UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
1201 NE Lloyd Boulevard, Suite 1100
PORTLAND, OR 97232-1274

**Refer to NMFS Consultation No.:**
**WCRO-2019-00110**

October 24, 2019

Michelle Walker
Chief, Regulatory Branch
U.S. Army Corps of Engineers, Seattle District
Regulatory Branch CENSW-OD-RG
P.O. Box 3755
Seattle, Washington 98124-3755

Re: Endangered Species Act Section 7(a)(2) Biological Opinion, and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Port of Anacortes A-Dock Replacement Project in Anacortes, Washington (Corps No. NWS-2017-1125)

Dear Ms. Walker:

Thank you for your letter on April 30, 2019, requesting initiation of consultation with the National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NMFS) pursuant to section 7 of the Endangered Species Act of 1973 (ESA) (16 USC 1531 et seq.) for the proposed Port of Anacortes A-Dock Replacement Project in Anacortes, Washington. 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 (MSA) (16 USC 1855(b)) for this action.

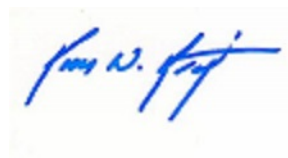
The enclosed document contains the biological opinion (Opinion) prepared by NMFS pursuant to section 7(a)(2) of the ESA on the effects of the proposed action. In this Opinion, NMFS concludes that the proposed action is not likely to jeopardize the continued existence of Puget Sound (PS) Chinook salmon, PS steelhead, Puget Sound/Georgia Basin (PS/GB) bocaccio, PS/GB yelloweye rockfish, humpback whales, and Southern Resident Killer Whales (SRKW). NMFS also concludes that the proposed action is not likely to result in the destruction or adverse modification of designated critical habitat for PS Chinook salmon, PS/GB bocaccio, and SRKW.

As required by section 7 of the ESA, we are providing an incidental take statement with the opinion. The incidental take statement describes reasonable and prudent measures we consider necessary or appropriate to minimize incidental take associated with this action. The take statement sets forth nondiscretionary terms and conditions, including reporting requirements that the United States Army Corps of Engineers (Corps) and any person who performs the action must comply with to carry out the reasonable and prudent measures. Incidental take from actions that meet these terms and conditions will be exempt from the ESA take prohibition.

NMFS also reviewed the likely effects of the proposed action on essential fish habitat (EFH), pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (16 USC 1855(b)), and concluded that the action would adversely affect the EFH of Pacific Coast groundfish, coastal pelagic species, and Pacific Coast salmon. Therefore, we have included the results of that review in Section 3 of this document.

Please contact Melaina Wright, consulting biologist at the Oregon Washington Coastal Office (OWCO) at melaina.wright@noaa.gov or 206-526-6155 if you have any questions concerning this consultation, or if you require additional information.

Sincerely,



Kim W. Kratz, Ph.D.
Assistant Regional Administrator
Oregon Washington Coastal Office

cc: Ronald Wilcox, Corps
Juliana Houghton, Corps

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

Port of Anacortes A-Dock Replacement Project
Skagit County, Washington
(Corps No. NWS-2017-1125)

**NMFS Consultation Number**: WCRO-2019-00110

**Action Agency:** United States Army Corps of Engineers, Seattle 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? |
|---|---|---|---|---|---|
| Puget Sound Chinook salmon (*Oncorhynchus tshawytscha*) | Threatened | Yes | No | Yes | No |
| Puget Sound steelhead (*O. mykiss*) | Threatened | Yes | No | NA | NA |
| Puget Sound/ Georgia Basin yelloweye rockfish (*Sebastes ruberrimus*) | Threatened | Yes | No | NA | NA |
| Puget Sound/ Georgia Basin bocaccio (*S. paucispinis*) | Endangered | Yes | No | Yes | No |
| Southern Resident killer whale (*Orcinus orca*) | Endangered | No | No | No | No |
| Humpback whale Mexico DPS (*Megaptera novaeanglia*) | Threatened | No | No | NA | NA |
| Humpback whale Central America DPS (*M. novaeanglia*) | Endangered | No | No | NA | NA |

| 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 | Yes |
| Pacific Coast Groundfish | Yes | Yes |
| Coastal Pelagic Species | Yes | Yes |

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

Issued By:

Kim W. Kratz, Ph.D.
Assistant Regional Administrator
Oregon Washington Coastal Office

Date: October 24, 2019

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LIST OF ACRONYMS

ºC – Degrees Celsius
ºF – Degrees Fahrenheit
BE – Biological Evaluation
CFR – Code of Federal Regulations
Corps – United States Army Corps of Engineers
dB – Decibels
DO – Dissolved Oxygen
DPS – Distinct Population Segment
DQA – Data Quality Act
Ecology – Washington State Department of Ecology
EF – Essential Features
EFH – Essential Fish Habitat
ESA – Endangered Species Act
ESU – Evolutionarily Significant Unit
FR – Federal Register
HAPC – Habitat Area of Particular Concern
HPA – Hydraulic Project Approval
ITS – Incidental Take Statement
LED – Light Emitting Diode
mg/L – Milligrams per Liter
MHHW – Mean Higher High Water Line
MLLW – Mean Lower Low Water Line
MPG – Major Population Group
MSA – Magnuson-Stevens Fishery Conservation and Management Act
NLAA – Not Likely to Adversely Affect
NMFS – National Marine Fisheries Service
NOAA – National Oceanic and Atmospheric Administration
NWFSC – Northwest Fisheries Science Center
OHW – Ordinary High Water Mark
Opinion – Biological Opinion
OWCO – Oregon Washington Coastal Office
PAH – Polycyclic Aromatic Hydrocarbon
PBF – Physical and Biological Feature
PCB – Polychlorinated Biphenyl
PFMC – Pacific Fishery Management Council
PCE – Primary Constituent Element
PS – Puget Sound
PS/GB – Puget Sound/Georgia Basin
RMS – Root Mean Square Sound Pressure Level
ROV – Remotely Operated Underwater Vehicle
RPA – Reasonable and Prudent Alternative
RPM – Reasonable and Prudent Measure
SAV – Submerged Aquatic Vegetation
SEL – Sound Exposure Level

$SEL_{cum}$ – Cumulative Sound Exposure Level
SRKW – Southern Resident Killer Whale
TRT – Technical Recovery Team
TSS – Total Suspended Solids
μg/L – Micrograms Per Liter
USC – United States Code
VSP – Viable Salmon Population
WCR – West Coast Region
WDFW – Washington State Department of Fish and Wildlife

# 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

The 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 USC 1531 et seq.), and implementing regulations at 50 CFR 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 USC 1801 et seq.) and implementing regulations at 50 CFR 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). A complete record of this consultation is on file at the Oregon Washington Coastal Area Office.

## 1.2. Consultation History

On March 21, 2019, NMFS received a request to initiate ESA section 7 consultation from the United States Army Corps of Engineers (Corps). The initiation package included an ESA section 7 consultation initiation letter; biological evaluation (BE); Hydraulic Project Approval (HPA) from the Washington State Department of Fish and Wildlife (WDFW); project drawings; eelgrass survey; and mitigation plan. The Corps determined the action may affect but is not likely to adversely affect (NLAA) Puget Sound (PS) Chinook salmon and their critical habitat, PS steelhead, and Puget Sound/Georgia Basin (PS/GB) bocaccio rockfish and their critical habitat. The Corps determined the action would have no effect on PS/GB yelloweye rockfish, Southern Resident killer whales (SRKW) and their critical habitat, humpback whales, and leatherback sea turtles. The Corps also determined that the project would not adversely affect Pacific salmon EFH, Pacific groundfish EFH, and coastal pelagic species EFH.

On April 25, 2019, we informed the Corps that we could not concur with all of their effects determinations. On April 30, 2019, the Corps requested formal consultation with NMFS. Consultation was initiated on that date.

Updates to the regulations governing interagency consultation (50 CFR part 402) will become effective on October 28, 2019 [84 FR 44976]. Because this consultation was pending and will be completed prior to that time, we are applying the previous regulations to the consultation. However, as the preamble to the final rule adopting the new regulations noted, “[t]his final rule does not lower or raise the bar on section 7 consultations, and it does not alter what is required or analyzed during a consultation. Instead, it improves clarity and consistency, streamline consultations, and codifies existing practice.” Thus, the updated regulations would not be expected to alter our analysis.

## 1.3. Proposed Federal Action

"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). 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). "Interrelated actions" are those that are part of a larger action and depend on the larger action for their justification. "Interdependent actions" are those that have no independent utility apart from the action under consideration (50 CFR 402.02).

The Corps is proposing to authorize the Port of Anacortes A-Dock Replacement Project at Cap Sante Marina, Anacortes, Skagit County, Washington (48.51667, -122.60556; Figure 1, Figure 2) under section 10 of the Rivers and Harbors Act section 404 of the Clean Water Act. A-dock currently supports moorage of recreational vessels, fishing vessels, and tugs (MarineTraffic 2018). The applicant proposes to remove the existing 10,099 square foot A-dock, which is comprised of a grated steel gangway, concrete main walk, and eleven concrete finger piers (Figure 3). Prior to work, they will install a silt curtain around the float. They will use hand tools to disconnect the gangway, main walk, and fingers. They will use a land-based or barge-mounted crane to remove the dock sections from the water. They will remove sixty-three 13- to 14-inch creosote timber piles using a barge mounted crane and/or vibratory hammer. Any piles that break will be cut off below the mudline. They will dispose of all removed material at an upland disposal site.

The applicant proposes to construct a new 17,145 square foot A-dock 18 to 20 feet further waterward of mean higher high water). The new dock will consist of a grated aluminum gangway, concrete gangway landing float, concrete main float, and ten concrete finger piers (Figure 4). They will construct the new dock off-site, place it into the water using a land-based or barge-mounted crane, and float it into place using a barge or boat. They will install two 16-inch steel piles and thirty-three 20-inch steel piles using a barge-mounted vibratory hammer. If impact proofing is necessary, up to 3,000 strikes may occur within one day. They will replace existing high pressure sodium fixtures along the dock with pole mounted luminaires with LED lighting.

Proposed upland demolition, excavation, grading, fill, and construction will be completed using a land-based excavator. The applicant will disturb approximately 4,100 square feet upland through replacement of existing concrete and asphalt paving, placement of fill, and installation of a 925 square foot covered structure. The covered structure will be 11 feet 5 inches tall, located approximately 15 feet from ordinary high water (OHW), and have artificial lighting. The applicant will install a new precast concrete abutment supported by four 16-inch steel piles landward of mean higher high water (MHHW). They will install the piles using vibratory and impact pile driving hammers. They will excavate and rework 100 square feet of the existing riprap above MHHW and install a 2-foot by 35-foot concrete backwall. There will be no net change in impervious surface. Stormwater runoff will continue to be conveyed to the existing city storm drain system.

The applicant also proposes to install 12 large woody debris structures along the northeast portion of Cap Sante Marina. These structures will consist of 16 to 20 foot logs with rootwads held in place by screw anchors and cables. They will install the structures between 8.2 feet and 5 feet mean lower low water (MLLW) along approximately 3,300 square feet of shoreline. The applicant will ensure contractors do not disturb saltmarsh vegetation.

The applicant commits to implementing the project and associated conservation measures identified in the WDFW HPA (Port of Anacortes email 2019), including the following:

1. Install anti-perching pile caps.
2. Limit pile driving to daylight hours.
3. Use low intensity lighting during construction that will be shielded or directed to prevent light from reaching the water surface.
4. Shield lighting along the length of the new A-dock to minimize the amount of light reaching the water surface.
5. Use a bubble curtain that distributes air bubbles around 100 percent of the perimeter to minimize underwater noise from impact driving. They will limit pile driving to daylight hours.
6. Operate construction vessels with minimal propulsion power to avoid propeller scour.
7. Use lubricants composed of biodegradable base oils in construction equipment operated in or near the water.

Additionally, the applicant has agreed to the following (Port of Anacortes email 2019):

1. Install a full-depth silt curtain around pile extraction.
2. Limit vibratory pile removal to vibratory extraction and/or simple pull techniques (no water jetting, no clamshell excavation).
3. Require their contractors and tugboat operators to adjust work practices to ensure that turbidity does not exceed 300 feet from the project site, and to halt work should the visible turbidity plume approach that range in order to reduce exposure to contaminated forage.
4. Utilize vibratory installation to the maximum extent practicable, and to minimize the use of impact proofing to reduce noise impacts to listed species.
5. Only conduct in-water work between November 1 and February 15, when juvenile salmonids are least likely to be present.

The Corps' action would authorize the installation of a replacement dock that would exist in the nearshore marine environment for decades beyond the useful life of the existing structure. Though the replacement dock will have six fewer slips than the existing A-dock, vessel activity would not continue at the project site "but for" the proposed action. Therefore, vessel activity at the new A-dock would be interrelated with the proposed action.


**Figure 1**. Project site location in Anacortes, Washington.

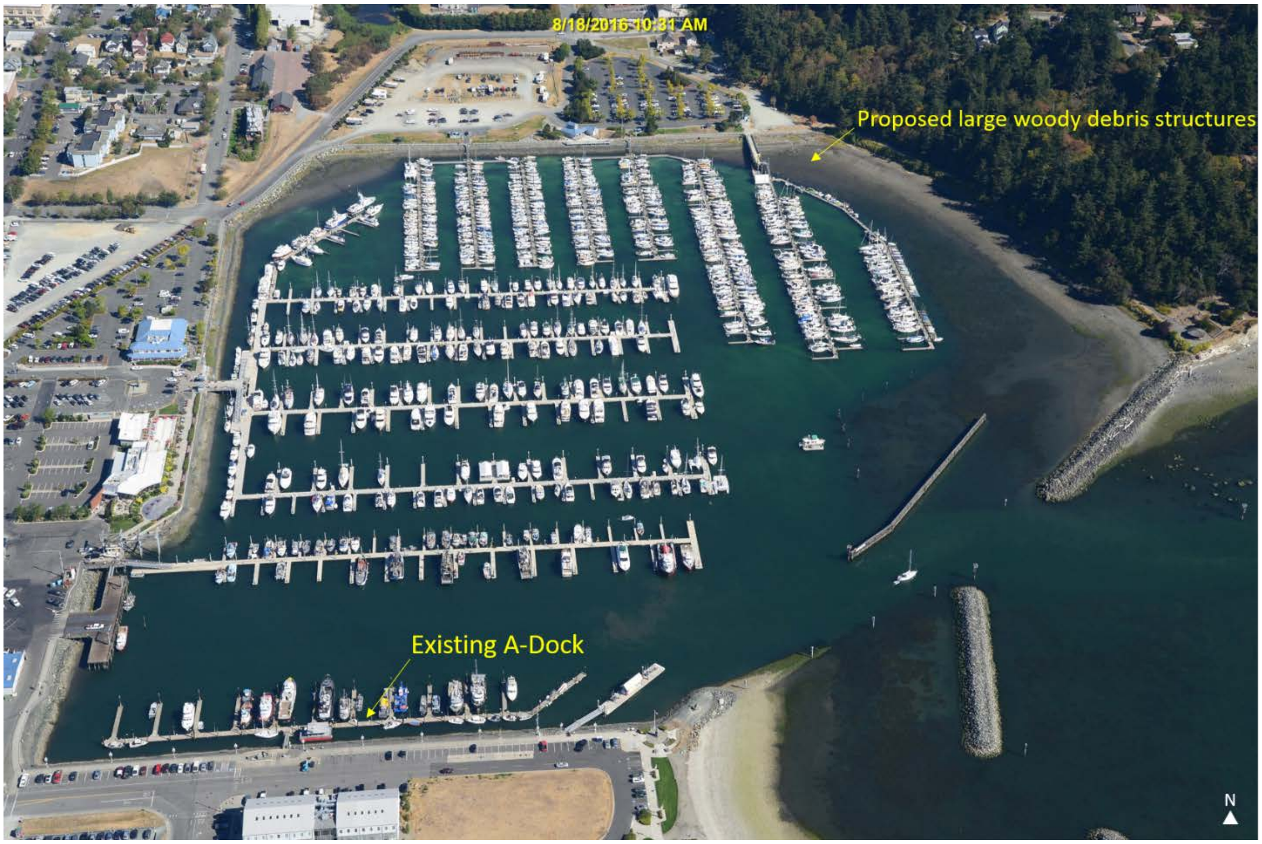


**Figure 2**. Aerial view of project site and vicinity.

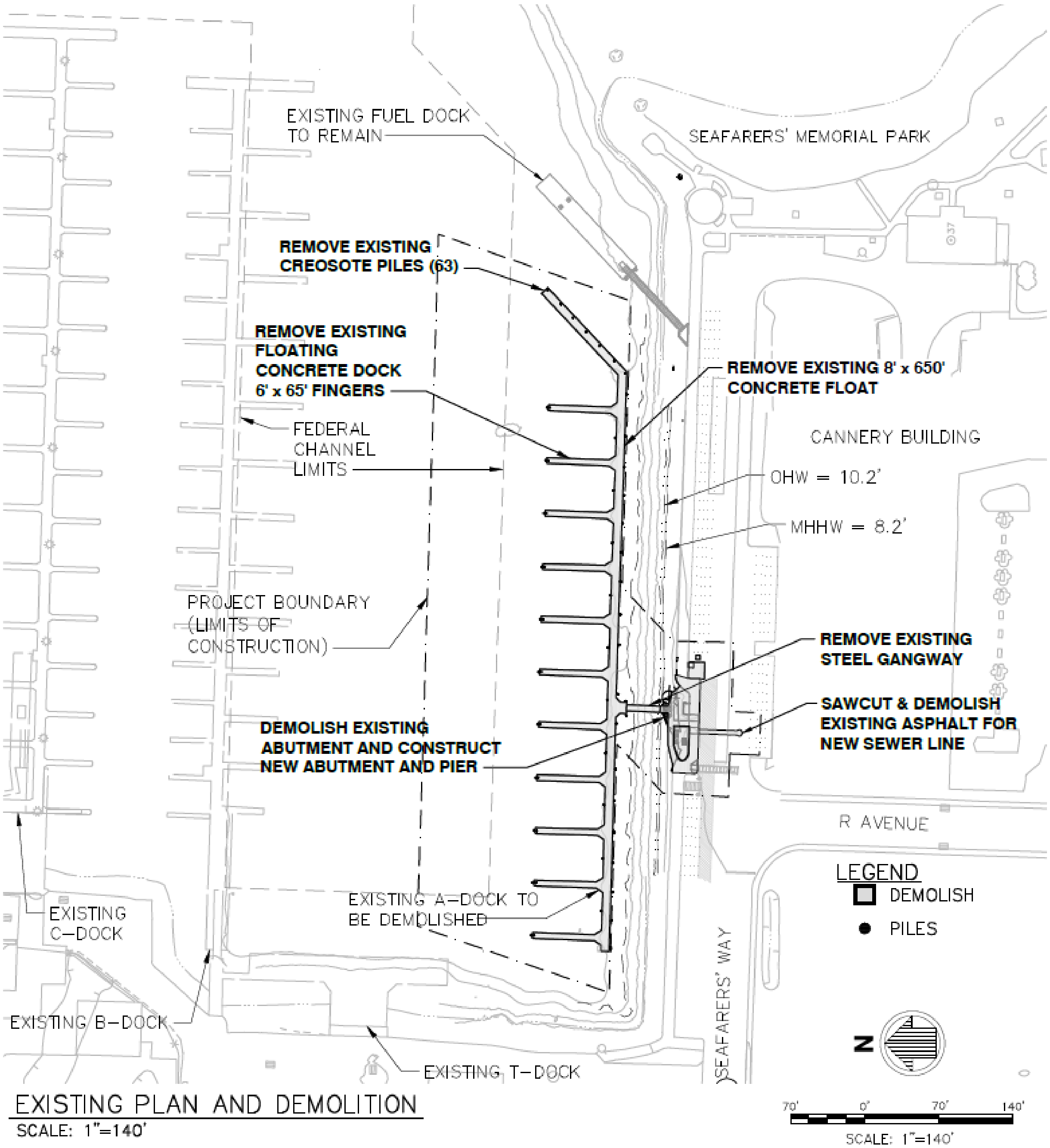


**Figure 3**. Location of the existing A-dock main walk, finger piers, gangway, and abutment proposed to be demolished.

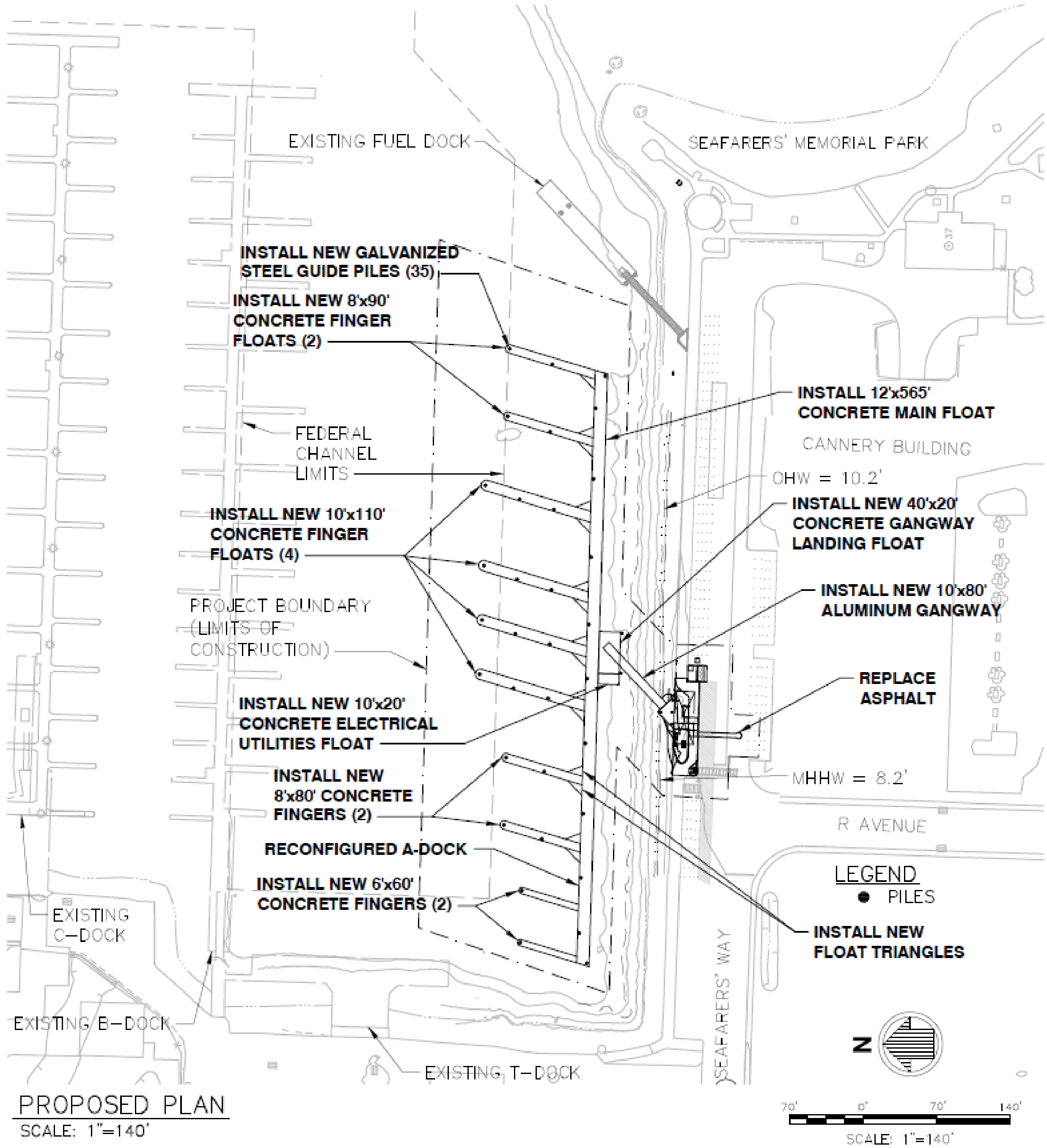


**Figure 4**. Location of the new A-dock main walk, finger piers, gangway and abutment proposed to be installed.

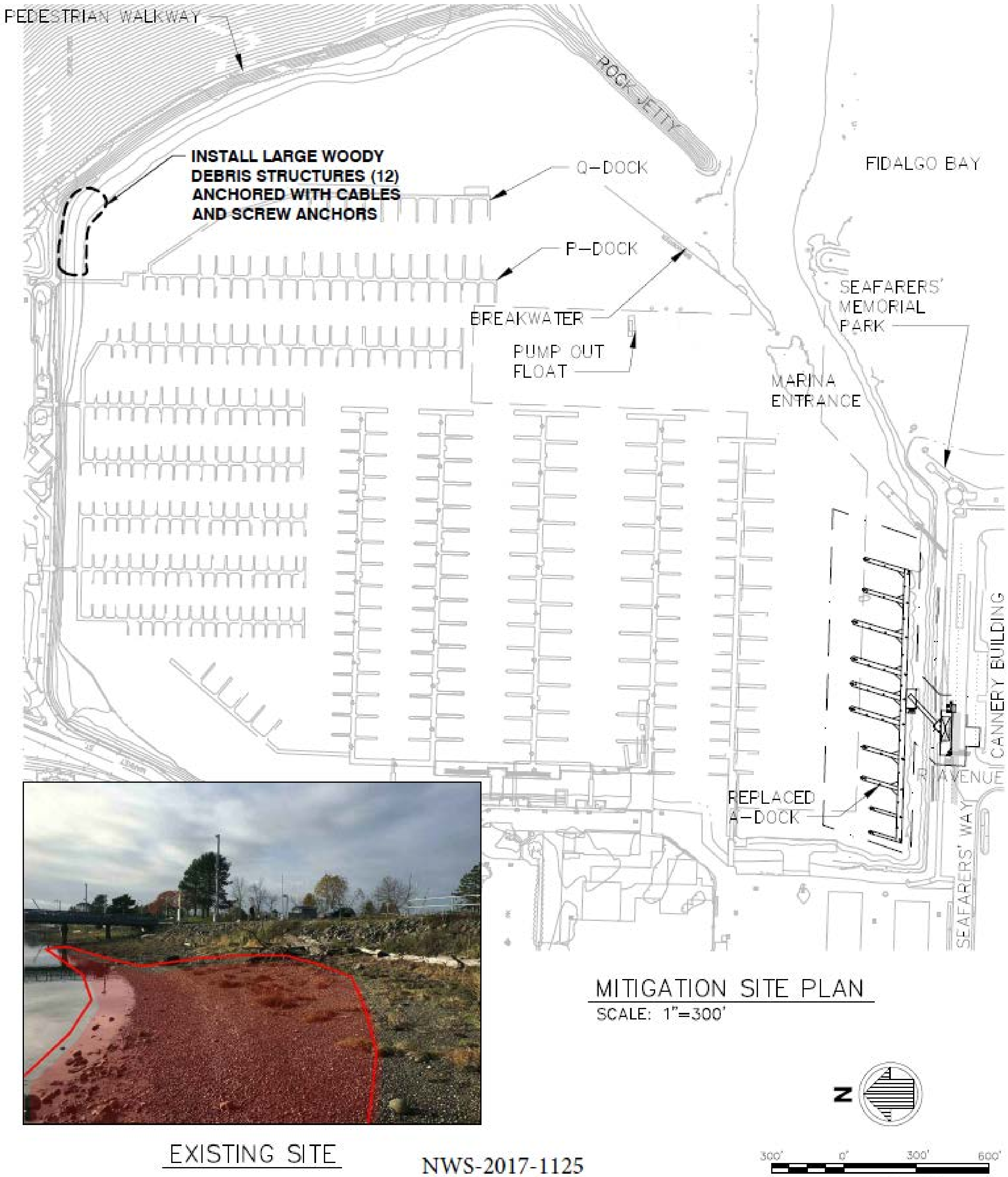


**Figure 5**. Location where the twelve large woody debris structures are proposed to be installed.

## 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 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 provides 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 non-discretionary 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 humpback whales, and SRKW and their critical habitat. Our concurrence is documented in the "Not Likely to Adversely Affect" Determinations section (Section 2.12).

### 2.1. Analytical Approach

This biological opinion includes both a jeopardy analysis and/or an adverse modification analysis. The jeopardy analysis relies upon the regulatory definition of "to jeopardize the continued existence of" a listed species, which is "to engage in an action that 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 relies on the definition of "destruction or adverse modification," which "means a direct or indirect alteration that appreciably diminishes the value of critical habitat for the conservation of a listed species. Such alterations may include, but are not limited to, those that alter the physical or biological features essential to the conservation of a species or that preclude or significantly delay development of such features" (81 FR 7214).

The designation(s) of critical habitat for (species) use(s) the term primary constituent element (PCE) or essential features. The new critical habitat regulations (81 FR 7414) replace this term with physical or biological features (PBFs). The shift in terminology does not change the approach used in conducting a ''destruction or adverse modification'' analysis, which is the same regardless of whether the original designation identified PCEs, PBFs, or essential features. In this biological opinion, we use the term PBF to mean PCE or essential feature, as appropriate for the specific critical habitat.

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

1. Identify the rangewide status of the species and critical habitat expected to be adversely affected by the proposed action.

2. Describe the environmental baseline in the action area.
3. Analyze the effects of the proposed action on both species and their habitat using an "exposure-response-risk" approach.
4. Describe any cumulative effects in the action area.
5. Integrate and synthesize the above factors by: (1) Reviewing the status of the species and critical habitat; and (2) adding the effects of the action, the environmental baseline, and cumulative effects to assess the risk that the proposed action poses to species and critical habitat.
6. Reach a conclusion about whether species are jeopardized or critical habitat is adversely modified.
7. If necessary, suggest a reasonable and prudent alternative (RPA) to the proposed action.

## 2.2. Status of the Species and Critical Habitat

This opinion examines the status of each species that would 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' current "reproduction, numbers, or distribution" as described in 50 CFR 402.02. The Opinion also examines the condition of critical habitat throughout the designated area, evaluates the conservation value of the various watersheds and coastal and marine environments that make up the designated area, and discusses the current function of the essential PBFs that help to form that conservation value.

### 2.2.1. <u>Climate Change</u>

One factor affecting the status of ESA-listed species considered in this opinion, and aquatic habitat at large, is climate change. Climate change is likely to play an increasingly important role in determining the abundance and distribution of ESA-listed species, and the conservation value of designated critical habitats, in the Pacific Northwest. These changes will not be spatially homogeneous across the Pacific Northwest. The largest hydrologic responses are expected to occur in basins with significant snow accumulation, where warming decreases snow pack, increases winter flows, and advances the timing of spring melt (Mote et al. 2016; Mote et al. 2014). Rain-dominated watersheds and those with significant contributions from groundwater may be less sensitive to predicted changes in climate (Mote et al. 2014; Tague et al. 2013).

During the last century, average regional air temperatures in the Pacific Northwest increased by 1-1.4°F as an annual average, and up to 2°F in some seasons based on average linear increase per decade (Abatzoglou et al. 2014; Kunkel et al. 2013). Warming is likely to continue during the next century as average temperatures are projected to increase another 3 to 10°F, with the largest increases predicted to occur in the summer (Mote et al. 2014). Decreases in summer precipitation of as much as 30 percent by the end of the century are consistently predicted across climate models (Mote et al. 2014). Precipitation is more likely to occur during October through March, less during summer months, and more winter precipitation will be rain than snow (ISAB 2007; Mote et al. 2013; Mote et al. 2014). Earlier snowmelt will cause lower stream flows in late spring, summer, and fall, and water temperatures will be warmer (ISAB 2007; Mote et al. 2014).

Models consistently predict increases in the frequency of severe winter precipitation events (i.e., 20-year and 50-year events), in the western United States (Dominguez et al. 2012). The largest increases in winter flood frequency and magnitude are predicted in mixed rain-snow watersheds (Mote et al. 2014).

Overall, about one-third of the current cold-water salmonid habitat in the Pacific Northwest is likely to exceed key water temperature thresholds by the end of this century (Mantua et al. 2009). Higher temperatures will reduce the quality of available salmonid habitat for most freshwater life stages (ISAB 2007). Reduced flows will make it more difficult for migrating fish to pass physical and thermal obstructions, limiting their access to available habitat (Isaak et al. 2012; Mantua et al. 2010). Temperature increases shift timing of key life cycle events for salmonids and species forming the base of their aquatic foodwebs (Crozier et al. 2011; Tillmann and Siemann 2011; Winder and Schindler 2004). Higher stream temperatures will also cause decreases in dissolved oxygen and may also cause earlier onset of stratification and reduced mixing between layers in lakes and reservoirs, which can also result in reduced oxygen (Meyer et al. 1999; Raymondi et al. 2013; Winder and Schindler 2004). Higher temperatures are likely to cause several species to become more susceptible to parasites, disease, and higher predation rates (Crozier et al. 2008; Raymondi et al. 2013; Wainwright and Weitkamp 2013).

As more basins become rain-dominated and prone to more severe winter storms, higher winter stream flows may increase the risk that winter or spring floods in sensitive watersheds will damage spawning redds and wash away incubating eggs (Goode et al. 2013). Earlier peak stream flows will also alter migration timing for salmon smolts, and may flush some young salmon and steelhead from rivers to estuaries before they are physically mature, increasing stress and reducing smolt survival (Lawson et al. 2004; McMahon and Hartman 1989).

In addition to changes in freshwater conditions, predicted changes for coastal waters in the Pacific Northwest as a result of climate change include increasing surface water temperature, increasing but highly variable acidity, and increasing storm frequency and magnitude (Mote et al. 2014). Elevated ocean temperatures already documented for the Pacific Northwest are highly likely to continue during the next century, with sea surface temperature projected to increase by 1.0 to 3.7ºC by the end of the century (IPCC 2014). Habitat loss, shifts in species' ranges and abundances, and altered marine food webs could have substantial consequences to anadromous, coastal, and marine species in the Pacific Northwest (Reeder et al. 2013; Tillmann and Siemann 2011).

Moreover, as atmospheric carbon emissions increase, increasing levels of carbon are absorbed by the oceans, changing the pH of the water. Acidification also impacts sensitive estuary habitats, where organic matter and nutrient inputs further reduce pH and produce conditions more corrosive than those in offshore waters (Feely et al. 2012; Sunda and Cai 2012).

Global sea levels are expected to continue rising throughout this century, reaching likely predicted increases of 10 to 32 inches by 2081 to 2100 (IPCC 2014). These changes will likely result in increased erosion and more frequent and severe coastal flooding, and shifts in the composition of nearshore habitats (Reeder et al. 2013; Tillmann and Siemann 2011). Estuarine-dependent salmonids such as chum and Chinook salmon are predicted to be impacted by significant reductions in rearing habitat in some Pacific Northwest coastal areas (Glick et al. 2007).

Historically, warm periods in the coastal Pacific Ocean have coincided with relatively low abundances of salmon and steelhead, while cooler ocean periods have coincided with relatively high abundances, and therefore these species are predicted to fare poorly in warming ocean conditions (Scheuerell and Williams 2005; Zabel et al. 2006). This is supported by the recent observation that anomalously warm sea surface temperatures off the coast of Washington from 2013 to 2016 resulted in poor coho and Chinook salmon body condition for juveniles caught in those waters (NWFSC 2015). Changes to estuarine and coastal conditions, as well as the timing of seasonal shifts in these habitats, have the potential to impact a wide range of listed aquatic species (Reeder et al. 2013; Tillmann and Siemann 2011).

The adaptive ability of these threatened and endangered species is depressed due to reductions in population size, habitat quantity and diversity, and loss of behavioral and genetic variation. Without these natural sources of resilience, systematic changes in local and regional climatic conditions due to anthropogenic global climate change will likely reduce long-term viability and sustainability of populations in many of these evolutionarily significant units (ESUs) (NWFSC 2015). New stressors generated by climate change, or existing stressors with effects that have been amplified by climate change, may also have synergistic impacts on species and ecosystems (Doney et al. 2012). These conditions will possibly intensify the climate change stressors inhibiting recovery of ESA-listed species in the future.

### 2.2.2. <u>Status of the Species</u>

This section provides a summary of listing and recovery plan information, status, and limiting factors for the species addressed in this opinion. More information can be found in recovery plans and status reviews for these species. These documents are available on the NMFS West Coast Region website (http://www.fisheries.noaa.gov/).

***PS Chinook salmon***

We listed the PS Chinook salmon ESU as threatened on June 28, 2005 (70 FR 37160). Recovery plans for PS Chinook salmon include the Shared Strategy for Puget Sound 2007 Plan and the NMFS 2006 Plan (NMFS 2006; SSDC 2007). The most recent status review was in 2015 (NWFSC 2015). This ESU comprises 22 populations distributed over five geographic areas. Most populations within the ESU have declined in abundance over the past 7 to 10 years, with widespread negative trends in natural-origin spawner abundance and hatchery-origin spawners present in high fractions in most populations outside of the Skagit watershed. Escapement levels for all populations remain well below the Technical Recovery Team (TRT) planning ranges for recovery, and most populations are consistently below the spawner-recruit levels identified by the TRT as consistent with recovery.

Limiting factors for PS Chinook salmon include:
1. Degraded floodplain and in river channel structure.
2. Degraded estuarine conditions and loss of estuarine habitat
3. Degraded riparian areas and loss of in river large woody debris

4. Excessive fine-grained sediment in spawning gravel
5. Degraded water quality and temperature
6. Degraded nearshore conditions
7. Impaired passage for migrating fish
8. Severely altered flow regime

***PS Steelhead***

We listed the PS steelhead distinct population segment (DPS) as threatened on May 11, 2007 (72 FR 26722). There is a draft recovery plan for this DPS (NMFS 2018). The most recent status review was in 2015 (NWFSC 2015). This DPS comprises 32 populations. The DPS is currently at very low viability, with most of the 32 populations and all three population groups at low viability. Long-term abundance trends have been predominantly negative or flat across the DPS. Information considered during the most recent status review indicates that the biological risks faced by the PS Steelhead DPS have not substantively changed since the listing in 2007, or since the 2011 status review. Furthermore, the PS Steelhead TRT recently concluded that the DPS was at very low viability, as were all three of its constituent major population groups (MPGs), and many of its 32 populations. In the near term, the outlook for environmental conditions affecting PS steelhead is not optimistic. While harvest and hatchery production of steelhead in PS are currently at low levels and are not likely to increase substantially in the foreseeable future, some recent environmental trends not favorable to PS steelhead survival and production are expected to continue.

Limiting factors for PS steelhead include:
1. Continued destruction and modification of habitat
2. Widespread declines in adult abundance despite significant reductions in harvest
3. Threats to diversity posed by use of two hatchery steelhead stocks
4. Declining diversity in the DPS, including the uncertain but weak status of summer-run fish
5. A reduction in spatial structure
6. Reduced habitat quality
7. Urbanization
8. Dikes, hardening of banks with riprap, and channelization

***PS/GB Bocaccio***

We listed the PS/GB bocaccio DPS as endangered on April 28, 2010 (75 FR 22276). A recovery plan for PS/GB bocaccio was published by NMFS in 2017 (NMFS 2017a). The most recent status review was in 2016 (NMFS 2016). Though bocaccio were never a predominant segment of the multi-species rockfish population within the PS/GB, their present-day abundance is likely a fraction of their pre-contemporary fishery abundance. Most bocaccio within the DPS may have been historically spatially limited to several basins within the DPS. They were apparently historically most abundant in the Central and South Sound with no documented occurrences in the San Juan Basin until 2008. The apparent reduction of populations of bocaccio in the Main Basin and South Sound represents a further reduction in the historically spatially limited distribution of bocaccio, and adds significant risk to the viability of the DPS.

Limiting factors for PS/GB bocaccio include:
1. Over harvest
2. Water pollution
3. Climate-induced changes to rockfish habitat
4. Small population dynamics

### *PS/GB Yelloweye Rockfish*

We listed the PS/GB yelloweye rockfish DPS as threatened on April 28, 2010 (75 FR 22276). A recovery plan for PS/GB yelloweye rockfish was published by NMFS in 2017 (NMFS 2017a). The most recent status review was in 2016 (NMFS 2016). Yelloweye rockfish within the PS/GB (in United States waters) are very likely the most abundant within the San Juan Basin of the DPS. Yelloweye rockfish spatial structure and connectivity is threatened by the apparent reduction of fish within each of the basins of the DPS. This reduction is probably most acute within the basins of PS proper. The severe reduction of fish in these basins may eventually result in a contraction of the DPS' range.

Limiting factors for PS/GB yelloweye rockfish include:
1. Over harvest
2. Water pollution
3. Climate-induced changes to rockfish habitat
4. Small population dynamics

## 2.2.3. <u>Status of the Critical Habitat</u>

This section describes the status of designated critical habitat affected by the proposed action by examining the condition and trends of the essential physical and biological features of that habitat throughout the designated areas. These features are essential to the conservation of the ESA-listed species because they support one or more of the species' life stages (e.g., sites with conditions that support spawning, rearing, migration and foraging).

### *Puget Sound Chinook Salmon*

We designated critical habitat for PS Chinook salmon on September 2, 2005 (70 FR 52630). Critical habitat for PS Chinook salmon includes 1,683 miles of streams, 41 square miles of lakes, and 2,182 miles of nearshore marine habitat in PS. The PS Chinook salmon ESU has 61 freshwater and 19 marine areas within its range. Of the freshwater watersheds, 41 are rated high conservation value, 12 low conservation value, and eight received a medium rating. Of the marine areas, all 19 are ranked with high conservation value. Marine habitat threats include urbanization, wetland draining and conversion, dredging, armoring of shorelines, and marina and port development. These activities have diminished the availability and quality of nearshore marine habitats and reduced water quality across the region.

### *Puget Sound/Georgia Basin Bocaccio*

We designated critical habitat for the PS/GB DPS of bocaccio on November 13, 2014 (79 FR 68042). Critical habitat for bocaccio rockfish includes 590.4 square miles of nearshore habitat and 414.1 square miles of deepwater habitat. Critical habitat is not designated in areas outside of United States jurisdiction; therefore, although waters in Canada are part of the DPSs' ranges for this species, critical habitat was not designated in that area. Based on the natural history of bocaccio and their habitat needs, NMFS identified two PBFs, essential for their conservation: 1) Deepwater sites (>30 meters) that support growth, survival, reproduction, and feeding opportunities; 2) Nearshore juvenile rearing sites with sand, rock and/or cobbles to support forage and refuge. Habitat threats include degradation of rocky habitat, loss of eelgrass and kelp, introduction of non-native species that modify habitat, and degradation of water quality as specific threats to rockfish habitat in the Georgia Basin.

### 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 for this project includes the footprint of the project and adjacent aquatic areas within 1,585 meters (approximately 1 mile) due to the spatial extent of underwater sound (Section 2.5.1).

### 2.4. Environmental Baseline

The "environmental baseline" includes the past and present impacts of all Federal, state, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of state or private actions which are contemporaneous with the consultation in process (50 CFR 402.02).

Past and ongoing anthropogenic impacts, including climate change, described in Section 2.2 have impacted ESA-listed species and critical habitat present in the action area. There are 1,007 boat moorage slips in Cap Sante Marina. The vessels most likely to moor at A-dock are recreational vessels, fishing vessels, and tugs (MarineTraffic 2018). In-water noise is primarily characterized by vessel traffic. Approximately 80 percent of the shoreline in Cap Sante Marina consists of steeply sloped riprap. Structures within the marina include docks, floats, gangways, and boat lifts. Attenuators and breakwaters are located near the entrance to the marina. Concrete sidewalks, asphalt roads, and buildings dominate upland areas. The level of nighttime artificial illumination is likely high given the high level of shoreline development and density of boats and docks in the action area.

The action area is currently listed on the Washington State 303(d) list of impaired waterways for exceeding copper criterion for water quality, but not sediment quality (Ecology 2018). Cap Sante Marina has been dredged to -12 to -14 feet mean lower low water (MLLW). The substrate consists of unconsolidated sands and silts. According to the applicant's eelgrass survey, there is no eelgrass or macroalgae in the vicinity of A-dock. However, there are eelgrass beds located within the eastern portion of the action area and east of the northern attenuator. Large woody debris is present along the western shoreline of Cap Sante Marina. According to the Washington State Forage Fish Spawning Map (WDFW 2018), surf smelt spawning habitat has been documented in the action area. Documented surf smelt spawning is located within Cap Sante Marina south of the existing A-dock (Figure 6). Surf smelt spawning occurs in this location between May and September. Pacific herring spawning is located outside of the marina.

On the northeastern side of Cap Sante Marina where the large woody debris structures are proposed to be built, the shoreline is not dominated by riprap. The shoreline is gradually sloped, and the substrate consists of gravel and cobble at upper elevations and sand and silt at lower elevations. Landward, there is a saltmarsh bed.

Juvenile PS Chinook are nearshore oriented (Fresh 2006). Juveniles occur in the nearby Padilla Bay from June through October (Rice et al. 2011), which is outside the in-water work window. Juvenile PS steelhead primarily emigrate from natal streams in April and May (outside the in-water work window), and appear to move directly out into the ocean to rear, spending little time in the nearshore zone (Goetz et al. 2015). They are not commonly caught on beach seine surveys (Brennan et al. 2004).

Adult PS Chinook can reside in PS year-round, and return to their natal river between June and September. Adult winter-run PS steelhead typically return to their natal river November through May; summer-run PS steelhead return between April and October.

Pacunski et al. (2013) surveyed the San Juan Islands by remotely operated underwater vehicle (ROV) between September and November 2008. They observed bocaccio and yelloweye rockfish southeast of Guemes Island. Rockfish fertilize their eggs internally and extrude the young as larvae, which are approximately 4 millimeters to 5 millimeters in length (Love et al. 2002). Larval rockfish appear in the greatest numbers during the spring months (Greene and Godersky 2012; Moser and Boehlert 1991; Palsson et al. 2009). However, PS rockfish have been reported to extrude larvae as late as September (Greene and Godersky 2012). Rockfish larvae are typically found in the pelagic zone, often occupying the upper layers of open waters, under floating algae, detached seagrass, and kelp. Rockfish larvae are thought to be mostly distributed passively by currents (Love et al. 2002).

Juvenile rockfish move from the pelagic environment and associate with the benthic environment when they reach about 30 to 90 millimeters in length at approximately 3 to 6 months of age (Love et al. 2002). Juvenile bocaccio are known to settle onto rocky or cobble substrates in the shallow nearshore in areas that support kelp and sandy zones with eelgrass or drift algae. They move to progressively deeper waters as they grow (Love et al. 2002; Palsson et al. 2009).

Yelloweye rockfish are not known to typically occupy shallow water habitats (Love et al. 2002). Juvenile yelloweye rockfish between 25 and 100 millimeters have been observed in areas of high relief at depths greater than 48 feet (Love et al. 2002). These conditions are not supported in the action area.

Adult yelloweye and bocaccio typically occupy waters deeper than 300 feet and 165 feet, respectively (Love et al. 2002) and prefer rocky habitats. Given these depths do not occur in the action area, it is extremely unlikely that adult ESA-listed rockfish will occur within the shallow water in the action area.

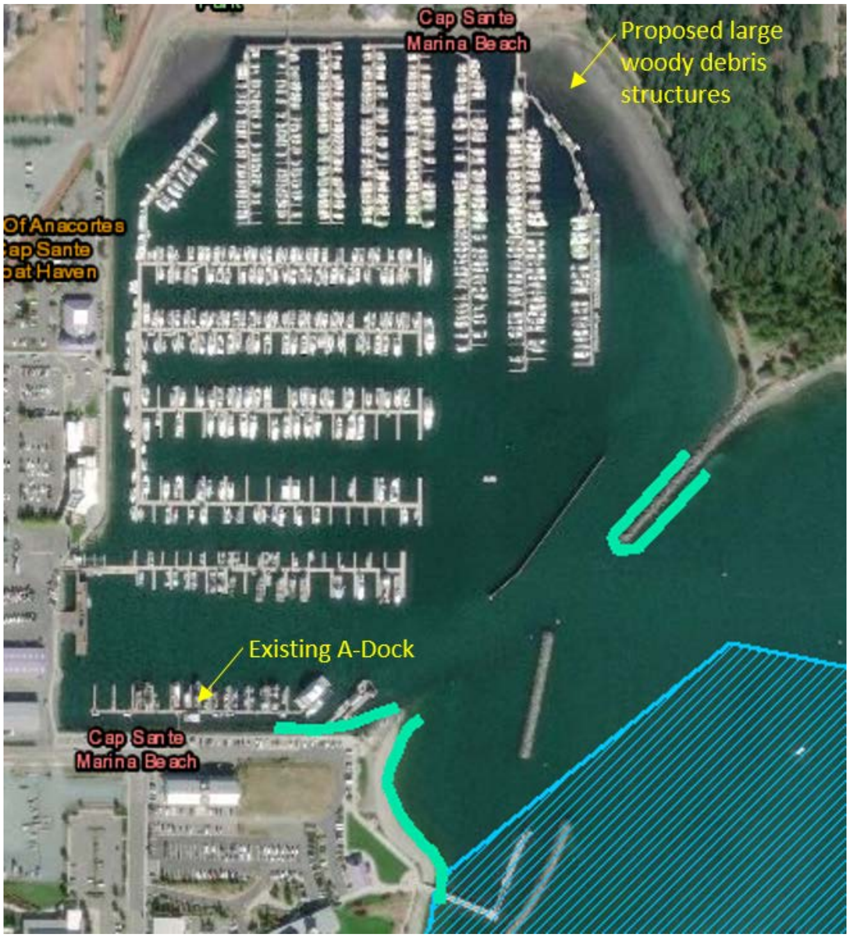


**Figure 6**. Location of documented surf smelt spawning (green) and Pacific herring spawning (blue).

### 2.5. Effects of the Action

Under the ESA, "effects of the action" means the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline (50 CFR 402.02). Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur.

Future impacts of the structure (i.e., effects associated with its presence in the environment, separate from the effects associated with its construction) are considered "effects of the action" under this consultation.

#### 2.5.1. <u>Effects on Species</u>

***Underwater Noise***

NMFS established the injury thresholds for impulsive sound at 206 dB peak, 187 dB cumulative sound exposure level ($SEL_{cum}$) for fish more than 2 grams, and 183 dB $SEL_{cum}$ for fish less than 2 grams (Fisheries Hydroacoustic Working Group 2008). The behavioral disturbance threshold is

150 dB root mean square (RMS). Any received level below 150 dB sound exposure level (SEL) is considered “Effective Quiet” (Stadler and Woodbury 2009).

Impact pile driving

Noise generated from in-water impact driving is estimated based on single strike noise levels of 208 dB peak, 176 dB SEL, and 187 dB RMS for 20-inch piles at 10 meters in three to four meters water depth (Caltrans 2015). We expect the noise from impact driving the two in-water 16-inch steel piles to be less than or equal to this value. Impact driving the four 16-inch steel piles that will support the concrete abutment will occur above MHHW. However, in-water noise is generated from pile driving within 200 feet within the edge of the water (Caltrans 2015). Land-based impact driving of 16-inch piles is estimated based on single strike noise levels of 198 dB peak, 171 dB SEL, and 183 dB RMS for 20-inch steel piles at 10 meters (Caltrans 2015). All impact driving will be done with use of a bubble curtain, which is expected to attenuate sound by 8 dB (WSDOT 2018). As described in Section 1.3, up to 3,000 pile strikes may occur in a day.

Any adult or juvenile PS Chinook salmon, adult PS steelhead, juvenile or larval PS/GB bocaccio, or larval PS/GB yelloweye rockfish that is within 4 meters of impact proofing could be injured or killed from exposure to a single pile strike (Table 1). As discussed in Section 2.4, juvenile PS Chinook salmon and PS steelhead are extremely unlikely to be present during the in-water work window and thus exposed to construction-related noise.

**Table 1**. Distance to reach NMFS accepted threshold for behavioral disturbance and the onset of physical injury to fish from unattenuated impact pile proofing under the proposed project.

| | **Onset of Physical Injury** | | | **Behavior** |
|---|---|---|---|---|
| | Peak dB | Cumulative SEL dB | | RMS dB |
| | | Fish ≥ 2 g | Fish < 2 g | |
| NMFS accepted threshold | 206 | 187 | 183 | 150 |
| **Distance (m) to threshold** | **4** | **113** | **158** | **858** |

Fish less than two grams within 158 meters (0.1 miles) and fish greater than two grams within 113 meters of impact proofing that remain in the area for the full duration would likely experience physiological impacts on auditory and non-auditory soft tissues from accumulated sound energy (Table 1). The severity and permanence of those impacts would depend on the range from the source and the duration of the exposure, with intensity decreasing with increased distance and/or reduced length of exposure. Adult PS Chinook salmon and PS steelhead will be larger than 2 grams, highly mobile, and will be migrating past the site in route to their natal streams. They are unlikely to remain within 113 meters of impact driving long enough to accumulate injurious levels of sound energy. The area of acoustic effect does not overlap with the presence of submerged aquatic vegetation (SAV) on the eastern side of Cap Sante Marina where juvenile bocaccio are most likely to occur. Therefore, they are unlikely to occur within 158 meters of impact driving and accumulate injurious levels of sound energy (183 dB $SEL_{cum}$). However, PS/GB bocaccio and yelloweye rockfish larvae may be exposed as they enter the area on the currents. Therefore, they may accumulate injurious levels of sound energy.

Fish within 858 meters (0.5 miles) of impact proofing would experience behavioral disturbances. This may include acoustic masking (Codarin et al. 2009), startle responses and altered swimming

(Neo et al. 2014), abandonment or avoidance of the area of acoustic effect (Mueller 1980; Picciulin et al. 2010; Sebastianutto et al. 2011; Xie et al. 2008) and increased vulnerability to predators (Simpson et al. 2016). As discussed above, juvenile PS Chinook salmon and PS steelhead are extremely unlikely to be present during the in-water work window and be exposed to construction-related noise. Adult PS Chinook and PS steelhead are not nearshore dependent but may pass through the area of acoustic effect during migration. The most likely effect of exposure would be temporary minor behavioral effects, such as avoidance of the area within 858 meters around the project site. It is extremely unlikely that avoidance of the project site would prevent fish from moving past the area to their natal streams. Therefore, temporary avoidance of the area within 858 meters would cause no measure effects on the exposure of individuals. However, juvenile PS/GB bocaccio are likely to remain in the action area given the presence of rearing habitat (SAV) on the eastern side of Cap Sante Marina. Juvenile bocaccio that are within 858 meters around the project site are likely to experience behavioral disturbance, such as acoustic masking, startle response, altered swimming patterns, avoidance, and increased risk of predation. The intensity of these effects would increase with increased proximity to the source and/or duration. The number of individual PS/GB bocaccio that would be affected by this stressor is unquantifiable with any degree of uncertainty. However, the affected individuals would represent such small subsets of their respective cohorts that the numbers of exposed fish would be too low to cause detectable population-level effects.

Additionally, underwater noise may impact forage fish. However, the number of forage fish injured or killed would be too small to cause detectable effects on their populations in the action area. Therefore, construction-related forage reductions would be too small to cause detectable effects on ESA-listed species.

Vibratory pile driving

While impact pile driving produces an intense impulsive underwater noise, vibratory pile driving produces a lower level continuous noise (Duncan et al. 2010) that does not injure fish. Fish consistently avoid sounds like those of a vibratory hammer (Dolat 1997; Enger et al. 1993; Knudsen et al. 1997; Sand et al. 2000) and appear not to habituate to these sounds, even after repeated exposure (Dolat 1997; Knudsen et al. 1997). Caltrans (2015) reports an underwater sound level of 153 dB RMS for 24-inch steel pipe piles at 10 meters in three meters water depth. Given a maximum duration of 4 hours, the noise from the pile installation/extraction will attenuate to 150 dB RMS within 16 meters.

Juvenile PS Chinook salmon and PS steelhead are extremely unlikely to be present during the in-water work window and thus exposed to construction-related noise. The area of acoustic effect (16 meters) does not overlap with the presence of SAV on the eastern side of Cap Sante Marina where juvenile bocaccio are most likely to occur. We do not expect any effects to PS/GB bocaccio and PS/GB yelloweye rockfish larvae as we do not expect vibratory pile driving/extraction to produce injurious levels of sound energy. Adult PS Chinook and PS steelhead are not nearshore dependent but may pass through the area of acoustic effect during migration. The most likely effect of exposure would be temporary avoidance of the project site, which would cause no measurable effects on adult PS Chinook salmon and adult PS steelhead.

Vessels

Tugboats may be used during demolition and installation of A-dock. Additionally, after A-dock is replaced, vessel moorage will continue into the foreseeable future. The vast majority of that activity will likely occur during daylight hours, but some pre-dawn or post-dusk engine running and vessel movement may take place at the site. In the absence of specific use estimates, this assessment assumes that on any given day, 12 hours of continuous vessel noise is likely to occur, which likely overestimates exposure risk most of the time. Unlike construction noises, vessel noise could occur year-round. As discussed in Section 1.3, the vessels most likely to moor at A-dock are tug boats, fishing vessels, and recreational vessels. The best available information for source levels of those vessel classes (Table 2) is Veirs et al. (2016). However, the available information describes vessels running at or close to full-speed, which is likely to overestimate exposure risk. Because SEL is often identical to RMS for non-impulsive sources, we assume that reported sound levels by Veirs et al. (2016) are in dB RMS which would, at worst, overestimate sound levels. To conservatively estimate source levels, we also assume that the mean plus the standard deviation represents the source level for each vessel class.

**Table 2**. Source level (dB) by vessel class and distance to behavioral threshold for fish.

| Vessel Class | Source Level (dB) ± Standard Deviation | Distance (meters) to behavioral threshold |
|---|---|---|
| Tug | 170±5 | 46 |
| Fishing | 164±9 | 34 |
| Recreational | 159±9 | 16 |

Given the tugboats have the highest maximum source level (175 dB), we conservatively assume that the area of continuous acoustic affect (above 150 dB SEL) from construction-related and structure-related vessel noise will include all of the water within 46 meters around A-dock.

The area of acoustic effect from construction-related and structure-related vessel noise (46 meters) does not overlap with the presence of SAV on the eastern side of Cap Sante Marina where juvenile bocaccio are most likely to occur. We do not expect any effects to PS/GB bocaccio and PS/GB yelloweye rockfish larvae as non-impulsive sound does not produce injurious levels of sound energy, as discussed above.

Juvenile PS Chinook salmon and PS steelhead are extremely unlikely to be present during the in-water work window and thus exposed to construction-related noise. Adult PS Chinook and adult and juvenile PS steelhead are not nearshore dependent but may pass through the area of acoustic effect during migration. The most likely effect of exposure to non-injurious construction-related vessel noise levels would be temporary avoidance of the project site, which would cause no measurable effects on adult PS Chinook salmon and adult PS steelhead.

Structure-related vessel noise levels would cause no measurable effects on adult Chinook salmon, and adult and juvenile PS steelhead for the reasons described above. However, juvenile PS Chinook salmon are nearshore oriented and are likely to occur near A-dock. Juvenile Chinook salmon that are within 46 meters of structure-related vessels are likely to experience behavioral disturbance, such as acoustic masking, startle response, altered swimming patterns, avoidance, and increased risk of predation. The intensity of these effects would increase with increased proximity to the source and/or duration. The number of individual PS Chinook salmon that would be affected by this stressor is unquantifiable with any degree of certainty. However, the affected individuals would represent such small subsets of their respective cohorts that the numbers of exposed fish would be too low to cause detectable population-level effects.

***Turbidity***

Pile extraction/installation
In-water pile removal and driving will cause short-term and localized increases in turbidity and total suspended solids (TSS). For reference, vibratory removal of hollow 30-inch steel piles in Lake Washington mobilized sediments that adhered to the piles as they were drawn through the water column, with much of the mobilized sediments being material that fell out of the hollow piles (Bloch 2010). Turbidity reached a peak of about 25 mg/L above background levels at 50 feet from the pile, and about 5 mg/L above background at 100 feet. Turbidity returned to background levels within 30 to 40 minutes. Pile installation created much lower turbidity. The proposed vibratory extraction of timber piles for this project is likely to mobilize far less sediment than the piles described above, because the timber piles are less than half the size (less surface area for sediments to adhere to) and they are solid (no tube to hold packed-in sediments). Further, extracted piles will be surrounded by a full depth silt curtain. Therefore, the mobilization of bottom sediments, and resulting turbidity from the planned pile removal is likely to be less than that reported by Bloch.

The effects of turbidity on fish are species and size dependent. In general, severity typically increases with sediment concentration and duration of exposure, and decreases with the increasing size of the fish. Newcombe and Jensen (1996) reported minor physiological stress in juvenile salmon only after about three hours of continuous exposure to concentration levels of about 700 to 1,100 mg/L. To the extent that adult salmonids are present in the areas with elevated suspended sediment, they are expected to be of sufficient size to swim away from these areas, which would also limit the potential for, and duration of, exposure. Construction-related turbidity would be very short-lived and at concentrations too low to cause more than temporary, non-injurious behavioral effects (e.g., alarm reaction and avoidance of the plume), physiological effects (e.g., gill flaring and coughing), and temporary reduced feeding rates (Newcombe and Jensen 1996). None of these potential responses, individually, or in combination are likely to adversely affect exposed individuals.

Vessels
Tugboats may be used during demolition and installation of A-dock. Though tugboats will be operated with minimal propulsion power to minimize scour, some sediment may still be mobilized given the relatively shallow depth of the water (about -12 MLLW). After A-dock is replaced, vessel moorage will continue into the foreseeable future. As discussed in Section 1.3, the vessels most likely to moor at A-dock are tug boats, fishing vessels, and recreational vessels. A recent study described the turbidly cause by tugboats operations in water about 40 feet (12 meters) deep (ESTCP 2016). At about 13 minutes, the plume extended about 550 yards (500 meters) and had a TSS concentration of about 80 mg/L. The TSS concentration fell to 30 mg/L within 1 hour and to 15 mg/L within 3 hours. Therefore, vessel-related turbidity would be

temporary and at concentrations too low to cause more than temporary, non-injurious effects that, as described above, are not expected to affect the fitness of exposed individuals.

***Dissolved Oxygen***

Mobilization of anaerobic sediments can decrease dissolved oxygen (DO) levels (Hicks et al. 1991; Morton 1976). However, as described above, only a small amount of sediment will be mobilized by construction and structure-related vessels. This suggests that any impacts on DO will be too small and short-lived to cause detectable effects in exposed fish.

***Contaminants***

Pile extraction/installation

Presently, creosote-treated piles contaminate the surrounding sediment up to two meters away with polycyclic aromatic hydrocarbon, or PAHs (Evans et al. 2009). Cutting or removing the creosote-treated piles mobilizes these PAHs into the surrounding water and sediments (Parametrix 2011; Smith 2008). The project will also release PAHs directly from creosote-treated timber if any of the piles break during removal (Parametrix 2011). The concentration of PAHs released into surface water rapidly dilutes. Smith (2008) reported concentrations of total PAHs of 101.8 μg/L 30 seconds after creosote-pile removal and 22.7 μg/L 60 seconds after. However, PAH levels in the sediment after pile removal can remain high for six months or more (Smith 2008). Romberg (2005) found a major reduction in sediment PAH levels three years after pile removal contaminated an adjacent sediment cap.

There are two pathways for PAH exposure to listed fish species in the action area, direct uptake through the gills and dietary exposure (Karrow et al. 1999; Lee and Dobbs 1972; McCain et al. 1990; Meador et al. 2006; Neff et al. 1976; Roubal et al. 1977; Varanasi et al. 1993). Fish rapidly uptake PAHs through their gills and food but also efficiently remove them from their body tissues (Lee and Dobbs 1972; Neff et al. 1976). Juvenile Chinook salmon prey, including amphipods and copepods, uptake PAHs from contaminated sediments (Landrum et al. 1984; Landrum and Scavia 1983; Neff 1982).Varanasi et al. (1993) found high levels of PAHs in the stomach contents of juvenile Chinook salmon in the Duwamish estuary.

The primary effects of PAHs on salmonids from both uptake through their gills and dietary exposure are immunosuppression and reduced growth. Karrow et al. (1999) characterized the immunotoxicity of creosote to rainbow trout (*Oncorhynchus mykiss*) and reported a lowest observable effect concentration for total PAHs of 17 μg/L. Varanasi et al. (1993) found greater immune dysfunction, reduced growth, and increased mortality compared to control fish. In order to isolate the effects of dietary exposure of PAHs on juvenile Chinook salmon, Meador et al. (2006) fed a mixture of PAHs intended to mimic those found by Varanasi et al. (1993) in the stomach contents of field-collected fish. These mixture-fed fish showed reduced growth compared to the control fish.

Vibratory pile removal will be limited to vibratory extraction and/or simple pull techniques and will be surrounded by a full depth silt curtain, which will limit contamination. NMFS expects the water and substrate within 300 feet of pile removal activities will have increased levels of PAHs (NMFS 2017b). Within this area, contaminants may be biologically available for years, at steadily decreasing levels. While present, contaminants such as PAHs are likely to bioaccumulate in benthic invertebrates (Landrum et al. 1984; Landrum and Scavia 1983; Neff 1982), some of which will be consumed by listed fish that forage in the action area. Fish have low PAH uptake retention (Niimi and Dookhran 1989; Niimi and Palazzo 1986) and metabolize PAHs rapidly (Hellou and Payne 1986; Roubal et al. 1977; Statham et al. 1978; Varanasi et al. 1989). Nevertheless, even brief exposure to PAH-contaminated habitats has been shown to reduce growth, suppress immune competence, and increased mortality in outmigrating juvenile Chinook salmon (Meador et al. 2006; Varanasi et al. 1993). In contrast, it is unlikely that adult listed salmonids and rockfish that feed on forage fish would be impacted as biomagnification of PAHs does not occur in fish (Suedel et al. 1994). Juvenile bocaccio are unlikely to consume contaminated forage as they are most likely to be present within the SAV along the eastern side of marina away from A-dock.

The annual number of juvenile Chinook salmon that may be exposed to PAH-contaminated forage that will be attributable to this action is unquantifiable with any degree of certainty, as is the amount of contaminated prey that any individual fish may consume, or the intensity of any effects that an exposed individual may experience. However, the small affected area and the low volume of contaminated sediment that would be brought to the surface suggest that the probability of trophic connectivity to the contamination would be very low for any individual fish. Therefore, the numbers of fish that may be annually exposed to contaminated prey would be very low, and no detectable effects at the population level for Chinook salmon are expected.

<u>Vessels</u>
Infrequent and relatively small discharges of petroleum-based fuels and lubricants that contain PAHs would occur from the approximately 1,000 other vessels that moor in Cap Sante Marina. Vessels that will continue to moor at A-dock may discharge petroleum-based fuels and lubricants, contributing to the pollutants in the area. Construction-related vessels may discharge petroleum-based fuels, but lubricants will be biodegradable. Propeller scour from construction-related and structure-related vessels may also mobilized contaminated sediments. As described above, the potential effects of exposure to PAHs can range from avoidance of an area to mortality, depending on the compound and its concentration (Meador et al. 2006). Some contaminants would evaporate relatively quickly (Werme et al. 2010), and tidal currents would help disperse pollutants. However, discharged pollutants would tend to collect within the marina, which is highly enclosed at the surface.

Over the decades-long life of the new A-dock, some juvenile PS Chinook salmon and PS/GB bocaccio in the action area would be directly exposed to petroleum-based pollutants, and/or exposed to contaminated prey resources, at concentrations capable of causing reduced growth, increased susceptibility to infection, and increased mortality. The number of individuals that would be affected by exposure to fuels and lubricants is unquantifiable with any degree of certainty. However, based on the expected infrequency and small volumes of discharge, the number of individuals would represent such small subsets of their respective cohorts that their loss would cause no detectable population-level effects. Adult PS Chinook and juvenile and adult PS steelhead are not nearshore dependent and are not expected to remain in the action area long enough to be impacted by vessel-related discharges.

***Shade***

Forage and Natural Cover
Intense shade can limit primary production and reduce the diversity of the aquatic communities under over-water structures (Nightingale and Simenstad 2001; Simenstad et al. 1999). According to the applicant's eelgrass survey, there is no eelgrass or macroalgae in the vicinity of the proposed or existing A-dock. However, A-dock will be installed adjacent to more than a dozen similar structures that are installed within Cap Sante Marina. Across the marina, structure-related shade prevents or reduces SAV growth under and adjacent to the structures, and reduces the production and diversity of invertebrate organisms that are prey for juvenile salmonids and rockfish. Therefore, across the marina, structure-related shade likely reduces productivity enough to reduce the fitness of juvenile PS Chinook salmon and juvenile PS/GB bocaccio. A-dock would contribute measurably to that impact.

Migration length and predation
Juvenile Chinook salmon are known to forage between two and four meters depth (Tabor et al. 2011), which would overlap with the location of the new A-dock and other marina structures. The concrete A-dock will cast an intense shadow where juvenile PS Chinook salmon may occur. Construction barges, the new covered structure, and vessels that moor at A-dock will also cast a shadow. Numerous studies demonstrate that juvenile salmon, in both marine and freshwater habitats, are more likely to avoid the shadow of an overwater structure than to pass through the shadow (Celedonia et al. 2008a; Celedonia et al. 2008b; Kemp et al. 2005; Moore et al. 2013; Munsch et al. 2014; Nightingale and Simenstad 2001; Ono et al. 2010; Southard et al. 2006).

An implication of juvenile salmon avoiding overwater structures is that some of them will swim around the structure (Nightingale and Simenstad 2001). Swimming around overwater structures lengthens the salmonid migration route, which is correlated with increased mortality (Anderson et al. 2005). In addition, if any juvenile approaches A-dock, any predator hovering in the shade of the structure would simultaneously be more difficult to be detected and better able to see approaching juveniles (Helfman 1981). Across the marina, juveniles are likely to swim between and around multiple piers, increasing migratory path length and exposing them to piscivorous predators. This will likely result in proportionally increased juvenile PS Chinook mortality. A-dock would contribute measurably to that impact.

The annual number of juvenile PS Chinook salmon that may be exposed to increased predation and longer migration distances attributable to this action is unquantifiable with any degree of certainty. However, the small affected area suggests that the probability of mortality would be very low for any individual fish. Therefore, the numbers of fish that may be exposed to increased predation and longer migration distances annually will be very low, and no detectable effects at the population level are expected.

Adult PS Chinook salmon and PS steelhead will likely be too large to be affected by increased predation due to their size. Juvenile PS steelhead will move quickly through the area and will be relatively large and free from shoreline obligation. Therefore, like adults, they are unlikely to face increased predation due to the presence of the structure. Unlike salmonids, juvenile rockfish migration and risk of predation are not known to be adversely impacted by artificial structures such as piers and docks (Love et al. 2002). The aggregation of some rockfish near docks, piers, and other artificial structure suggests that, harm is unlikely to occur to juvenile PS/GB bocaccio from those structures.

***Artificial Lighting***

Little to no project work would occur outside of daylight hours. During construction, the applicant will use low intensity lighting, which will be shielded or directed to prevent light from reaching the water surface. However, as discussed in Section 1.3, the applicant will replace existing lighting along the dock. The proposed covered structure will also have artificial lighting. The construction barges and vessels that will continue to moor at A-dock may be illuminated after dark. The type, intensity, and duration of vessel lighting would be variable, but most of the boat illumination would likely be limited to low-intensity navigation lights that would be on only for short periods (minutes) just before leaving the dock, or after arriving.

The available literature demonstrates that artificial lighting can attract fish (positive phototaxis) and may shift nocturnal behaviors toward more daylight-like behaviors. It may also affect light-mediated behaviors such as migration timing. In lacustrine environments, subyearling Chinook, coho, and sockeye salmon exhibit strong nocturnal phototaxic behavior toward light from 60-watt incandescent bulbs held about 6 feet above the water, with phototaxis positively correlated with light intensity (Tabor et al. 2017). Becker et al. (2013) found that the abundance of small shoaling fish and larger predatory fish increased in artificially illuminated estuarine waters. Ina et al. (2017) demonstrated that post-larvae and juvenile Pacific bluefin tuna show strong positive phototaxis. Celedonia and Tabor (2015) reported that attraction to artificial lights may delay the onset of early morning migration by up to 25 minutes for some juvenile Chinook salmon in the Lake Washington Ship Canal, but it was unlikely to alter migration timing in the evening. The available information to describe the effects of artificial lighting on predator/prey relationships suggests that light-based predatory success in piscivorous fish is probably offset by similar improvements in predator avoidance by juvenile salmonids (Mazur and Beauchamp 2003; Tabor et al. 1998).

Based on the high level of shoreline development and the high density of boats and docks in the action area, nighttime artificial illumination is likely high. The lights from structure-related vessels, upland covered structure, and A-dock will add to in-water illumination in the area. Though the LED lights along the length of the new A-dock will be shielded, the lights will not be low intensity and will be located close to the water's surface. Therefore, they are likely to be detectable by fish. Adult PS Chinook and juvenile and adult PS steelhead are not nearshore dependent but may pass through the area during migration. The increased illumination does not overlap with the presence of SAV on the eastern side of Cap Sante Marina where juvenile bocaccio are most likely to occur. However, juvenile PS Chinook salmon are nearshore oriented and are likely to be exposed to structure-related artificial lighting. Exposed juvenile Chinook would likely experience some level of nocturnal phototaxis, and may experience other altered behaviors, such as delayed resumption of migration in the morning. The effect this may have on the fitness and survival of exposed individuals is unknown. However, given the short duration of the work and the low numbers of juvenile PS Chinook salmon that may be present at the project site, any individuals that may be affected by artificial lighting would likely comprise extremely small subsets of the cohorts from their respective populations, and the numbers of exposed fish would be too low to cause any detectable population-level effects.

### *Propeller Wash and Scour*

Propellers and propeller wash can mobilize sediments and dislodge aquatic organisms. In shallow water areas with high levels of vessel traffic, propeller scour can diminish the density and diversity of the benthic community. Though construction-related and structure-related vessels would likely operate at low power levels, they would be situated over relatively shallow water (about -12 MLLW). Across the marina, propeller wash likely reduces productivity enough to reduce the fitness of Chinook salmon and juvenile PS/GB bocaccio. A-dock would contribute measurably to that impact.

Killgore et al. (2011) report that fish are killed by spinning boat propellers. Propeller-related turbulence has also been documented to kill small aquatic organisms like copepods (Bickel et al. 2011). Small fish and larvae that are exposed to propeller wash may also be displaced by the fast-moving turbulent water. Propeller wash is unlikely to affect adult PS Chinook salmon and PS steelhead, because they are unlikely to approach close enough to operating boats to be exposed. In the unlikely event of adult exposure, their increased size and swimming ability suggest that they will swim away from the propeller wash with no detectable effects other than a very brief avoidance behavior. Juvenile PS/GB bocaccio are unlikely to be affected as they are associated with benthic habitat away from the surface where effects are likely to occur.

Juvenile PS Chinook salmon and PS steelhead that migrate past the dock and larval PS/GB bocaccio and PS/GB yelloweye rockfish that drift by the dock are likely to be relatively close to the surface where they may be exposed to spinning propellers and propeller wash, and will be too small to effectively swim against the turbulent water. Therefore, juvenile PS Chinook salmon, juvenile PS steelhead, larval PS/GB bocaccio, and larval PS/GB yelloweye rockfish may be injured, killed, or displaced propellers and propeller wash. Juvenile PS Chinook salmon and juvenile PS steelhead are not present during the in-water work window, but may be exposed to structure-related propeller wash. Although the likelihood of this interaction is very low for any individual fish or any individual boat trip, it is likely that over the life of A-dock, at least some juvenile salmonids and larval rockfish will experience reduced fitness or mortality from exposure to spinning propellers and/or propeller wash at the site. The annual number of individuals that may be impacted by this stressor is unquantifiable with any degree of certainty. However, based on the expectation that exposed individuals would be very small subsets of the cohorts from their respective populations, the numbers of exposed fish will be too low to cause detectable population-level effects.

### *Shoreline Armoring*

<u>Forage</u>

The proposed project will strengthen and maintain an armored shoreline in the project area. As described in Section 1.3, the applicant proposes to rework the existing riprap at the site and install a concrete backwall above MHHW. Juvenile PS Chinook salmon survival is positively influenced by rapid growth during early estuarine and nearshore marine residence (Duffy and Beauchamp 2011). For several weeks to months after Chinook salmon leave their natal streams, they tend to prefer undisturbed, gently sloping shallow nearshore estuarine and marine habitats. These habitats are very important to juvenile salmon because they provide high quality forage resources and refuge from predators while the juveniles grow and undergo their physiological transition to offshore marine life.

Shoreline armoring interrupts sediment recruitment and transport, which alters grain size and artificially steepens the shore. It prevents the recruitment of driftwood and beach wrack that support invertebrate organisms (Dethier et al. 2016; Heerhartz and Toft 2015; Sobocinski et al. 2010). Steepened banks that are typical along shoreline armoring effectively force the juvenile salmon that pass it into deeper waters, where foraging often comes at a higher energetic cost. Heerhartz and Toft (2015) report that feeding behaviors of juvenile salmon are higher along unarmored shorelines than along armored shorelines, and that decreased or altered prey availability along armored shorelines is detrimental to juvenile salmon in nearshore ecosystems. Shoreline armoring can also negatively affect forage fish spawning by reducing the amount of available spawning habitat, and/or by increasing egg mortality (Rice 2006), which may reduce the available forage for adult salmon. Across the marina, shoreline armoring likely prevents or reduces forage fish spawning and the abundance of invertebrate organisms that are prey for Chinook salmon enough to reduce the fitness of PS Chinook salmon. A-dock would contribute measurably to that impact.

Migration and Predation

Armoring also increases juvenile salmon exposure to piscivorous predators in both freshwater and marine habitats (Edwards and Cunjak 2007; Peters et al. 1998; Willette 2001). The increased rugosity of riprap allows predators to hide much more effectively than shallow waters with relatively smooth bottoms (Peters et al. 1998). As described above, juvenile salmonids would swim around A-dock due to shading. Swimming around A-dock and/or the other structures in the marina would drive juvenile salmonids toward the armored shoreline. However, the steepened banks of the armored shoreline would effectively force the juvenile salmon that pass it into the deeper waters between the shoreline and A-dock where they may encounter increased predation risk. Heerhartz and Toft (2015) report that feeding behaviors of juvenile salmon are higher along unarmored shorelines than along armored shorelines, and that decreased or altered prey availability along armored shorelines is detrimental to juvenile salmon in nearshore ecosystems. Willette (2001) reports that marine piscivorous predation of juvenile salmon increased fivefold when the juvenile salmon were forced to leave shallow nearshore habitats.

Based on the best available information, some of the juvenile PS Chinook salmon that swim along the riprap structure are likely to be killed due increased exposure to predators or to experience sub-lethal effects, such as reduced growth, from reduced forage availability. The number of individual PS Chinook salmon that may be impacted annually by this stressor is unquantifiable with any degree of certainty. However, based on the expectation that exposed individuals would be very small subsets of the cohorts from their population, the numbers of exposed fish will be too low to cause detectable population-level effects. Adult PS Chinook and juvenile and adult PS steelhead are not nearshore dependent. Juvenile PS/GB bocaccio are unlikely to be affected as they are associated with SAV located along the eastern side of the marina away from the armored shoreline. Therefore, they are unlikely to be adversely affected by shoreline armoring in the action area.

*Stormwater*

As discussed in Section 1.3, the applicant proposes to replace existing concrete and asphalt paving upland. The proposed project would not increase the amount of impervious surface nor increase the volume or composition of stormwater runoff that would come from the project site. Stormwater runoff will continue to be conveyed to the existing city storm drain system. Even if the replacement did not occur, the same amount and composition of stormwater would be discharged to the same site. Therefore, there is no "but for" causal relationship between the proposed action and stormwater discharge.

### 2.5.2. Effects on Critical Habitat

Past critical habitat designations have used the terms primary constituent elements (PCE) or essential features (EF) to identify important habitat qualities. The new critical habitat regulations (81 FR 7214) replace those terms with physical or biological features (PBF). This shift in terminology does not change the approach used in conducting our analysis, whether the original designation identified PCE, EF, or PBF.

*Chinook Salmon*

Designated critical habitat within the action area for PS Chinook salmon consists of estuarine and marine rearing sites, migration corridors, and their essential physical and biological features. The PBFs of PS Chinook salmon critical habitat in the action area are nearshore marine areas free of obstruction with water quality and quantity conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation; and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels.

Free of Obstruction and Excessive Predation

Pile driving and vessel noise would cause PS Chinook salmon to avoid the action area and/or increase the predation risk for PS Chinook salmon. Strengthening and maintaining the armored shoreline will maintain conditions that enhance piscivorous predator success. The proposed action will replace and expand a longstanding overwater structure that may affect shoreline migration of juveniles and increase the risk of predation. Artificial lighting along the dock may also delay migration. The proposed action will act to maintain this PBF at a reduced functional level compared to undisturbed areas. Therefore, the action will cause a long-term negative change in the quality and function of this PBF.

Water Quality

The action will eliminate sources of ongoing PAH water contamination through the removal of the existing structure's creosote-treated piles. Construction will briefly mobilize contaminated sediments, and may also very slightly reduce DO in very limited areas. Detectable construction-related effects on water quality are expected to be limited to the area well within 300 feet around the project site, and are not expected to persist past one or two hours after work stops. However, structure-related vessels may continue to mobilize contaminated sediments and discharge pollutants into the foreseeable future. Therefore, the action will cause a minor long-term negative change in the quality and function of this PBF.

Water Quantity
The proposed action will have no effect on water quantity, and will cause no change in the quality and function of this PBF.

Forage
Pile driving may injure and kill forage fish that may occur in the action area. However, the number of individuals injured or killed would be too small to cause population-level effects and be detectable by PS Chinook salmon. Construction will mobilize small amounts of PAH-contaminated sediments that could be taken up by benthic invertebrates that are forage resources for juvenile salmon. Sediment distribution will be limited to the area well within 300 feet around the project site, but detectable levels of contaminants may persist for years. Structure-related vessels may also mobilize contaminated sediments and discharge pollutants, which may be taken up by benthic invertebrates. Shading from A-dock, vessels moored at A-dock, and the covered structure may slightly reduce the production and diversity of invertebrate organisms that are prey for juvenile salmonids under and near the structure into the foreseeable future. The armored shoreline will reduce forage fish spawning, the abundance of benthic invertebrates, and increase the energetic cost of forage in the action into the foreseeable future. Therefore, the action will cause a long-term minor change in the quality and function of this PBF.

Natural Cover
The proposed action will not affect natural cover from SAV as there is no eelgrass or macroalgae in the vicinity of the proposed or existing A-dock. Installation of the 12 large woody debris structures will provide habitat for juvenile Chinook salmon. Therefore, the action will cause a long-term beneficial change in the quality and function of this PBF.

***Rockfish***

Nearshore areas (less than 30 meters, 98 feet deep, relative to MLLW) with substrates such as sand, rock and/or cobble compositions, that also support kelp, provide settlement habitat for juvenile bocaccio. Designated critical habitat for PS/GB yelloweye rockfish does not occur in the action area. The PBFs for juvenile bocaccio in the action area include juvenile settlement habitats located in the nearshore with substrates such as sand, rock and/or cobble compositions that also support kelp with the following attributes

- Quantity, quality, and availability of prey species to support individual growth, survival, reproduction, and feeding opportunities; and
- Water quality and sufficient levels of dissolved oxygen to support growth, survival, reproduction, and feeding opportunities.

Quantity, Quality, and Availability of Prey Species
Pile driving may injure and kill forage fish that may occur in the action area. However, the number of individuals injured or killed would be too small to cause population-level effects and be detectable by bocaccio. Construction will mobilize small amounts of PAH-contaminated sediments that could be taken up by benthic invertebrates that are forage resources for juvenile salmon. Sediment distribution will be limited to the area well within 300 feet around the project site, but detectable levels of contaminants may persist for years. Structure-related vessels may also mobilize contaminated sediments and discharge pollutants, which may be taken up by benthic invertebrates. Shading from A-dock, vessels moored at A-dock, and the covered

structure may slightly reduce the production and diversity of invertebrate organisms that are prey for juvenile bocaccio. Therefore, the action will not cause a long-term negative change in the quality and function of this PBF.

Water Quality

The action will eliminate sources of ongoing PAH water contamination through the removal of the existing structure's creosote-treated piles. Construction will briefly mobilize contaminated sediments, and may also very slightly reduce DO in very limited areas. Detectable construction-related effects on water quality are expected to be limited to the area well within 300 feet around the project site, and are not expected to persist past one or two hours after work stops. However, structure-related vessels may continue to mobilize contaminated sediments and discharge pollutants into the foreseeable future. Therefore, the action will cause a minor long-term negative change in the quality and function of this PBF.

## 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). 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 in the Environmental Baseline section (Section 2.4).

The current condition of ESA-listed species and designated critical habitat within the action area are described in the Status of the Species and Critical Habitat and the Environmental Baseline sections above. The contribution of non-federal activities to those conditions include past and on-going shoreline development, maritime activities, and upland urbanization. Those actions were driven by a combination of economic conditions that characterized traditional natural resource-based industries, general resource demands associated with settlement of local and regional population centers, and the efforts of social groups dedicated to restoration and use of natural amenities, such as cultural inspiration and recreational experiences.

NMFS is unaware of any specific future non-federal activities that are reasonably certain to affect the action area. However, NMFS is reasonably certain that future non-federal actions such as the previously mentioned vessel activities are all likely to continue and increase in the future as the human population continues to grow across the region. Continued habitat loss and degradation of water quality from development and chronic low-level inputs of non-point source pollutants will likely continue into the future. Recreational and commercial use of nearshore marine waters within the action area is also likely to increase as the human population grows.

The intensity of these influences depends on many social and economic factors, and therefore is difficult to predict. Further, the adoption of more environmentally acceptable practices and standards may gradually reduce some negative environmental impacts over time. Interest in restoration activities has increased as environmental awareness rises among the public. State, tribal, and local governments have developed plans and initiatives to benefit ESA-listed species in the action area. However, the implementation of plans, initiatives, and specific restoration projects are often subject to political, legislative, and fiscal challenges that increase the uncertainty of their success.

## 2.7. Integration and Synthesis

The Integration and Synthesis section is the final step in our assessment of the risk posed to species and critical habitat as a result of implementing the proposed action. 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 diminishes the value of designated or proposed critical habitat for the conservation of the species.

### 2.7.1. ESA-listed Species

The species considered in this Opinion have been listed under the ESA, based on declines from historic levels of abundance and productivity, loss of spatial structure and diversity, and an array of limiting factors as a baseline habitat condition. Each species will be affected over time by cumulative effects, some positive – as recovery plan implementation and regulatory revisions increase habitat protections and restoration, and some negative – as climate change and unregulated or difficult to regulate sources of environmental degradation persist or increase. Overall, to the degree that habitat trends are negative, as described below, effects on viability parameters of each species are also likely to be negative. In this context we consider the effects of the proposed action's effect on individuals of the listed species at the population scale. The action area provides habitat for nearshore marine life histories of PS Chinook salmon, PS steelhead, PS/GB bocaccio, and PS/GB yelloweye rockfish.

***Chinook Salmon***

The action area supports PS Chinook salmon adult and juvenile migration, and juvenile rearing. The long-term trend in abundance of the PS Chinook salmon ESU is slightly negative. Reduced or eliminated accessibility to historically important habitat, combined with degraded conditions in available habitat appear to be the greatest threats to the recovery of PS Chinook salmon. Degraded water quality and temperature, degraded nearshore conditions, and impaired passage for migrating fish also continue to impact this species.

The environmental baseline within the action area has been highly degraded from upland urbanization, shoreline armoring, overwater cover, and maritime activities. However, the action area remains supportive of PS Chinook salmon, and provides migratory habitat for adults and juveniles. Adults may also be present during construction, but they would be independent of the shoreline. However, very low numbers may be injured or killed if they are present within 4 meters of impact proofing.

Juvenile PS Chinook salmon will not be present during the in-water work window, but will be exposed to structure-related effects. Very low numbers of juveniles may be exposed annually to structure-related altered lighting, noise, propeller wash, contaminants, reduced forage, increased migratory length and predation over the decades-long expected life of A-dock, the armored shoreline, and upland covered structure. These stressors, both individually and collectively, are likely to cause a range of effects that would include some combination of altered behaviors, delayed migration, reduced fitness, and mortality in some exposed individuals.

The number of PS Chinook salmon that are likely to be injured or killed by action-related stressors is unknown, but is expected to be very low, and such a small fraction of a returning cohort that it will have no detectable effect on any of the characteristics of a viable salmon population (VSP), abundance, productivity, distribution, or genetic diversity) for the affected population(s). Based on the best available information, the scale of the direct and indirect effects of the proposed action, when considered in combination with the degraded baseline, cumulative effects, and the impacts of climate change, will be too small to cause any population level impacts on PS Chinook salmon. Therefore, the proposed action will not appreciably reduce the likelihood of survival and recovery of this listed species.

***Steelhead***

The action area supports adult and juvenile migration. The DPS is currently at very low viability, and long-term abundance trends have been predominantly negative or flat across the DPS. Continued destruction and modification of habitat, widespread declines in adult abundance, and declining diversity appear to be the greatest threats to the recovery of PS steelhead. Reduced habitat quality and urbanization also continue to impact this species. The environmental baseline within the action area has been highly degraded from upland urbanization, shoreline armoring, overwater cover, and maritime activities.

Project-related work will avoid the presence of out-migrating juvenile PS steelhead, but will overlap with the presence of returning adults. Juveniles and adults are expected to be independent of the shoreline. During construction, very low numbers of adults may be injured, killed, or displaced by noise. Propellers and propeller wash associated with continued use of the pier may also injure, kill, or displace juvenile PS steelhead. The number of PS steelhead that are likely to be injured or killed by action-related stressors is unknown, but is expected to be very low, and such a small fraction of a returning cohort that it will have no detectable effect on any of the characteristics of a VSP, abundance, productivity, distribution, or genetic diversity) for the affected population(s). Similarly, the annual number of juveniles that are likely to be injured or killed by exposure to action-related stressors is also unknown, but is expected to be too low to cause detectable effects on any VSP characteristics for the affected population(s).

Based on the best available information, the scale of the direct and indirect effects of the proposed action, when considered in combination with the degraded baseline, cumulative effects, and the impacts of climate change, will be too small to cause any population level impacts on PS steelhead. Therefore, the proposed action will not appreciably reduce the likelihood of survival and recovery of this listed species.

***Bocaccio***

The action area may support juvenile rearing and larvae. No reliable population estimates are available for the DPS, but the best available information indicates that bocaccio were never a predominant segment of the total rockfish abundance in Puget Sound, and suggest that their present-day abundance is likely a fraction of their pre-contemporary fishery abundance. Fishing removals and degraded water quality appear to be the greatest threats to the recovery of the DPS. The environmental baseline within the action area has been highly degraded from upland urbanization, shoreline armoring, overwater cover, and maritime activities.

The construction work window largely overlaps with the timing for juveniles and larvae in the Puget Sound region. Should individuals be present during construction, very low numbers of bocaccio may be killed, injured, or displaced by noise. Propellers and propeller wash associated with continued use of the structure may injure, kill, or displace PS/GB bocaccio larvae. Vessel-related contamination may injure or kill bocaccio. Structure-related reduced forage may impact the fitness of individuals. The number of juvenile and larval PS/GB bocaccio that are likely to be injured or killed by action-related stressors is unknown, but is expected to be extremely low, and such a small fraction of a cohort that it will have no detectable effect on any of the characteristics of a viable population (abundance, productivity, distribution, or genetic diversity) for this DPS.

The proposed action will allow the continued existence of an overwater structure that will keep certain habitat conditions at slightly reduced functional levels as compared to undisturbed areas. However, the structure will not cause or worsen any habitat conditions in a manner that will act to limit the recovery of this species. Based on the best available information, the scale of the direct and indirect effects of the proposed action, when considered in combination with the degraded baseline, cumulative effects, and the impacts of climate change, will be too small to cause any population level impacts on PS/GB bocaccio. Therefore, the proposed action will not appreciably reduce the likelihood of survival and recovery of this listed species.

***Yelloweye Rockfish***

The action area may support larvae. Best available information suggests that the present-day abundance of yelloweye rockfish in PS is likely a fraction of their pre-contemporary fishery abundance. Fishing removals and degraded water quality appear to be the greatest threats to the recovery of the DPS. The environmental baseline within the action area has been highly degraded from upland urbanization, shoreline armoring, overwater cover, and maritime activities.

As discussed above, there will be no population-level effects for PS Chinook salmon and PS/GB bocaccio. Thus, there will be no detectable effect on forage availability for the adult PS/GB yelloweye rockfish that prey on them. Further, the number of juvenile PS Chinook salmon that may consume contaminated prey at the site will be very low, only a small subset of those individuals may be consumed by PS/GB yelloweye rockfish, and biomagnification of PAHs does not occur in fish (Suedel et al. 1994). Therefore, the action is extremely unlikely to cause detectable levels of contaminants in PS/GB yelloweye rockfish.

Should yelloweye rockfish larvae be present during construction, very low numbers may be killed, injured, or displaced by noise. Propellers and propeller wash associated with continued use of the structure may also injure, kill, or displace larval PS/GB yelloweye rockfish. The number of PS/GB yelloweye rockfish larvae that are likely to be injured or killed by action-related stressors is unknown, but is expected to be extremely low, and such a small fraction of a cohort that it will have no detectable effect on any of the characteristics of a viable population (abundance, productivity, distribution, or genetic diversity) for this DPS.

Based on the best available information, the scale of the direct and indirect effects of the proposed action, when considered in combination with the degraded baseline, cumulative effects, and the impacts of climate change, will be too small to cause any population level impacts on PS/GB yelloweye rockfish. Therefore, the proposed action will not appreciably reduce the likelihood of survival and recovery of this listed species.

### 2.7.2. Critical Habitat

As described above at Section 2.5.2, the proposed action is likely to adversely affect designated critical habitat for PS Chinook salmon and PS/GB bocaccio.

***Chinook Salmon***

For PS Chinook salmon critical habitat, past and ongoing anthropogenic activities have diminished the availability and quality of nearshore marine habitats and reduced water quality across the Puget Sound basin. Marine habitat threats include urbanization, wetland draining and conversion, dredging, armoring of shorelines, and marina and port development. Future non-federal actions and climate change are likely to increase and continue acting against the quality of salmonid critical habitat. The intensity of those influences on salmonid habitats is uncertain, as is the degree to which those impacts may be tempered by adoption of more environmentally acceptable land use practices, implementation of non-federal plans that are intended to benefit salmonids, and efforts to address the effects of climate change.

The PBF for PS Chinook salmon critical habitat in the action area are limited to nearshore marine areas free of obstruction and excessive predation. The site attributes of those PBF that will be affected by the action are limited to water quality, natural cover, and forage that support juvenile growth and maturation. As described above, the environmental baseline within the action area has been highly degraded from upland urbanization, shoreline armoring, overwater cover, and maritime activities. However, despite this overall degraded condition, the action area remains supportive of PS Chinook salmon.

Construction and the continued presence of A-dock and shoreline armoring would cause conditions within the marina that would cause long-term minor effects on obstruction and predation, water quality, and forage. The proposed action will cause a long-term positive change in natural cover with installation of large woody debris structures in the marina. Based on the best available information, the scale of the proposed action’s effects, when considered in combination with the degraded baseline, cumulative effects, and the impacts of climate change, will be too small to cause any detectable long-term negative changes in the quality or functionality of nearshore marine area PBFs in the action area. Therefore, this critical habitat will maintain its current level of functionality, and retain its current ability for PBF to become functionally established, to serve the intended conservation role for PS Chinook salmon.

***Bocaccio***

For PS/GB bocaccio critical habitat, nearshore critical habitat has been degraded by past and ongoing shoreline development that has altered shoreline substrates, degraded water quality, and reduced eelgrass and kelp habitats in many areas of Puget Sound. Future non-federal actions and climate change are likely to increase and continue acting against the quality of PS/GB bocaccio critical habitat. The intensity of those influences is uncertain, as is the degree to which those impacts may be tempered by adoption of more environmentally acceptable practices, restoration activities, and efforts to address the effects of climate change.

The PBF for PS/GB bocaccio critical habitat in the action area is limited to nearshore settlement habitats with sand, rock, and/or cobble substrates that also support kelp. The site attributes of that PBF that will be affected by the action are limited to prey quantity, quality, and availability, and water quality and sufficient DO to support individual growth, survival, reproduction, and feeding opportunities. As described above, the environmental baseline within the action area has been highly degraded from upland urbanization, shoreline armoring, overwater cover, and maritime activities. However, despite this degraded condition, the action area remains supportive of PS/GB bocaccio

Construction and the continued presence of A-dock would cause conditions within the marina that would cause long-term minor effects on water quality and the quantity, quality, and availability of prey species. Based on the best available information, the scale of the proposed action's effects, when considered in combination with the degraded baseline, cumulative effects, and the impacts of climate change, will be too small to cause any detectable long-term negative changes in the quality or functionality of nearshore marine area PBFs in the action area. Therefore, this critical habitat will maintain its current level of functionality, and retain its current ability for PBF to become functionally established, to serve the intended conservation role for PS/GB bocaccio.

## 2.8. Conclusion

After reviewing and analyzing the current status of the listed species, the environmental baseline within the action area, the effects of the proposed action, any effects of interrelated and interdependent actions, and cumulative effects, it is NMFS' opinion that the proposed action is not likely to jeopardize the continued existence of PS Chinook salmon, PS steelhead, PS/GB yelloweye rockfish and PS/GB bocaccio, nor is it likely to destroy or adversely modify designated critical habitat for PS Chinook salmon and PS/GB bocaccio.

## 2.9. Incidental Take Statement

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

### 2.9.1. <u>Amount or Extent of Take</u>

In the biological opinion, we determined the proposed action is reasonably certain to cause incidental take of listed fish:

Harm of PS Chinook salmon from

- Exposure to construction-related noise
- Exposure to construction-related propeller wash
- Exposure to contaminated forage
- Exposure to structure-related noise
- Exposure to structure-related propeller wash
- Exposure to structure-related contaminated water
- Exposure to structure-related reduced forage
- Exposure to structure-related altered migratory behaviors
- Exposure to structure-related predation

Harm of PS steelhead

- Exposure to construction-related noise
- Exposure to structure-related propeller wash

Harm of PS/GB yelloweye rockfish from

- Exposure to construction-related noise
- Exposure to construction-related propeller wash
- Exposure to structure-related propeller wash

Harm of PS/GB bocaccio from

- Exposure to construction-related noise
- Exposure to construction-related propeller wash
- Exposure to structure-related propeller wash
- Exposure to structure-related contaminated water

- Exposure to contaminated forage
- Exposure to structure-related reduced forage

The distribution and abundance of fish that occur within an action area are affected by habitat quality, competition, predation, and the interaction of processes that influence genetic, population, and environmental characteristics. These biotic and environmental processes interact in ways that may be random or directional, and may operate across far broader temporal and spatial scales than are affected by the proposed action. Thus, the distribution and abundance of fish within the action area cannot be attributed entirely to habitat conditions, nor can NMFS precisely predict the number of fish that are reasonably certain to be injured or killed if their habitat is modified or degraded by the proposed action.

Therefore, we cannot predict with meaningful accuracy the number of PS Chinook salmon, PS steelhead, PS/GB bocaccio, and PS/GB yelloweye rockfish that are reasonably certain to be injured or killed by exposure to any of these stressors. Additionally, NMFS knows of no device or practicable technique that would yield reliable counts of individuals that experience these impacts. In such circumstances, NMFS uses the causal link established between the activity and the likely extent and duration of changes in habitat conditions to describe the extent of take as a numerical level of habitat disturbance. The most appropriate surrogates for take are action-related parameters that are directly related to the magnitude of the expected take.

***Construction-Related Noise and Propeller Wash***

For this action, the timing and duration of work are the best available surrogates for the extent of take of listed species from exposure to construction-related noise and propeller wash. Timing and duration of work are applicable because the planned work windows were selected to reduce the potential for fish presence at the project site. Therefore, working outside of the planned work window and/or working for longer than planned would increase the number of fish likely to be exposed to construction-related impacts that are likely to cause injury or reduce fitness.

For take resulting from noise from pile driving and extraction, we use the geographic extent of noise as a habitat surrogate. This surrogate is proportional to the amount of take, because we expect an increased number of individuals exposed to project-related noise with increasing geographic extent of the noise.

***Contaminated Forage***

For increased suspended sediment and PAH exposure, the best available indicator for the extent of take is the extent of visible increased turbidity. Based on past projects (Bloch 2010), the observed extent of turbidity is a reliable indicator of the extent of elevated suspended sediment, and therefore, the extent of exposure of to listed species. Because PAHs will be released during activities that increase suspended sediment, the observed extent of turbidity is a reliable indicator of the extent of PAH exposure.

*Structure-Related Reduced Forage and Increased Predation*

The size of A-dock and upland covered structure are the best available surrogate for the extent of take of juvenile PS Chinook salmon from exposure to structure-related altered lighting. This is because the size of the shaded area is positively correlated with size of A-dock, and the size and intensity of the artificially illuminated of the area is positively correlated with number and type of lights that are installed along those structures. As the size of the shadow increases, the amount of productive habitat decreases. This reduces available shelter and forage, which increases risk of predation, increases energetic costs, and reduces fitness in exposed individuals. As the number and intensity of the dock lights increase, the size and intensity of the artificially illuminated area increases. Increases in either would increase the number of exposed fish and/or increase the intensity of phototaxis and other light altered behaviors that exposed fish would experience.

*Structure-Related Vessel Noise, Propeller Wash, Contaminated Water and Forage*

The size of A-dock is the best available surrogate for the extent of 1) take of juvenile PS Chinook salmon from structure-related vessel noise, 2) take of juvenile PS Chinook salmon and juvenile PS/GB bocaccio from contaminated water and forage, and 3) take of juvenile PS steelhead, juvenile PS Chinook, larval PS/GB bocaccio and larval PS/GB yelloweye rockfish from propeller wash. This is because both stressors are positively correlated with the number of boats that moor at A-dock, which is largely a function of the dock's length. As the length of A-dock increases, the number of vessels that can moor there would increase. As the number of vessels increases, vessel activity would likely increase, and the potential for listed species to be exposed to the related noise, propeller wash, vessel discharge, contaminated sediments and associated contaminated forage would increase.

*Shoreline Armoring*

The area of altered riprap and proposed concrete backwall are the best take surrogate for structure-related armored shoreline. This is because increasing their length may increase the migratory distance for shoreline-obligated juvenile Chinook salmon that swim along the armored shoreline, and reduce benthic productivity and forage fish spawning. Expansion of the existing riprap, would improve habitat conditions for piscivorous predators. Those changes are likely to increase energetic costs and risk of predation for juvenile Chinook salmon.

The take represented by these surrogates is equivalent to the maximum amount of take considered in our jeopardy analysis. Therefore, if a surrogate is exceeded, reinitiation of consultation will be required. This surrogate will function as an effective reinitiation trigger because these surrogates can and will be measured and reported.

In summary, the extent of take for this action is defined as:

1. PS Chinook salmon:
    - 1.1 In-water work between November 1 and February 15;
    - 1.2 Geographic extent of underwater noise from pile driving/extraction;
    - 1.3 Geographic extent of visible turbidity from pile driving/extraction;
    - 1.4 Size of A-dock;

1.5 Size the upland covered structure; and
1.6 Size of the altered shoreline armoring.

2. PS steelhead:
   2.1 In-water work between November 1 and February 15;
   2.2 Geographic extent of underwater noise from pile driving/extraction; and
   2.3 Size of A-dock.

3. PS/GB bocaccio:
   3.1 In-water work between November 1 and February 15;
   3.2 Geographic extent of underwater noise from pile driving/extraction;
   3.3 Geographic extent of visible turbidity; and
   3.4 Size of A-dock.

4. PS/GB yelloweye rockfish:
   4.1 In-water work between November 1 and February 15;
   4.2 Geographic extent of underwater noise from pile driving/extraction; and
   4.3 Size of A-dock.

#### 2.9.2. <u>Effect of the Take</u>

In the biological opinion, NMFS determined that the amount or extent of anticipated take, coupled with other effects of the proposed action, is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat (Section 2.7).

#### 2.9.3. <u>Reasonable and Prudent Measures</u>

"Reasonable and prudent measures" are nondiscretionary measures that are necessary or appropriate to minimize the impact of the amount or extent of incidental take (50 CFR 402.02). NMFS believes that the full application of the reasonable and prudent measures described below is necessary and appropriate to minimize the likelihood of incidental take of ESA-listed species.

The Corps shall:

1. Implement monitoring and reporting to confirm that the take exemption for the proposed action is not exceeded.

The applicant shall:

2. Implement monitoring and reporting to confirm that the take exemption for the proposed action is not exceeded.

#### 2.9.4. <u>Terms and Conditions</u>

The terms and conditions described below are non-discretionary, and the Corps or any applicant must comply with them in order to implement the RPMs (50 CFR 402.14). The Corps or any applicant 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, protective coverage for the proposed action would likely lapse.

To implement RPM Number 1, the Corps shall require the applicant to collect and report details about the take of listed species. That plan shall:

1. Require the contractor to maintain and submit construction logs to verify that all take indicators are monitored and reported. The logs should indicate:
    - 1.1 An in-water work window of November 1 to February 15;
    - 1.2 A maximum of 23 days of pile extraction and installation combined;
    - 1.3 A maximum of 4 hours of vibratory pile extraction and installation per day;
    - 1.4 Vibratory extraction of a maximum sixty-three 13-inch and 14-inch creosote-treated timber piles;
    - 1.5 Vibratory installation of a maximum of two 16-inch and thirty three 20-inch steel pipe piles;
    - 1.6 Impact proofing a maximum of two 16-inch and thirty three 20-inch steel pipe piles;
    - 1.7 A maximum of 3,000 pile strikes per day using an impact hammer;
    - 1.8 Use of a bubble curtain that distributes air bubbles around 100 percent of the perimeter of the pile during impact proofing;
    - 1.9 A visible turbidity plume not to exceed 300 feet from the project site during any portion of the project; and
    - 1.10 A maximum area of A-dock of 17,145 square feet.

2. Submit an electronic post-construction report to NMFS within six months of project completion. Send the report to: projectreports.wcr@noaa.gov. Be sure to include the NMFS Tracking number for this project in the subject line: Attn: WCRO-2019-00110.

To implement RPM Number 2, the applicant shall collect and report details about the take of listed species. That plan shall:

3. Require the contractor to maintain and submit construction logs to verify that take indicators are monitored and reported. The logs should indicate:
    - 3.1 A maximum area of 100 square feet for riprap reworking;
    - 3.2 A maximum size of the new concrete backwall of 2 feet in height and 35 feet in length;
    - 3.3 Vibratory installation of a maximum of four 16-inch steel piles above MHHW;
    - 3.4 Impact proofing a maximum of four 16-inch steel piles above MHHW;
    - 3.5 A maximum area of the concrete abutment of 295 square feet; and
    - 3.6 Size of the new upland covered structure.

4. Submit an electronic post-construction report to NMFS within six months of project completion. Send the report to: projectreports.wcr@noaa.gov. Be sure to include the NMFS Tracking number for this project in the subject line: Attn: WCRO-2019-00110.

## 2.10. Conservation Recommendations

Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Specifically, conservation recommendations are suggestions regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information (50 CFR 402.02).

1. The Corps and applicant should encourage contractors to use the lowest safe maneuvering speeds and power settings when maneuvering in shallow water close to the shoreline, with the intent to minimize propeller wash.
2. The Corps should encourage the applicant to install clean capping material over substrates where contaminated sediments may settle out after pile installation.
3. The Corps should encourage the applicant to enforce best management practices (BMPs) required by the Clean Marina Washington program.
4. The Corps should encourage the applicant to require patrons to operate vessels at low speeds near the dock and other shallow shoreline areas.

## 2.11. Reinitiation of Consultation

This concludes formal consultation for the Corps' authorization of the Port of Anacortes A-Dock Replacement Project in Anacortes, Washington. As 50 CFR 402.16 states, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained or is authorized by law and if: (1) The amount or extent of incidental taking specified in the ITS is exceeded, (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion, (3) the agency action is subsequently modified in a manner that causes an effect on the listed species or critical habitat that was not considered in this opinion, or (4) a new species is listed or critical habitat designated that may be affected by the action.

## 2.12. "Not Likely to Adversely Affect" Determinations

This concurrence was prepared pursuant to section 7(a)(2) of the ESA, implementing regulations at 50 CFR 402 and agency guidance for preparation of letters of concurrence.

### 2.12.1. Southern Resident Killer Whales and Humpback Whales

The maximum distance of underwater noise from the proposed action is 1,585 meters (approximately 1 mile). This represents the distance from pile driving to the threshold for behavioral disruption. According to SRKW sightings from (The Whale Museum 2019), no SRKW have been observed in the action area or nearby Fidalgo Bay from 1990 to 2013. Further, the Orca Network (2018) reports no SRKW or humpback whale sightings in the action area or Fidalgo Bay. Given lack of sightings and high volume of marine traffic in the area (CH2M Rodino Inc. and Peterson Resources 2016), the presence of SRKW and humpback whales in the action area is extremely unlikely. Therefore, suspended sediment and noise are not likely to adversely affect SRKW and humpback whales.

The proposed action will cause ephemeral minor effects on prey. The effects to Chinook salmon will not cause population-level effects that will measurably reduce SRKW forage. Additionally, because the number of juvenile PS Chinook salmon that consume contaminated prey at the site would be very low, and because only a small subset of those individuals may be consumed by SRKW, the action is extremely unlikely to cause detectable levels of contaminants in SRKW.

As discussed in Section 1.3, vessel activity is interrelated and interdependent with the proposed action. However, the proposed action will not increase the number or frequency (timing) of vessel transits in the action area. It will not change the concentration of vessel traffic, and therefore, will not change sound propagation and the soundscape in the action area. Further, it will not change the acoustic characteristics (such as the source level or frequency spectrum) of the individual vessels, because it will not affect factors such as vessels' size, shape, speed, load, age, condition, or propulsion system (Southall et al. 2019). Therefore, ongoing vessel activity is not likely to adversely affect SRKW and humpback whales.

### 2.12.2. Southern Resident Killer Whale Critical Habitat

The proposed action is not likely to adversely affect critical habitat that has been designated for SRKW. We designated critical habitat for SRKW on November 29, 2006 (71 FR 69054). Critical habitat for SRKW includes marine waters of PS that are at least 20 feet deep.

The PBFs of SRKW critical habitat in the action area include:

- Water quality to support growth and development;
- Prey species of sufficient quantity, quality, and availability to support individual growth, reproduction and development, as well as overall population growth; and
- Passage conditions to allow for migration, resting, and foraging.

The proposed action will cause ephemeral minor effects on water quality. It will cause no measurable changes in water temperature and salinity. The presence of detectable levels of contaminants, including suspended sediments, will be ephemeral, infrequent, localized, and of such low concentrations that changes in water quality will be insignificant.

As discussed above, the proposed action will cause ephemeral minor effects on prey. The effects to Chinook salmon will not cause population-level effects that will measurably reduce SRKW forage. Therefore, effects to SRKW prey will be insignificant.

Detectable levels of construction-related noise will be limited to 1 mile east of the project site. As described above, SRKW do not use this area. Therefore, the action will cause insignificant effects on this PBF.

As described above, the proposed action will not increase the number or frequency (timing) of vessel transits in the action area. It will not change the concentration of vessel traffic or change the acoustic characteristics of the individual vessels. Therefore, effects to SRKW passage from vessel activity interrelated and interdependent with the proposed action will be insignificant.

Therefore, the proposed action is not likely to adversely affect humpback whales or SRKW and their designated 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. The MSA (section 3) defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." 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) also requires NMFS to recommend measures that can be taken by the action agency to conserve EFH.

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

## 3.1. Essential Fish Habitat Affected by the Project

The proposed action and action area for this consultation are described in Sections 1 and 2 of this document. The action area includes areas designated as EFH for various life-history stages of Pacific coast groundfish, coastal pelagic species, and Pacific coast salmon. The PFMC described and identified EFH for Pacific Coast groundfish (PFMC 2005), coastal pelagic species (PFMC 1998), and Pacific Coast salmon (PFMC 2014). The action area is not designated as a habitat area of particular concern (HAPC).

## 3.2. Adverse Effects on Essential Fish Habitat

The ESA portion of this document describes the adverse effects of this proposed action on ESA-listed species and critical habitat, and is relevant to the effects on EFH for Pacific coast groundfish, coastal pelagic species, and Pacific coast salmon. Based on the analysis of effects presented in Section 2.5, the proposed action will cause small-scale adverse effects on this EFH through direct or indirect physical, chemical, or biological alteration of the water or substrate, and through alteration of benthic communities, and the reduction in prey availability. Therefore, we have determined that the proposed action would adversely affect the EFH identified above.

## 3.3. Essential Fish Habitat Conservation Recommendations

Fully implementing the EFH conservation recommendation below would protect, by avoiding or minimizing the adverse effects described in Section 3.2, above, approximately 9 acres of designated EFH for Pacific Coast salmon, Pacific Coast groundfish, and coastal pelagic species.

1. To reduce adverse alteration of the physical, chemical, or biological characteristics of the water and substrate, the Corps shall require the applicant to implement the project and associated conservation measures as described in Section 1.3 of this Opinion, particularly:
    - 1.1 Install a full-depth silt curtain around pile extraction.
    - 1.2 Limit vibratory pile removal to vibratory extraction and/or simple pull techniques (no water jetting, no clamshell excavation).
    - 1.3 Require that contractors and tugboat operators adjust work practices to ensure that turbidity does not exceed 300 feet from the project site, and to halt work should the visible turbidity plume approach and that range.

2. To reduce adverse alteration of benthic communities and reduction in prey availability, the Corps shall require the applicant to implement the project and associated conservation measures as described in Section 1.3 of this Opinion, particularly:
    - 2.1 Utilize a bubble curtain during impact proofing to minimize impacts to prey species.

### 3.4. Statutory Response Requirement

As required by section 305(b)(4)(B) of the MSA, the Corps must provide a detailed response in writing to NMFS within 30 days after receiving an EFH Conservation Recommendation. Such a response must be provided at least 10 days prior to final approval of the action if the response is inconsistent with any of NMFS' EFH Conservation Recommendations unless NMFS and the Federal agency have agreed to use alternative time frames for the Federal agency response. The response must include a description of measures proposed by the agency for avoiding, minimizing, mitigating, or otherwise offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with the Conservation Recommendations, the Federal agency must explain its reasons for not following the recommendations, including the scientific justification for any disagreements with NMFS over the anticipated effects of the action and the measures needed to avoid, minimize, mitigate, or offset such effects (50 CFR 600.920(k)(1)).

In response to increased oversight of overall EFH program effectiveness by the Office of Management and Budget, NMFS established a quarterly reporting requirement to determine how many conservation recommendations are provided as part of each EFH consultation and how many are adopted by the action agency. Therefore, we ask that in your statutory reply to the EFH portion of this consultation, you clearly identify the number of conservation recommendations accepted.

### 3.5. 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)).

## 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 is the Corps. Other interested users could include other Puget Sound ports and the citizens of Anacortes, Washington. Individual copies of this opinion were provided to the Corps. The format and naming adheres to conventional standards for style.

### 4.2. Integrity

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

### 4.3. Objectivity

***Information Product Category***: Natural Resource Plan

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

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

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

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

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