface infrastructure to be removed during the Project.

Methodology for this 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 avoidance and minimization measures before beginning any in-water work that could impact abalone. These measures 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.

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 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 the following species that may be found in the action area: CCC steelhead, green sturgeon southern DPS, leatherback turtle. Our concurrence is documented in the "Not Likely to Adversely Affect" Determinations section (Section 2.11).

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

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.

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 percent; populations south of Point Conception have declined by more than 90 percent (Neuman et al. 2010). Historical abalone harvest contributed to some degree, but the primary cause of these declines was withering syndrome (WS-RLO pathogen). 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 2.5º C 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. Recovering the species will involve protecting the remaining healthy populations to the north that have not yet been affected by the disease, and increasing the abundance and density of populations that have already been affected by the disease (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 Global Climate Change

One factor affecting the range-wide status of ESA-listed species and aquatic habitat at large is climate change. 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 habitat include sea level rise, changes to ocean water chemistry (e.g., ocean acidification), elevated ocean temperatures 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). 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"[1], 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. 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.

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 the Pillar Point Harbor, including the inner and outer Harbor areas. Although all work will occur within the inner Harbor, noise from pile driving and turbidity from construction may extend approximately 100 meters into the outer Harbor through the south entry point into the inner harbor. The construction site includes the Johnson Pier and associated docks within the Marina in the inner Harbor.

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

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

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 containing the 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. The L-shaped Johnson Pier (Pier), some vessel slips, and a fuel dock, were originally constructed in the 1960s after the outer breakwater was complete. The Pier extends approximately 572-feet from the shoreline into Half Moon Bay in a north-south trending orientation and runs approximately 268-feet east-west at the end. The Pier is comprised of concrete decking panels supported by concrete piles. The north-south section of the pier is approximately 30-feet wide while the east-west portion is approximately 72-feet wide. In 1982, an additional breakwater was constructed in three sections to surround and further protect the Pier and two associated floating docks (also added in 1982), thereby creating the 'inner Harbor' of approximately 73 acres. Six more floating docks were added to the Marina in 1987. Currently, the Pier and docks include 369 vessel slips, several buildings, as well as a fuel dock (Figure 2). The outer Harbor contains anchorages for vessels and a boat launch ramp on the east side. The inner and outer Harbors are heavily used by recreational, fishing, and small commercial vessels. The Harbor is protected from large ocean waves, except in the strongest winter storms when waves may overtop the breakwaters.

The Harbor is 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 beaches. Water depth within the inner Harbor ranges from 0 to 13 feet at mean lower low water (Moffatt and Nichol 2022). The seafloor within the inner Harbor is mostly sand and mud, with some submerged aquatic vegetation (no eelgrass has been observed). The submerged portions of Pier pilings and floating docks in the inner Harbor serve as habitat to a variety of invertebrates and algae (Figure 3). 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 East Harbor Basin where boat traffic enters the inner Harbor (Marine Taxonomic Services 2020). The outer Harbor seafloor is mostly sand and mud. Eelgrass within the outer Harbor has been observed since the mid-2000s and as of May 2023 occurs in the East Harbor basin mainly along the eastern outer

breakwater and in the southwest corner of the West Harbor Basin (MTS 2023). Rocky reef and cobble habitats are interspersed with sand and mud in the West Harbor Basin near Pillar Point.

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

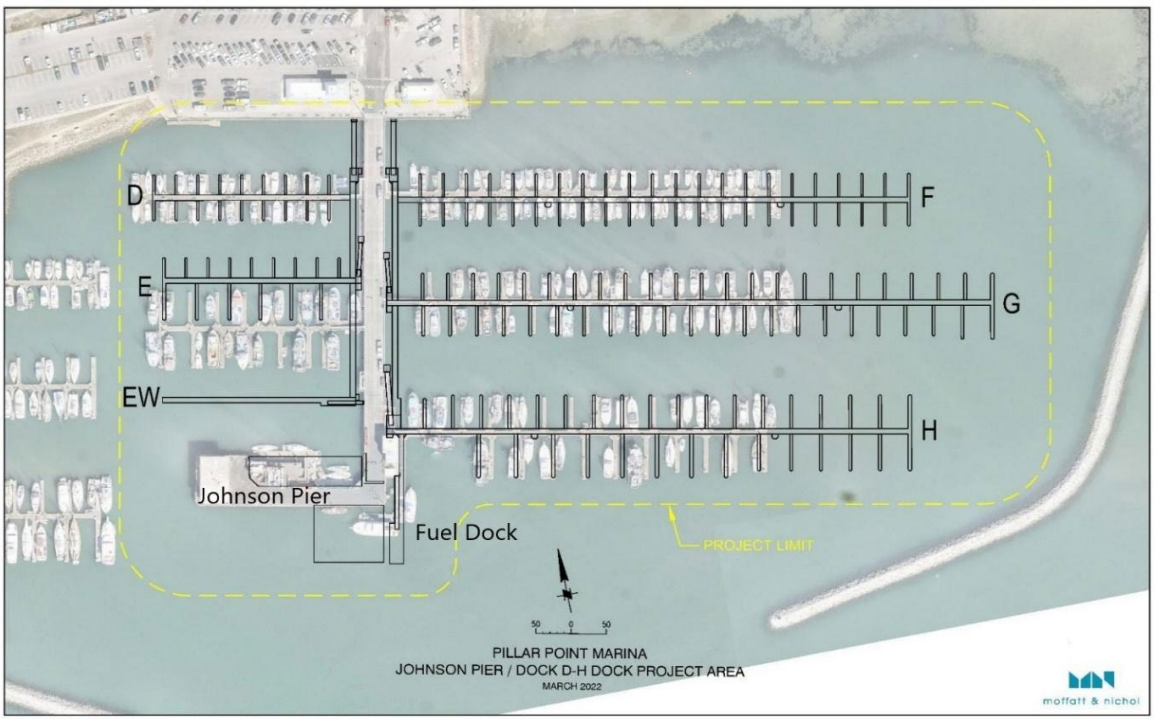

Figure 2. Pillar Point Marina construction area (dotted yellow line) within the Pillar Point Inner Harbor (Moffatt and Nichol 2022).

Figure 3. Photo of encrusting organisms on a floating dock to be removed during the Project (Moffatt and Nichol 2022).

2.4.2 Status of Black Abalone 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 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 only known survey for abalone in the vicinity of the action area, by Raimondi (2015), found black abalone in the intertidal zone at Pillar Point (outside the Harbor). However, the habitat where abalone were found near Pillar Point (rocky intertidal) is drastically different than the submerged infrastructure in the action area, and is subject to potential poaching and predation that is unlikely within the inner Harbor. 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 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. Prior to construction of the outer Harbor breakwater (1960s) and inner Harbor breakwater (1980s), black abalone may have been present in rock habitats near Pillar Point that are now enclosed by the outer breakwater and may have persisted within the Harbor on natural rock, rip-rap, or other submerged infrastructure. Surveys for black abalone have not been conducted within the Pillar Point Harbor, therefore it is uncertain whether or how many black abalone exist inside the Harbor.

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. 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.

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 Demolition/Removal of Submerged Infrastructure

Portions of the existing pier will be removed from the water intact or demolished and removed in pieces. Black abalone have been observed attached to submerged solid infrastructure, such as docks and pilings, in areas of the California coast. As surveys have not yet been conducted for black abalone in the action area, it is possible that black abalone may be found on the submerged infrastructure proposed to be removed during the Project. If not relocated prior to demolition/removal of infrastructure, black abalone could be directly injured or killed, or removed from the water while attached to infrastructure to later perish. Pre-construction surveys for abalone on submerged structures in the Marina will be conducted prior to demolition activities and surveyors are expected to observe all abalone present. If abalone are observed on infrastructure likely to be demolished or nearby, the Applicant will coordinate with NMFS to relocate them to suitable habitat outside of the construction area or otherwise mitigate for their presence (see Section 2.5.3). These measures are expected to avoid impacts from these Project actions to black abalone. Although proposed removal of infrastructure during the Project would also remove attached macroalgae that may serve as food for black abalone; however, the new infrastructure installed during the Project should allow for algae growth to recover within a few months. As any abalone present in the area would be relocated, the temporary loss of algae on the Pier and docks is unlikely to impact black abalone.

2.5.2 Increased Structure, Shade and Fill

Underwater shading will increase in the Project area through increased overwater structure and the materials used. The Project will result in up to approximately 30,700 sq. ft of additional overwater infrastructure coverage, with roughly 18,100 sq. ft of the increase due to larger floating docks and the remainder due to expansion of the Pier (Table 1). As part of these activities, sunlight-permeable wooden docks will be replaced with solid concrete docks. Although shade does not impact black abalone directly, their food source (algae) can be impacted by shade. Submerged Aquatic Vegetation (SAV) in the inner Harbor is not expected to

include eelgrass or kelp based on recent surveys (Rincon Consultants 2022). Much of the existing SAV in the inner Harbor consists of algae attached to submerged infrastructure in the Marina, or attached on breakwater rocks (Rincon Consultants 2022). The larger docks will provide more space for algal growth in the Marina in areas exposed to sunlight; however, these changes will also reduce algal growth below docks and on pilings due to increased shading from larger and non-sunlight permeable docks. The net change in algae present on the Pier and docks due to increased structure and shade is uncertain, but these structures are considered poor habitat for black abalone due to less refuge and food sources compared to natural rocky reef habitat or rip-rap composing breakwaters (i.e., critical habitat areas). Therefore, any permanent loss of macroalgae food supplies in the area due to shading would likely have minimal impacts on black abalone.

The Project will add significant amounts of underwater fill with new pilings. Pile installation will result in up to approximately 480 sq. ft of additional permanent benthic habitat impacts at the base of new pilings (Table 2). New pilings will take up approximately 22,734 cubic ft of additional fill in the water column below mean higher high water (MHHW). The addition of more submerged infrastructure would not negatively affect black abalone and could allow black abalone more area to attach. Black abalone are unlikely to be using the benthic habitat that would be filled by this work, as it is primarily mud/sand. Therefore, additional fill is not expected to impact black abalone.

Table 1. Proposed net change in overwater cover due to Project activities (T. Meyers, personal communication, February 10, 2023).

Project Activity	**Net Overwater Cover**
North Expansion	+7,200 sf
South Expansion	+8,500 sf
North Timber Pier Removal	-2,500 sf
East Timber Pier Removal	- 600 sf
Floating Dock and Fuel Dock Replacement	+20,000 sf
North Floats Removal	- 1,900 sf
Total	30,700 sf

Table 2. Proposed net change in fill due to piling removal and installation (T. Meyers, personal communication, February 13, 2023).

Project Activity	Piles Installed (+)/ Removed (-)	Benthic Habitat Impacts (sq. ft)	Fill Impacts below MHHW (cu. ft)
North Expansion	+60, 24-inch precast concrete	+205	+8,370
South Expansion	+60, 24-inch precast concrete	+205	+8,370
North Timber Pier Removal	-55, 14-inch treated timber	-55	-2,430
North Floats Removal	-10, 12 to 14-inch square	-10	-432
East Timber Pier Removal	-20, 12 to 14-inch square	-20	-864
Floating Dock and Fuel Dock Removal	-190, 14-inch square concrete	-255	-12,825
Floating Dock and Fuel Dock Replacement	+215, 16-inch square concrete + 15, 24-inch octagonal precast concrete	+410	+22,545
Total		+480	+22,734

2.5.3 Black Abalone Relocation

SMCHD proposes to conduct a pre-construction survey for black abalone on submerged infrastructure to be removed (see Section 1.3.3) and, if any are observed, 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 submerged infrastructure that avoid observation during the survey may be exposed to risks from removal of infrastructure described in section 2.5.1. However, NMFS assumes that all black abalone present on submerged infrastructure to be removed 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 on infrastructure to be removed/demolished, due to abalone entering the action area after the survey or for other reasons, operations would cease and NMFS will be notified to discuss options. If black abalone are observed during the pre-construction survey attached to infrastructure that is not planned to be removed during the project, NMFS will be contacted to determine if additional AMMs will be required in addition to avoiding equipment contact with abalone.

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 (see Section 2.4), or in

similar habitats elsewhere on the California coast, 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 Pillar Point Harbor. 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 2022a). An additional 13 percent of individual black abalone that are relocated will perish after relocation (1 additional individual out of 10 encountered) (NMFS 2022a). 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 within the Marina. Black abalone relocated outside of the Harbor will also potentially contribute more to species recovery, as the Harbor breakwaters cause disconnection of most adult movement and larval transport out of the Harbor.

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.

2.5.4 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.

Installation and removal of pilings, and removal of docks will disturb and displace seafloor sediment (see Section 1.3.1). The construction activities will occur over substrate that is primarily sand and mud. Large grained sediment (sand) will settle fairly rapidly back to the seafloor, whereas fine grained sediment (mud and silt) may remain suspended for a longer timeframe. Sediment and other matter attached to submerged infrastructure that may be mobilized during removal of pilings and docks is expected to be fine-grained material. Although

the overall Project will require multiple years to complete, turbidity increases will occur over shorter time periods (i.e., days to weeks) within the overall Project timeline. Currents within the Harbor will likely disperse suspended sediment to ambient levels within several days following turbidity generating events.

If black abalone are exposed to sufficiently high turbidity due to Project activities, respiration could be inhibited or suffocation could occur. Black abalone located on submerged infrastructure within the Marina will be relocated from the area in which turbidity plumes would occur. Dispersion of sediment from currents in the Harbor will likely result in exposure of individuals elsewhere in the inner harbor (i.e., on rocks or infrastructure not to be removed) to less concentrated turbidity plumes. If contractors for SMCHD use a silt curtain, dispersion of turbidity will be primarily limited to the immediate construction area in the marina (Figure 2). Pillar Point Marina construction area (dotted yellow line) within the Pillar Point Inner Harbor (Moffatt and Nichol 2022).), preventing black abalone located elsewhere in the Harbor from being exposed to turbidity levels above ambient conditions. If a silt curtain is not used, turbidity effects will be greater for any black abalone on rock habitats within the inner Harbor. However, 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 considers effects to black abalone associated with exposure to elevated turbidity from Project activities to be minimal.

2.5.5 Construction-related Contaminants and Contaminated Sediment

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). 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 site 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 PAHs, PCBs, DDT, and heavy metals. As noted above, any abalone found in the pre-construction survey will be relocated. Additionally, if a silt curtain is not used during construction to contain contaminants that may be present in disturbed sediment, sediment sampling will be required as outlined in Section 1.3.3. If sediment sampling finds contamination above established thresholds, further mitigation will be required, including a

silt curtain. Any abalone located in the inner Harbor further away from the construction site, such as the inner breakwater, could be exposed to contaminants from disturbed sediment carried by currents at low concentrations over short durations. Dispersion and/or a silt curtain will reduce exposure of abalone to this impact. Exposure of these individuals to low concentrations of sediment-borne contaminants over short durations is not expected to reduce their fitness. Therefore, impacts from contaminated sediments are expected to be minor.

2.5.6 Construction-Related Noise

The nearest pile driving location to the inner breakwater is 348 feet, as estimated by the Project applicant (T. Meyers, personal communication, September 27, 2022). Based on acoustic impact analysis using the NMFS acoustic impact calculator (calculator), the distance for physical injury to fish due to pile driving is 382 feet without noise barriers. However, a large breakwater composed of boulders (i.e., rip rap) surrounds the inner Harbor where the Project work will occur, with a relatively narrow opening on the south side for boats from the Marina to exit into the outer Harbor (Figure 1). NMFS expects the inner breakwater in Pillar Point Harbor will serve to attenuate much of the acoustic noise from pile driving. Research from acoustic noise produced within Monterey Harbor (on the central California coast) indicated approximately 10 decibels of attenuation due to a similar type of breakwater structure (Illingworth and Rodkin 2018). Using this rate of attenuation, the NMFS calculator estimates up to 82 feet of physical injury for fish from pile driving sites in the action area. This method of determining attenuation is considered by acoustic experts at the California Department of Transportation to be valid for estimating impacts to fish species (Ryan Pommerenck, personal communication September 28, 2022). Additionally, SMCHD agreed to conduct hydroacoustic monitoring outside the breakwater during a portion of the pile driving operations to confirm that sound is attenuated as expected. However, abalone are not known to have dedicated auditory structures (Bevelander 1988) and impacts from noise have not been tested. Research has shown bivalves (also in the phylum Mollusca) are affected by high intensity sound such as pile driving (Sole´ et al. 2023), but the threshold (i.e, distance) for physical injury for abalone from pile driving noise is unknown and they may not be affected at all. Any abalone found during pre-construction surveys (see Section 1.3.3) on submerged infrastructure to be demolished will be relocated after consultation with NMFS, which will avoid impacts to these individuals from pile driving. Effects of pile driving noise on black abalone potentially located elsewhere within the inner Harbor, such as on the pilings not being removed or the inner breakwater rocks, are expected to be minor due to greater distance from the pile driving and lack of evidence for impacts to abalone from pile driving noise. Beyond the impact of noise from pile driving, boats used during construction will add to the overall noise within the inner harbor through. Noise from gas- or diesel-powered boat engines and propellers will be minor compared to pile driving noise and this type of noise is commonplace within the busy Marina. Overall, noise impacts from the Project on black abalone are expected to be minor due to AMMs and lack of evidence for effects of noise on this species.

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.

The Project includes the removal, rebuilding and expansion of Johnson Pier and associated docks within Pillar Point Harbor. It is unknown whether black abalone persist in the action area, as surveys for black abalone have not occurred. However, black abalone were observed by researchers near the Harbor. Habitat that could support black abalone exists within the action area, including infrastructure planned for removal during the Project. Therefore, NMFS concludes a small number of black abalone are likely to be present in the action area during Project activities. NMFS requires a pre-construction black abalone survey to determine presence of abalone on submerged infrastructure within the Marina.

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

As described in Section 2.5, NMFS identified the following components of the Project that may result in effects to black abalone: demolition and removal of infrastructure, additional structure, black abalone relocation, sediment mobilization, contaminants and construction-related noise. Demolition and removal of infrastructure is not expected to cause impacts to black abalone, as they would be relocated out of the action area prior to these activities. Additional structure, and resulting shade may reduce algae food sources temporarily, but these effects are expected to be minor, and additional fill is unlikely to impact black abalone. Proposed AMMs will minimize turbidity and contaminants to levels that will result in only minor effects to black abalone. It is unknown whether noise from pile driving could impact black abalone, but relocation of abalone from infrastructure to be removed and distance to areas where other abalone may be found will

result in minor effects. 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 submerged infrastructure to be removed 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 2022a). 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 Pillar Point Harbor would represent a small portion of black abalone currently found on the central California coast. Habitat within the Marina, 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 and lack of shelter from predators. Black abalone within the Harbor likely contribute little to species recovery due to the Harbor breakwaters, which cause disconnection of most adult movement and larval transport from inside the Harbor to nearby coastal habitat. Relocating black abalone in harm's way from the Project to outside the Harbor will reduce risk of mortality for these individuals. Relocation of abalone could also provide a benefit for the species by reducing disconnection with other black abalone outside the Harbor. 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, 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 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.

2.8.1 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 Project activities to remove submerged infrastructure. 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 present on submerged infrastructure to be removed for the duration of the Project, 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.

2.8.2 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.

2.8.3 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 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.

2.8.4 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, the Corps or applicant must contact NMFS to discuss relocation or avoidance procedures prior to beginning in-water Project work. 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 relocation 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 2.10). 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.
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 survey and 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 applicants 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 removal of submerged infrastructure in the action area. 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.

2.9 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.

2.10 Reinitiation of Consultation

This concludes formal consultation for the Johnson Pier Expansion and Dock Repair 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."

2.11 "Not Likely to Adversely Affect" Determinations

2.11.1 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 *Onchorhynchus 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.

Noise impacts that could harm steelhead migrating or foraging in the outer Harbor or Denniston Creek are not expected to extend beyond the inner Harbor due to attenuation created by the inner breakwater (see Section 2.5.6). The Applicant will monitor underwater sound during pile driving to confirm expected levels in the outer Harbor. Turbidity from Project activities may extend up to 100 meters into the outer Harbor, and proposed AMMs will help to reduce impacts to

steelhead to a minor level (see Section 1.3.3). Based on the analysis above, NMFS concurs with the Corps determination that the Project is not likely to adversely affect CCC steelhead.

2.11.2 Southern DPS Green Sturgeon

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 2018). 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 inner Harbor during Project activities, they may be impacted by noise or reduced water quality. However, due to overall poor-quality habitat in the inner Harbor, and the overall low abundance of the DPS, they are unlikely to be found in the inner Harbor. Pile driving will occur in the inner Harbor and fish in the outer Harbor, where green sturgeon are likely more common, are not expected to be impacted by pile driving noise due to sound attenuation by the inner breakwater (see Section 2.5.6). Effects on water quality associated with the Project are not expected to negatively affect green sturgeon in the outer Harbor due to proposed AMMs that would likely confine such impacts to the inner Harbor (see Section 1.3.3). Based on the analysis above, NMFS concurs with the Corps that Southern DPS green sturgeon are not likely to be adversely affected by the Project.

2.11.3 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 (2014) 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 inner Harbor during Project activities, they may be impacted by noise from pile driving or reduced water quality. However, due to overall low prey availability, high vessel traffic, and the overall low abundance of the DPS, leatherback are unlikely to be found in the inner Harbor. Pile driving will occur in the inner Harbor and animals in the outer Harbor are not expected to be impacted by pile driving noise due to sound

attenuation by the inner breakwater (see Section 2.5.6). To minimize impacts on sea turtles from pile driving noise, an exclusion zone will be monitored and a 'soft start' pile driving technique will be used (see Section 1.3.3; Moffatt and Nichol 2022). Effects on water quality associated with the Project are not expected to negatively affect any leatherback occurring in the outer Harbor due to proposed AMMs that will confine most of these impacts to the inner Harbor (see Section 1.3.3). Based on the analysis above, NMFS concurs with the Corps' determination that the Project is not likely to adversely affect leatherback turtle.

2.11.4 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 waters from the intertidal to at least 435 m deep and occurs over a broad array of soft-, mixed-, and hard-bottom habitats from the Aleutian Islands, AK, to Baja California, MX (NMFS 2022b). The species is a broadcast spawner with a planktonic larval stage, facilitating current-driven distribution of offspring. Reproduction also occurs via larval cloning, enhancing potential reproductive output beyond female fecundity. Sunflower sea star hunts a range of bivalves, gastropods, crustaceans, and other invertebrates using chemosensory stimuli and is well known to dig for preferred prey in soft sediment. Through top-down predatory control of sea urchins and other kelp predators, sunflower sea star fills the role of a keystone mesopredator. The species also scavenges fish, birds, and octopus as available. While generally solitary, and highly competitive with conspecifics, sunflower sea star is known to seasonally aggregate, potentially for spawning (NMFS 2022b).

Prior to 2013, the global abundance of sunflower sea star was estimated at several billion animals, but from 2013-17 sea star wasting syndrome (SSWS) reached pandemic levels, killing an estimated 90 percent of the population (NMFS 2022b). Impacts varied by region across the range of the species and generally progressed from south to north. By 2017, sunflower sea star was rare south of Cape Flattery, WA, in areas where it had long been an important component of benthic marine ecosystems. Declines in coastal British Columbia and the Aleutian Islands were less pronounced, but still likely exceeded 80 percent. While the cause of SSWS has not been identified, dozens of independent monitoring efforts have documented similar declines in abundance, and sometimes spatial distribution, without subsequent recovery. Environmental factors such as temperature and dissolved oxygen likely contributed to the pandemic, and continue to interact with the disease agent to suppress recovery, but studies have failed to document conclusive linkages that apply on broad scales.

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 in or near Pillar Point Harbor; however, given the documented population decline in central California, this is highly unlikely. Records from the Multi-Agency Rocky Intertidal Network (MARINe 2023) 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 2023). Pier and dock removal and installation for the Project will disturb a very small portion of sunflower sea stars' habitat, therefore we do not expect sea stars will be exposed to the construction activities given their current very low population density across the central California coast. In addition, as sea stars are habitat generalists and could use the disturbed area, we conclude that effects on sunflower sea star from Project induced changes in sea star habitat would be insignificant. Based on the above analysis, NMFS' determination is the Project is not likely to adversely affect sunflower sea stars.

2.11.5 Black Abalone Critical Habitat

NMFS designated critical habitat for black abalone in 2011 (76 FR 66806). The designation encompasses rocky intertidal and subtidal habitat (from the mean higher high water, MHHW, line to a depth of -6m relative to the mean lower low water, line) within five segments of the California coast. 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., 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.

Rocky intertidal and subtidal habitats from Moss Beach to Pescadero State Beach, San Mateo County, CA are designated as critical habitat for black abalone and overlap with the action area in Pillar Point Harbor. NMFS (2011) indicates that all of the PCEs for black abalone critical habitat were present in this area with a quality ranging from poor to good. This area also lies to the north of areas that have experienced population declines, and habitat in this area may provide a valuable refuge from the effects of withering syndrome (NMFS 2011). Areas of natural rocky intertidal and subtidal habitat within the Pillar Point Harbor are limited to the far western side of the Harbor at Pillar Point. However, a large amount of potential black abalone habitat exists in the Harbor in the form of the rip-rap (i.e., stacked boulder) inner and outer breakwaters. The Harbor breakwaters are considered part of black abalone critical habitat, as they are within the depth and spatial ranges defined in NMFS (2011).

Black abalone critical habitat within the action area that may be impacted by Project activities includes the inside of the inner breakwater and potentially other rock habitat in the Harbor. Effects may include turbidity, addition of new overwater coverage, and contamination from construction and sediments. Water quality effects (turbidity and contamination) associated with the Project are not expected to negatively affect black abalone critical habitat in the outer Harbor as proposed AMMs would likely confine such impacts to the inner Harbor (see Section 1.3.3); therefore, these effects were considered discountable. Water quality effects within the inner Harbor may occur, but if a silt curtain is used these impacts will likely be concentrated at the Marina, away from rock habitat on the breakwater. If a silt curtain is not used, sediment will be tested for contamination to ensure that aquatic species are not harmed by sediment mobilized by hydraulic jetting during the Project. If a silt curtain is not used, and sediment is not contaminated (necessitating further AMMs), the main water quality impact on the inner breakwater would be

from turbidity. Turbidity will be episodic during different phases of the Project, which could take years to complete, but will be temporary. As turbidity will be temporary, effects such as smothering of black abalone or their food sources (algae) on the breakwater, are expected to be insignificant. Addition of new overwater coverage through expansion of the Pier and associated docks is not expected to impact black abalone critical habitat located on the Harbor breakwaters. The Pier and docks are located far enough from the breakwaters to avoid any effects from shading or other impacts resulting from infrastructure removal and construction, therefore these effects are considered discountable. Based on the analysis above, NMFS concurs with the Corps' determination that the Project is not likely to adversely affect black abalone critical habitat.

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 partly based on the EFH assessment provided by the Corps. The analysis also relies on descriptions of EFH within FMPs for Pacific Coast Groundfish, Coastal Pelagic Species, and Pacific Coast Salmon. Each FMP was developed by the Pacific Fishery Management Council 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.

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, underwater noise from the Project will be substantial within the inner Harbor. Any fish, sea turtle or marine mammal species in the inner Harbor during pile driving could be impacted by noise. Impacts of noise on invertebrates in the inner Harbor are less likely, but may also occur. Although NMFS recommended use of alternative pile driving methods (e.g., vibratory hammer) to minimize noise impacts on aquatic species, SMCHD indicated this method would not be feasible and that use of an impact hammer is required due to seafloor sediment composition. As described in the opinion above, minimization measures (visual observations and soft start to pile driving) will be used to reduce noise impacts on sea turtles and marine mammals but are not expected to reduce impacts for fish and invertebrates in the inner Harbor. As explained in the opinion above, noise impacts are not expected to extend to the outer Harbor, where habitat is generally superior for aquatic species relative to the inner Harbor. Although EFH for Pacific groundfish, coastal pelagic species, and Pacific Coast salmon will be impacted in the inner Harbor by noise from pile driving, salmonids are not expected to forage within the inner Harbor, while groundfish and coastal pelagic species are expected to do so infrequently. Prey resources for these species are expected to become re-established subsequent to noise impacts.

As described in the opinion above, degraded water quality is expected to be temporary and limited to the inner Harbor. Turbidity produced by infrastructure removal, hydraulic jetting and pile driving may impair the ability of fish species to feed within the Harbor or smother benthic invertebrates. A silt curtain may be used to limit water quality impacts to the Marina; alternatively, in lieu of using a silt curtain, SMCHD must demonstrate sediment is not contaminated above EPA thresholds for impacts to aquatic biota. Turbidity effects will be high within the inner Harbor at times during Project activities, but will be temporary, as suspended sediment will eventually settle or be dispersed by currents after in-water work is complete. Impacts to eelgrass present in the outer Harbor (East and West Harbor Basins) are not expected, as turbidity effects in the outer Harbor are expected to be minor and temporary.

Benthic disturbance will include temporary impacts from hydraulic jetting and piling removal, as well as permanent effects from pile driving and expansion of pilings. Pile installation activities will result in up to approximately 480 sq. ft of permanent benthic habitat impacts and up to 840 cubic yards of fill below MHHW. The benthic habitat within the Marina is poor quality due to anthropogenic impacts from constructing the Pier and docks, and heavy use by vessels. NMFS expects the benthic community in the inner Harbor to recover within several months after disturbance, based on a relevant scientific study of benthic disturbance within a Harbor on the central California coast (Oliver et al. 1977). Although benthic prey resources may be temporarily reduced, most of the benthos in the inner Harbor (and all of the outer Harbor) will not be impacted by Project activities, leaving large areas of prey resources unaffected and available for foraging. Impacts to eelgrass present in the outer Harbor are not expected, as benthic disturbance will be limited to the inner Harbor.

Additional overwater cover added by the Project will create more underwater shade in the action area, potentially reducing SAV. Section 2.5.2 analyzes impacts from shading on macroalgae (one type of SAV), which serves as a food source for black abalone. Although there is likely to be impacts to EFH from increased shade, additional impacts to SAV beyond those analyzed in Section 2.5.2 are not expected.

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 adhere 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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