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 No:
WCRO-2019-03375

May 14, 2020

Michelle Walker
Chief, Regulatory Branch
U.S. Army Corps of Engineers
Seattle District
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 Bellingham's Blaine Harbor Bulkhead Repairs (Corps No.: NWS-2019-347)

Dear Ms. Walker:

Thank you for your letter of May 5, 2019, requesting initiation of consultation with NOAA's National Marine Fisheries Service (NMFS) pursuant to section 7 of the Endangered Species Act of 1973 (ESA) (16 U.S.C. 1531 et seq.) for the Port of Bellingham's Blaine Harbor Bulkhead Repairs. This consultation was conducted in accordance with the 2019 revised regulations that implement section 7 of the ESA (50 CFR 402, 84 FR 45016).

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 U.S.C. 1855(b)), and concluded that the action would adversely affect the EFH of Pacific salmon. Therefore, we have included the results of that review in Section 3 of this document. One conservation recommendation is included.

In the opinion, we conclude that the proposed action is not likely to jeopardize the continued existence of Puget Sound (PS) Chinook salmon (*Oncorhynchus tshawytscha*) nor will it result in the destruction or adverse modification of PS Chinook designated critical habitat.

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 U.S. Army Corps of Engineers (COE) 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.

Please contact Janet Curran, Oregon Washington Coastal Office in Lacey, Washington, janet.curran@noaa.gov, 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: Randel Perry, COE
Matthew Bennett, COE

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

Port of Bellingham's Blaine Harbor Bulkhead Repairs
(Corps No.: NWS-2019-347)

NMFS Consultation Number: WCRO-2019-03375

Action Agency: U.S. Army Corps of Engineers

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

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

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: May 14, 2020

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1. INTRODUCTION

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

1.1 Background

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

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

1.2 Consultation History

The U.S. Army Corps of Engineers (COE) proposes to authorize the Port of Bellingham to rebuild sections of bulkheads with Blaine Harbor Marina, Blaine, Washington. The COE submitted a Biological Evaluation (BE) and other supporting information on May 3, 2019. In early 2020, NMFS was advised of the perceived urgency of the repairs for public safety. We proceeded to evaluate the proposed action under an individual consultation. On February 4, 2020, we received more detailed information on the amount of creosote being removed by the Port. We initiated consultation on February 4, 2020.

The COE determined the project is “likely to adversely affect” (LAA) Puget Sound (PS) Chinook salmon. The COE also determined that the project is “not likely to adversely affect” (NLAA) PS Chinook salmon critical habitat, PS steelhead, and Southern Resident killer whale (SRKW). The COE made “no effect” determinations for critical habitat of PS steelhead and SRKW, therefore NMFS did not consult on these habitats. We did not agree that the project would not adversely affect PS Chinook critical habitat, therefore this opinion includes an analysis of effects on the critical habitat of PS Chinook salmon. Our concurrence with the remainder of the NLAA determinations is included in the document under Section 2.12.

NMFS also completed an Essential Fish Habitat (EFH) consultation. It was prepared in accordance with section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) (16 U.S.C. § 1801, *et seq.*) and implementing regulations codified at 50 C.F.R. § 600. As described in more detail in the consultation below, the action adversely affects EFH.

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). Under the MSA, federal action means any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken by a Federal Agency (50 CFR 600.910).

The proposed action, as described by the Port of Bellingham is as follows (edited to remove references to project drawing not included in this document or other non-pertinent information such as references to local regulations):

> "*The Port is proposing bulkhead repair and replacement activities . . . at the Boundary Fish, Walsh, and Sawtooth Piers and will include the following activities:*
>
> ***Boundary Fish Pier***
>
> *• Install new 12-inch steel H-pile or 12-inch-diameter steel soldier pile to reinforce degraded pile.*
>
> *• Demolish and replace sections of timber pier decking for access to pile caps and pile and lagging repairs.*
>
> *• Install cementitious grout behind existing lagging to repair holes in bulkhead.*
>
> *• Demolish existing asphalt landward of existing bulkhead, regrade, and replace demolished paving to repair sinkholes in existing asphalt.*
>
> ***Walsh Pier***
>
> *• Demolish and replace existing broken and missing timber cross bracing.*
>
> *• Install cementitious grout behind existing lagging to repair holes in bulkhead.*
>
> ***Sawtooth Pier***
>
> *• Replace approximately 271 feet of existing treated timber bulkhead with steel sheet pile wall and concrete pile cap.*
>
> *• Over 105 feet of the existing wall, excavate approximately 2,000 cubic yards behind the bulkhead, demolish the existing bulkhead, install a new sheet pile bulkhead, backfill sheet piles, and install precast concrete deadman or pile anchors for tieback restraint landward of replacement bulkhead.*
>
> *• For 166 feet of bulkhead under the Sawtooth Pier, demolish the pier at the bulkhead, install new sheet pile immediately in front of the existing bulkhead, backfill the space between the new and existing bulkhead, install precast concrete deadman or pile anchors for tieback restraint landward of the replacement bulkhead, install tiebacks, and reconstruct the demolished area of the pier.*
>
> *• Repave the area landward of the replacement bulkhead with hot mix asphalt.*

The Port of Bellingham also provided the following additional information on the project elements, construction techniques, and best management practices (BMPs)/conservation measures.

Boundary Fish and Walsh Piers

Construction activities at the Boundary Fish Pier include replacing an existing timber pile with a new 12-inch steel H-pile or 12inch- diameter steel soldier pile, demolishing and replacing sections of timber decking and pile caps for access to pile and lagging repairs, and installing grout behind existing lagging to repair holes in the bulkhead . . .

Pile installation of one 12-inchdiameter steel soldier pile at the Boundary Fish Pier will be conducted using vibratory pile driving methods. Equipment specific to vibratory pile installation includes a spring-isolated hammerhead and a set of hydraulic pile clamps. This process begins by placing a choker around the pile and lifting it into vertical position with a water- or land-based crane. The pile is then lowered into position and set in place at the mudline. The pile is held steady while the vibratory hammer installs the pile to the required tip elevation.

Demolishing and replacing sections of timber decking, pile caps, and lagging and grout installation at the Boundary Fish Pier will be conducted over and under the pier primarily using handheld equipment. Timber features will be replaced in-kind with ammoniacal copper zinc arsenate (ACZA) or similar treated timber for protection against the marine environment. The final treated timber type will be subject to agency approval.

Cementitious grout will be installed above ordinary high water in areas where gaps are found between the existing timber lagging. To install the grout, temporary forms or similar will be placed to prevent potential leakage of grout material during installation. The forms will be removed once the grout is cured. Work will be completed during low tide to the extent practicable.

In order to repair sinkholes in existing pavement landward of the Boundary Fish Pier bulkhead, the Project also includes demolishing, regrading as needed, and replacing pavement. Regrading will be conducted using an excavator or similar equipment and will include excavating up to 50 cubic yards of soil in an area of up to 2,000 square feet. Excavated soil will be reused to the extent practicable to provide an even grade and up to 20 cubic yards of excess soils will be disposed of at an approved off-site facility, pending suitability for reuse. If needed, up to 20 cubic yards of base course material will be imported to create a 6-inch layer below the repaved area. There will be no net gain of impervious surface in this area.

Timber cross bracing replacement and grout installation at the Walsh Pier will be conducted using similar construction methods as described above (see Sheets 4 and 8). Missing and broken timber cross bracing will be replaced using ACZA or similar treated 4- by 12-foot timber braces and bolted to existing timber piles.

Sawtooth Pier Bulkhead Replacement

The Sawtooth Pier bulkhead replacement activities include two zones, the Sawtooth Pier Zone (166 feet long) and the North Bulkhead Zone (105 feet long). . . . In both areas, the existing treated timber bulkhead will be replaced by a steel sheet pile wall and concrete pile cap. The sheet pile wall will be retained with tiebacks installed landward of the replacement bulkhead and attached to precast concrete deadman or upland pile anchors . . . . At the Sawtooth Pier Zone, the existing timber decking, stringers, and pile caps of *the pier up to the first pier bent will be removed to allow sheet pile installation. The replacement bulkhead will be installed waterward of the existing treated timber bulkhead and soldier piles, covering up to 650 square feet of aquatic habitat. . . . The steel sheet piles will be installed using vibratory pile drivers as described above. Additional impact driving may be necessary to drive the pile to final depth. This construction method is required in this zone due to assessed constructability at the Sawtooth Pier. An impact pile-driving hammer, used for installing piles, is a large piston-like device that is usually attached to a crane. Equipment specific to impact pile installation includes a crane and impact hammer. Impact pile driving will be completed when water levels are below mean sea level to reduce noise impacts to the extent practicable.*

The area behind the replacement bulkhead will be excavated to install the tiebacks and deadman anchors. The concrete pile cap will be formed and cast above mean higher high water (MHHW) using watertight forms. The area behind the replacement bulkhead will be backfilled and compacted using heavy equipment.

To offset aquatic habitat loss in this area, in the North Bulkhead Zone the replacement bulkhead will be installed landward of the existing bulkhead, creating at least 650 square feet of aquatic habitat resulting in no net loss. The aquatic habitat gained by bulkhead replacement in this area will be intertidal, open-water habitat, which will provide additional habitat function and opportunity for aquatic vegetation to recruit in this area, compared to the covered habitat lost by bulkhead replacement underneath the Sawtooth Pier.

To install the replacement bulkhead in this area, the existing bulkhead backfill will be excavated so that existing tiebacks, timber piles, and lagging can be removed. The replacement steel sheet piles, tiebacks, and deadman anchors will be installed using similar methods as the Sawtooth Pier Zone.

Paved areas landward of the replacement bulkhead will be repaved using a hot mix asphalt. In total, approximately 2,000 cubic yards of material will be excavated landward of the replacement bulkhead in both areas. Excavated materials will be reused and compacted to the extent practicable to regrade the area behind the replacement bulkhead. If excavated material is not suitable for reuse, up to 1,500 cubic yards of clean fill may be imported for use at the site. Treated timber and any excess excavated materials will be disposed of at an approved off-site facility.

Project Timing and Schedule

The Project will occur over two in-water work windows . . . . During the first in-water work window, the bulkhead in the North Bulkhead Zone will be replaced, creating the new aquatic habitat necessary for replacing the bulkhead in the Sawtooth Pier Zone. In addition, the work at the Boundary and Walsh bulkheads will occur in the first in-water work window. During the second in-water work window, the bulkhead in the Sawtooth Pier Zone will be replaced.

Inwater work will be performed consistent with the allowable in-water work windows established by regulatory agencies to minimize potential disturbance of sensitive fish and wildlife species, which is expected to be between July 16 and February 15. . . . Upland work may occur outside of the in-water work window.

Best Management Practices

Conservation measures and BMPs have been incorporated into the Project design to avoid or minimize environmental effects and the exposure of sensitive species to potential effects from this Project. The following general BMPs will be implemented to avoid or minimize environmental impacts during the Project.

• All applicable permits for the Project will be obtained prior to construction. All work will be performed according to the requirements and conditions of these permits.

• In-water work will be performed consistent with the allowable in-water work windows established by regulatory agencies to minimize potential disturbance of sensitive fish and wildlife species.

• In-water work will be completed during lower water levels in Blaine Harbor to the extent practicable to avoid or minimize potential impacts to the aquatic environment during construction.

• Turbidity and other water quality parameters will be monitored to ensure that construction activities are in compliance with Washington State water quality standards.

• The contractor will be responsible for the preparation of a Spill Prevention, Control, and Countermeasure Plan to be used for the duration of the Project to safeguard against an unintentional release of fuel, lubricants, or hydraulic fluid from construction equipment.

• Excess or waste materials will not be disposed of or abandoned waterward of MHHW or allowed to enter waters of the State.

• The contractor will be required to retrieve any floating debris generated during construction, using a skiff and a net. Debris will be disposed of at an appropriate upland facility.

• All areas disturbed by Project construction will be stabilized as soon as possible to prevent erosion. The contractor will supply a Temporary Erosion and Sediment Control Plan to the Project Engineer.

• Demolition and construction materials will not be stored where high water, wave action, or upland runoff can cause materials to enter surface waters.

• Timber products used for the Project will be treated consistent with the Specifiers Guide BMPs for the Use of Preserved Wood in Aquatic and Sensitive Environments guidance (WWPI et al. [date unknown]). This is the standard for treated wood when ACZA wood or equivalent is proposed.

We considered whether or not the proposed action would cause any other activities and determined that it would not. Port activities will continue whether or not the proposed action is undertaken. The action is necessary maintenance to support existing operations.

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 provide an opinion stating how the agency's actions would affect listed species and their critical habitats. If incidental take is reasonably certain to occur, section 7(b)(4) requires NMFS to provide an ITS that specifies the impact of any incidental taking and includes non-discretionary reasonable and prudent measures (RPMs) and terms and conditions to minimize such impacts.

The COE determined the project was "likely to adversely affect" (LAA) Puget Sound (PS) Chinook salmon. The COE also determined that the project is "not likely to adversely affect" (NLAA) PS Chinook salmon critical habitat, PS steelhead, and Southern Resident killer whale (SRKW). The COE made "no effect" determinations for critical habitat of PS steelhead and SRKW, therefore NMFS did not consult on these habitats. We did not agree that the project would not adversely affect PS Chinook critical habitat, therefore this opinion includes an analysis of effects on the critical habitat of PS Chinook salmon. Our concurrence with the remainder of the NLAA determinations is included in this document under Section 2.12.

NMFS also completed an Essential Fish Habitat (EFH) consultation. It was prepared in accordance with section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) (16 U.S.C. § 1801, *et seq.*) and implementing regulations codified at 50 C.F.R. § 600. As described in more detail in the consultation below, the action adversely affects EFH.

2.1 Analytical Approach

This biological opinion includes both a jeopardy analysis and an adverse modification analysis. The jeopardy analysis relies upon the regulatory definition of "jeopardize the continued existence of" a listed species, which is "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species" (50 CFR402.02). 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 as a whole for the conservation of a listed species" (50 CFR 402.02).

The designation(s) of critical habitat for (species) use(s) the term primary constituent element (PCE) or essential features. The 2016 critical habitat regulations (50 CFR 424.12) replaced 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.

The 2019 regulations define effects of the action using the term “consequences” (50 CFR 402.02). As explained in the preamble to the regulations (84 FR 44977), that definition does not change the scope of our analysis and in this opinion we use the terms “effects” and “consequences” interchangeably.

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

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

2.2 Rangewide Status of the Species and Critical Habitat

This opinion examines the status of each species that 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’ “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 function of the essential PBFs that help to form that conservation value.

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. 2014, Mote et al. 2016). Rain-dominated watersheds and those with significant contributions from groundwater may be less sensitive to predicted changes in climate (Tague et al. 2013, Mote et al. 2014).

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% 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 (Mantua et al. 2010; Isaak et al. 2012). 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; Winder and Schindler 2004; Raymondi et al. 2013). Higher temperatures are likely to cause several species to become more susceptible to parasites, disease, and higher predation rates (Crozier et al. 2008; Wainwright and Weitkamp 2013; Raymondi et al. 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 (McMahon and Hartman 1989; Lawson et al. 2004).

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 expected to be 1.0-3.7ºC higher 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 (Tillmann and Siemann 2011; Reeder et al. 2013).

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 10-32 inches by 2081-2100 (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 (Tillmann and Siemann 2011; Reeder et al. 2013). 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 (Tillmann and Siemann 2011; Reeder et al. 2013).

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 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.

Table 1, below, provides a summary of listing and recovery plan information, status summaries and listing 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.westcoast.fisheries.noaa.gov).

Table 1. A summary of listing and recovery plan information, status summaries and listing factors for the species addressed in this opinion.

Species	Listing Classification and Date	Recovery Plan Reference	Most Recent Status Review	Status Summary	Limiting Factors
Puget Sound Chinook salmon	Threatened 6/28/05	Shared Strategy for Puget Sound 2007 NMFS 2006	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 TRT planning ranges for recovery, and most populations are consistently below the spawner-recruit levels identified by the TRT as consistent with recovery.	• Degraded floodplain and in-river channel structure • Degraded estuarine conditions and loss of estuarine habitat • Degraded riparian areas and loss of in-river large woody debris • Excessive fine-grained sediment in spawning gravel • Degraded water quality and temperature • Degraded nearshore conditions • Impaired passage for migrating fish • Severely altered flow regime

This section describes the status of designated critical habitat relevant to 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). Critical habitat is not designated for Puget Sound Steelhead in marine waters.

For salmon, NMFS's critical habitat analytical review teams (CHARTs) ranked watersheds within designated critical habitat at the scale of the fifth-field hydrologic unit code (HUC5) in terms of the conservation value they provide to each ESA-listed species that they support (Good et al. 2005). The conservation rankings were high, medium, or low. To determine the conservation value of each watershed to species viability, the CHARTs evaluated the quantity and quality of habitat features, the relationship of the area compared to other areas within the species' range, and the significance to the species of the population occupying that area. Even if a location had poor habitat quality, it could be ranked with a high conservation value if it were essential due to factors such as limited availability, a unique contribution of the population it served, or serving another important role.

In designating critical habitat for PS Chinook in estuarine and nearshore marine areas, NMFS determined that the area from extreme high water extending out to the maximum depth of the photic zone (no greater than 30 meters relative to MLLW) contain essential features that require special protection. For nearshore marine areas, NMFS designated the area inundated by extreme high tide because it encompasses habitat areas typically inundated and regularly occupied during the spring and summer when juvenile salmon are migrating in the nearshore zone and relying heavily on forage, cover, and refuge qualities provided by these occupied habitats.

All physical and biological features (or primary constituent elements) of estuarine and nearshore marine critical habitat have been degraded throughout the PS region. The causes for these losses of critical habitat value include human development, including diking, filling of wetlands and bays, channelization, nearshore and floodplain development. The continued human population growth contributes to the anthropogenic modification of the PS shorelines and is the major factor in the cumulative degradation and loss of nearshore and estuarine habitat. The development of shorelines includes bank hardening and the introduction of obstructions in the nearshore, each a source of structure and shade which can interfere with juvenile salmonid migration, diminish aquatic food supply, and is a potential source of water pollution from boating uses (Shipman et al., 2010; Morley et al., 2012; Fresh et al., 2011).

The degradation of multiple aspects of PS Chinook salmon critical habitat indicates that the conservation potential of the critical habitat is not being reached, even in areas where the conservation value of habitat is ranked high.

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 is contained within the boundaries of the Blaine Harbor Marina where underwater sound from pile driving (see Section 2.5) will extend during construction. The action area also includes the upland construction and staging areas within the marina. The action area is determined by the greatest extent of physical, chemical and biological effects stemming from the project. For the proposed action, there are both short-term construction-related effects and long-term structure-related effects. The greatest extent of physical, chemical or biological effects stemming from the proposed action is associated with temporary construction-related underwater sound from pile driving. The contractor will use both vibratory and impact pile drivers. Sound waves from vibratory pile drivers can travel for miles through the water or until landfall. Given the shape of the marina and the breakwater structures at the entrance, the vibratory and impact sound waves will likely not travel outside of the marina. Therefore, the waters of Drayton Harbor and Semiahmoo Bay will likely not be affected by pile driving sound. Within a few hundred feet of the immediate work areas, turbidity will be intermittently elevated with tidal cycles and will quickly dissipate within a matter of hours during each day of construction. We also recognize that the rebuilt structures will continue to alter nearshore habitat by extending the useful life of the facilities. For this assessment we consider the life of the proposed structures to be 50 years. These impacts on nearshore and intertidal habitat and function are discussed in detail in the Effects of the Action section (2.5).

The tidal elevation which bounds the Army Corp of Engineer's regulatory authority and responsibility varies by location. At the project site under this review, NMFS has not determined the extreme high tide (i.e., the highest predicted tide in the 19 year tidal cycle) (Highest Astronomical Tide) HAT, but in other areas of Puget Sound, the HAT tideline is one to two+ feet higher than MHHW. Accordingly, NMFS has assessed potential effects on designated critical habitat separate from the COE's choice of MHHW for Clean Water Act permitting.

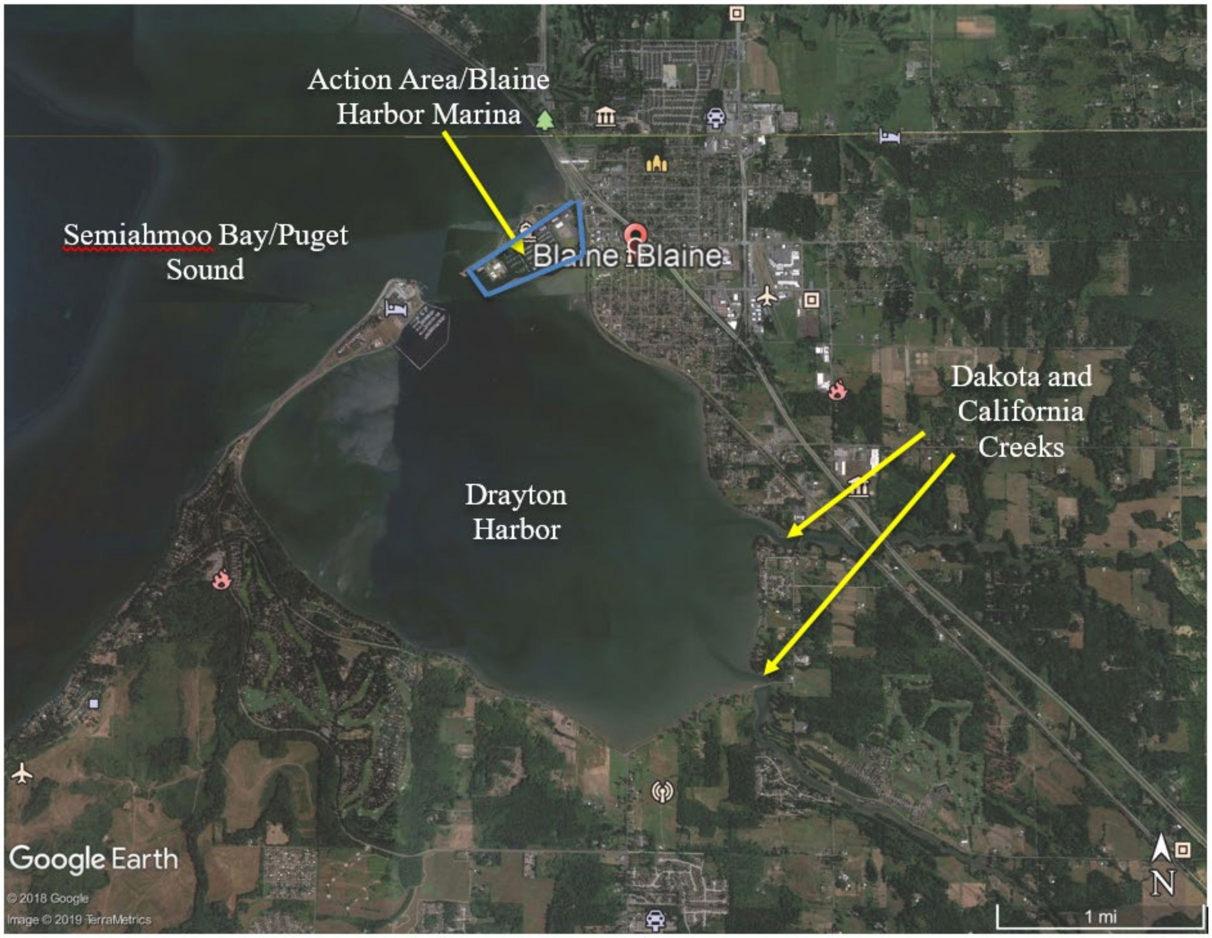

Figure 1. Action Area is shown in blue outline within larger vicinity. The action area is limited to the Blaine Harbor Marina.

2.4 Environmental Baseline

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

Blaine Harbor Marina is located at the mouth of the Drayton Harbor estuary, where aquatic conditions consist of marine water from Semiahmoo Bay (Puget Sound) mixing with freshwater from California and Dakota creeks. The project is located in a heavily used commercial and industrial portion of Blaine Harbor Marina that provides relatively low aquatic habitat value.

Originally the Blaine marina site was tide flats with shallow water depths similar to area that currently surrounds the marina (Port of Bellingham, 2007). In the mid-1880s, a wharf was built. By 1909, there were a number of businesses, including five canneries, three lumber mills, an oyster industry, a crab cannery, and three shingle mills. All of the original mills and canneries have since closed, with the last cannery shutting its doors in the mid-1960s. Although dredging and filling have been taking place in Blaine Harbor since the late 1800s, the last major fill activity occurred in the early 1950s, when the Army Corps of Engineers dredged what is now the marina basin. The dredge material from that project was used to expand the marina's upland area (Port of Bellingham, 2007).

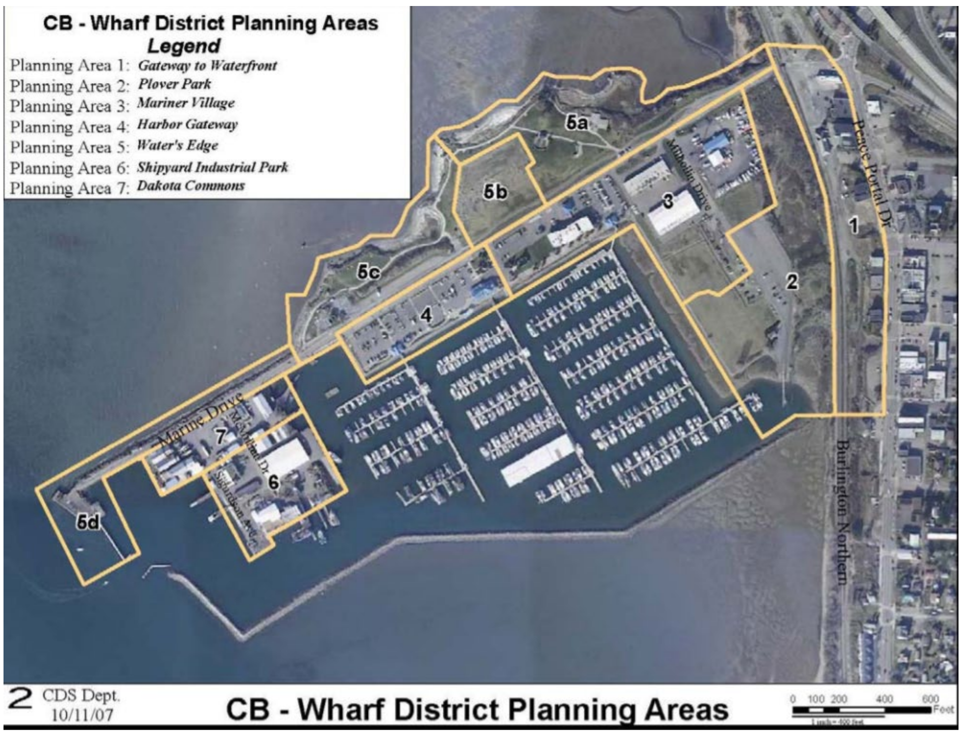

Figure 2. Aerial Photo of Blaine Harbor Marina in 2007.

The project area consists of the upland construction staging areas and the aquatic area within Blaine Harbor Marina in the immediate vicinity of construction. The larger action area is contained within the boundaries of the marina where underwater sound waves will carry from pile driving. The action area does not extend into Drayton Harbor or Semiahmoo Bay. Outside of the action area, Drayton Harbor and Semiahmoo Bay provide habitat for salmon and other fish, birds, mammals, and other wildlife. Drayton Harbor has a contiguous eelgrass (*Zostera marina*) bed that comprises a significant portion of the intertidal habitat area and extends out of the harbor into parts of Semiahmoo Bay (WDNR 2015). A portion of the existing Drayton Harbor eelgrass habitat area was planted by the Port in the late 1990s as mitigation for dredging and expansion at the Blaine Harbor Marina. Within the marina, vegetation and habitat conditions are limited by existing development, and there is no eelgrass mapped in the marina, including the immediate project area (WDNR 2015). The Washington Department of Fish and Wildlife

(WDFW) maps Blaine Harbor and the surrounding area as priority habitat area for Pacific herring (*Clupea pallasi*) and Dungeness crab *(Metacarcinus magister*) (WDFW 2019a).

The PS Chinook salmon in the action area originate from Dakota and California creeks. These two creeks are independent drainages that flow into Drayton Harbor. Both streams have been negatively impacted by past development that has resulted in degraded water quality, loss of habitat and impaired ecological functions, yet both creeks still support small fall Chinook runs.

Designated critical habitat within the action area for PS Chinook salmon consists of estuarine habitat and associated PBFs. The necessary PBFs of functional critical habitat of PS Chinook salmon critical are described below (description below is for properly functioning habitat, not what currently exists within the action area).

Estuarine areas free of obstruction and excessive predation with:

(i) Water quality, water quantity, and salinity conditions supporting juvenile and adult physiological transitions between fresh- and saltwater; (ii) Natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels; and (iii) Juvenile and adult forage, including aquatic invertebrates and fishes, supporting growth and maturation.

In the immediate action area within the marina, the shoreline is altered by the marina infrastructure with vertical bulkheads and industrial piers. There is a very narrow strip of intertidal substrate (sandy mud) that is exposed at the base of the bulkheads at low tides. The existing piers and vertical bulkheads in the marina create shade over the upper intertidal zone, creating a barrier to salmonid movement along the shoreline approximately one half of daytime hours when these hours coincide with high tides. Juvenile salmon migrate along the shallow nearshore margins of estuaries and will swim along the edges of eelgrass beds and along shadows cast by docks and piers. The eyes of salmonids adjust slowly to changes in light intensity so that salmonids often avoid swimming into shaded areas (Simenstad et al. 1999). In the marine nearshore, there is substantial evidence that over water structures impede the nearshore movements of juvenile salmonids with fish stopping at the edge of the structure and avoiding swimming into the shadow or underneath the structure (Heiser and Finn 1970; Able et al., 1998; Simenstad 1999; Southard et al., 2006; Toft et al., 2007; Ono 2010). In the PS nearshore, 35 millimeter to 45 millimeter juvenile chum and pink salmon were reluctant to pass under docks (Heiser and Finn 1970). Southard et al. (2006) snorkeled underneath ferry terminals and found that juvenile salmon were not underneath the terminals at high tides when the water was closer to the structure, but only moved underneath the terminals at low tides when there was more light penetrating the edges. Ono (2010) reports that juveniles tended to stay on the bright side of the shadow edge, two to five meters away from the dock, even when the shadow line moved underneath the dock. These findings suggest the overwater-structures within the marina disrupt juvenile migration as a baseline condition in the action area.

An implication of juvenile salmon avoiding over water structures is that some of them will swim around the structure (Nightingale and Simenstad 2001). This behavioral modification will cause them to temporarily swim into deeper water, thereby exposing them to increased piscivorous predation. Hesitating upon first encountering the structure also exposes salmonids to avian predators. When juvenile salmonids temporarily leave the relative safety of the shallow water, their risk of being preyed upon by other fishes increases. This has been shown in the marine environment where juvenile salmonid consumption by piscivorous predators increased fivefold when juvenile pink salmon were forced to leave the shallow nearshore (Willette 2001).

While these studies mostly examined larger structures, such as ferry terminals in deep water, NMFS is reasonably certain that the results reported for larger OWS, where juvenile salmon avoid shaded areas under large structures, concentrate at the edge of structures, and/or are pushed into deeper waters where predation increases, or ambushed by predators hiding in the shade under the structure and/or behind the piles, are also occurring within the marina, although it is not known to what extent PS Chinook salmon enter the marina versus swimming directly out of Drayton Harbor and into Semiahmoo Bay. Therefore, increased exposure to piscivorous predators in deeper water likely results in incrementally increased juvenile PS Chinook salmon mortality in the action area as a baseline condition. Albeit, the scale of the predation pressure within the marina is likely to be small because only a very small fraction of individual fish from any one cohort are likely to pass through the marina because the habitat in the adjacent areas of Drayton Harbor and Semiahmoo Bay are much more suitable/attractive to salmon. We presume that the vast majority of juvenile fish bypass the marina and swim out of Drayton Harbor directly into Semiahmoo Bay following the tidal currents in the narrow passage out of the bay (Figure 1). In addition, among those relatively few fish that may pass through the action area during a high tide, only a small fraction of those fish would actually be preyed upon in connection with the piers and bulkhead.

Water quality within the marina is assumed to be poor as a baseline condition from ongoing and legacy conditions, although specific data for the marina is not available. Marinas in general often have high levels of metals such as lead, arsenic, zinc, copper, iron, and chrome (EPA 2015). These metal compounds are often at levels that are toxic to aquatic organisms. Copper is the most common metal found at toxic concentrations in marina waters. These metals can accumulate in bottom sediments and aquatic organisms accumulate these toxins in their tissues, which then bio-accumulate up the food chain. Marinas also have high concentrations of petroleum hydrocarbons, particularly polynuclear aromatic hydrocarbons (PAHs) that tend to adsorb to particulate matter and become incorporated into sediments. The NMFS also assumes that water quality within the marina is affected by stormwater discharge from the upland areas of the marina. We also assume that over time, as the marina has been redeveloped, that water quality is/will be improved as the marina modernizes and comes into compliance with new stormwater regulations (Port of Bellingham, 2007).

As described in Section 2.2, sea level is expected to rise as a result of climate change and affect baseline conditions in the action area. As the sea level rises, the elevation of the intertidal zone will also rise, and where shoreline armoring prevents beach formation at these higher elevations, the width of intertidal zones will be reduced. This will reduce shallow water habitat during some low tides for juvenile salmonids, including PS Chinook salmon.

2.5 Effects of the Action

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

The primary work associated with the proposed project is bulkhead repair at the Sawtooth Pier. A total of 271 linear feet of creosote timber bulkhead will be replaced with a sheet pile wall in essentially the same footprint. At the Boundary Fish Pier, one pile will be replaced with a 12 inch steel pile. In addition, the bulkhead will be repaired with grouting behind the bulkhead wall above ordinary high water and sink holes will be filled in the pavement behind the wall. The Walsh Pier will be repaired by replacing some of the timber cross bracing and grouting the bulkhead on the landward side above the ordinary high water line. The new cross bracing will be made of ACZA treated timbers. The pier repairs are minor maintenance actions or they are incidental to the bulkhead repairs (parts of the piers need to be removed to gain access to the bulkhead). The proposed pier repairs do not meaningfully extend the useful life of the pier structures. Therefore, any structural impacts from the pier, or other activities caused by the pier, are not considered consequences of the proposed action. For the bulkhead work, the sections that will be grouted are considered minor in nature and will not significantly extend the useful life of the structures. However, the 271 foot replacement section of sheetpile bulkhead will extend the useful life of the bulkhead well into the future. However, this work is a spatially small repair in a larger bulkhead system that occurs throughout the marina. Therefore, we consider the effects of the new 271-foot sheetpile bulkhead to be effects of the action, but we do not consider the effects of the entire bulkhead system to be attributable to this action.

After the application of all minimization measures described in Section 1.3, the project would still have some adverse effects that cannot be avoided, which we analyze here. Designated critical habitat within the action area for PS Chinook salmon consists of estuarine rearing habitat within the marina. Temporary effects associated with construction that are reasonably certain to occur include localized water quality reduction from increased underwater sound from pile driving and elevated levels of turbidity and toxins. Long-term effects of the project (50 years; estimated life of the Sawtooth bulkhead repair) are continued degraded intertidal conditions caused by the presence of the bulkhead in the nearshore. Effects of the proposed structure is assessed in this biological opinion based on the expected life of the structure of 50 years. Therefore, we have not assessed effects of the proposed action beyond 50 years, and any activity (e.g. maintenance or repair) that extends the life of the structure beyond this is not included in our assessment of effects.

Short Term Effects

Pile Driving

Temporary, localized impacts to PS Chinook salmon and critical habitat will result from pile driving. The COE's allowable in-water work window of July 16 and February 15 avoids the time of year when juvenile salmonids are nearshore dependent and most abundant. Smolts usually migrate to estuarine areas within the first year, approximately 3 months after emergence from spawning gravel, with peak outmigration from natal rivers to Puget Sound from March through June. By mid-July, juveniles would be highly mobile and not strictly nearshore dependent, meaning that they can move offshore into deeper water outside of Drayton Harbor in Semiahmoo Bay (Puget Sound). Yearling PS Chinook may occur anywhere in Puget Sound at any time of year, though not in concentrated numbers. Adult PS Chinook salmon are not expected to occur in the action area within the marina. If any adults were to return to spawn in California and Dakota creeks, they would pass by the entrance of the marina, but would not be expected to enter the marina. Therefore, adults would not be exposed to effects of the action within the marina. Therefore, a small number, relative to the local populations from California and Dakota creeks, of individual juvenile and/or yearling PS Chinook salmon may occur in the action area during construction and be exposed to temporary construction effects.

The 12-inch diameter steel pile and the sheet pile bulkhead wall will be placed in the intertidal zone using both vibratory and impact hammer pile drivers. Piling driving in the intertidal zone will be completed to the extent practicable 'in the dry' when the tidal is out and the piles can be set without transferring sound waves directly into the seawater. However, some of the work may occur in shallow water because of the practicability of staging the work around daytime tide cycles during the in-water work window.

Impact pile driving

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).

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 maximum possible sound from impact driving the one 12-inch steel piles and the sheet piles to be less than or equal to this value. Any juvenile PS Chinook salmon that is within 4 meters of impact proofing could be injured or killed from exposure to a single pile impact strike (Table 2).

Table 2. 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**

Juvenile fish that remain within the boundaries of the marina for the full duration of impact pile driving would likely experience physiological impacts on auditory and non-auditory soft tissues from accumulated sound energy (Table 2). The severity and permanence of those impacts would depend on the distance from the source and the duration of the exposure, with intensity decreasing with increased distance and/or reduced length of exposure. Additionally, juvenile or yearling PS Chinook salmon within the action area, but not close enough for immediate harm, may experience sublethal effects from impact pile driving. 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). Therefore, a small number, relative to the local populations from California and Dakota creeks, of individual juvenile and/or yearling PS Chinook salmon may be harmed or killed during impact pile driving.

Impact pile driving sound waves may also harm forage fish if any are within the waters of the marina during impact pile driving. However, because of the small spatial area of the marina in relation to the larger, more suitable habitat of Drayton Harbor and Semiahmoo Bay, the number of forage fish injured or killed would be too small to cause detectable effects on local forage fish populations in the action area. Therefore, construction-related forage reductions would be too small to cause detectable effects among individual PS Chinook salmon in the action area, with no discernable effect to the local PS Chinook populations.

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). Therefore, for the vibratory pile driving, it is highly unlikely that fish would be directly harmed by the sound waves. Vibratory pile drivers generally produce less sound than impact hammers and do not produce the kind of impulsive sound associated with fish injuries (Caltrans 2015). Vibratory pile drivers are often employed as a minimization/avoidance measure to reduce the potential for adverse effects on fish that could result from impact pile driving (Caltrans 2015). NMFS does not have an established injury threshold criteria for vibratory pile driving for fish (meaning that there is no level at which fish injuries are presumed to occur (Caltrans 2015). Therefore, adverse effects from vibratory pile driving is not expected to occur. However, the vibratory sound waves will carry throughout the marina. This temporary sound disturbance may have some low level behavioral effect on juvenile PS Chinook salmon should they occur in the action area. Fish may startle or temporarily move out the area until the sound ceases likely without being harmed.

<u>Water Quality</u>

Pile driving will disturb bottom sediments which will elevate the concentration of suspended sediment periodically in the action area during each subsequent tidal cycle during the construction period, which will last approximately six weeks. By working primarily in the dry, during low tides, we expect only slightly elevated levels of turbidity during tidal inundations. Project-related turbidity is expected to abate within a matter of hours each day, and the area in which sediment creates turbid conditions would be localized (within a 150-foot to 300-foot radius of the work area). If any fish do pass by the work area, the elevated turbidity is expected to be within tolerance ranges of these fish, as the turbidity would be similar to that caused by wave activity. Effects to fish are likely to be limited to minor behavioral changes with fish volitionally avoiding turbidity pulses (Based on Newcombe and Jensen (1996).

The sediment that would be mobilized during construction is very likely to contain PAHs (polycyclic aromatic hydrocarbons) and other substances (toxins associated with creosote other legacy industrial chemicals likely to be in sediments at industrial piers) that are known to be injurious to fish. However, the amount of PAHs that may be released is expected to be very low, particularly because the creosote timbers are very old and highly weathered so that much of the toxin would have dissipated already. In addition, most lighter-weight PAHs would dissipate within a few hours after their release into the water through evaporation at the surface (Smith 2008; Werme *et al*. 2010). The remaining contaminants would quickly settle out of the water along with the sediments. The number of PS Chinook salmon expected to occur within the marina in close proximity to the work area is expected to be very low relative to the respective populations that occur in the action area. The low level of toxins and brief time period when the toxins would be mobilized would likely be too low and too short-lived to be detectable against background contamination, and too low to cause detectable effects on the fitness and normal behaviors in any fish that may be exposed to it.

The proposed ACZA-treated wood in and above water will leach some of the metals used for wood preservation into the environment. Of these metals, dissolved copper is of most concern to fish because of its higher leaching rate in the marine environment compared to arsenic and zinc (Poston 2001, Stratus 2006) and low level sublethal effects on olfactory function of fish (Hecht et al. 2007, McIntyre et al. 2012). The increase in dissolved copper concentration depends on many factors, including the amount of treated wood present, the leaching rate, BMPs applied, and water chemistry. Leaching from ACZA-treated wood has been shown to be highest during the first few weeks after installation and then decrease sharply to low levels. Post-treatment BMPs have been shown to further reduce initial leaching amount and duration (Stratus 2006). In addition to the amount of copper entering the water via leaching, concentrations of dissolved copper adjacent to the proposed structures depend on flow/mixing conditions, and water quality parameters including salinity, and pH (Stratus 2006). We expect generally moderate dilution from tidal-induced water movement around the structures. Further, salinity has been shown to decrease leaching of copper from ACZA-treated wood (Stratus 2006). In summary, we expect generally low copper concentrations in water and sediment around structures containing treated wood, primarily due to rapid dilution.

Sub-lethal concentrations of dissolved copper have been shown to impair olfactory function in salmon in freshwater (Tierney et al., 2010). This copper-induced loss of smell leads to a reduction in predator avoidance (McIntyre et al., 2008). Further, fish have shown avoidance of sub-lethal levels of dissolved copper in freshwater (Giattina et al. 1982), however no impairment of olfactory function in salmon has been found in saltwater (Sommers et al., 2016). Thus, we believe that the effects of copper leachate in the marine waters around the piers to be short term (limited to the first few weeks after installation) and biologically inconsequential among PS Chinook salmon in the action area.

Potential Spills of Toxic Material During Construction

Construction presents risk of inadvertent spills of toxic material such as hydraulic fluids from equipment and wet concrete and grout. Uncured concrete and grout can increase the pH of surface waters, which can be toxic to fish if the pH rises above 9 (McCleay 1983). The contractor will have a prepared Spill Control and Countermeasure Plan (SCC Plan) that addresses specific actions to prevent petroleum products from being discharged into surface waters. The contractor will also have oil-absorbent materials on site to be used in the event of a petroleum product spill and measures to avoid petroleum products or other deleterious materials from enter surface waters will be taken. The contractor will also follow standard BMPs to prevent wet concrete and grout from entering surface waters. With the use of proper BMPs, the risk of exposure of PS Chinook salmon is extremely small.

Short Term Effects to Critical Habitat

For critical habitat, we expect the short term effects of construction to the conditions and features of PS Chinook salmon critical habitat would not diminish the action area's conservation value for the species because the effects are minor, temporary, and spatially limited.

Long Term Effects to the Species and Critical Habitat

Presence of the Bulkhead in the Intertidal Zone

The proposed bulkhead rebuild will have long-term adverse effects on the features and function of intertidal habitat, including PS Chinook salmon critical habitat, by extending the useful life of the 271 foot section of bulkhead. These impacts on PS Chinook salmon critical habitat conditions are reasonably certain to include adverse effects on the forage and cover PBFs. Effects of the structure on intertidal habitat function include diminished prey availability (benthic invertebrates) and increased predation (see Shipman et al. 2010, Dethier et al. 2016). Bulkheads prevent the recruitment of native sediment (although in this built environment, there is no opportunity for native sediment recruitment from behind/above the wall). With no opportunity for sediment recruitment, the substrate at the base of the wall will remain homogenous, with poor habitat suitability for aquatic organisms. In addition, at high tides, there is no shallow water refuge for juvenile salmon, thereby exposing them to increased predation. These effects would be long-term and are considered permanent for the life of the structures. For this assessment we consider the life of the structures to be 50 years. However, the vastness of the surrounding shallow water habitat within Drayton Harbor and Semiahmoo Bay dwarfs the spatial extent of the bulkhead repair site, making the habitat alterations associated with this particular action inconsequential to critical habitat in scale and effect. The important habitat for the local fish populations is the high quality eelgrass beds of Drayton Harbor and Semiahmoo Bay, which will not be affected by the project. In terms of effects of the bulkhead on the population of PS Chinook salmon in the action area, the presence of the bulkhead will continue to increase the risk of predation for those individuals that pass through the marina and reduce the availability of food for them. Therefore, it is likely that a small fraction of those fish may die as a direct result of the bulkhead. However, the effect to the population will not be measurable because only a small fraction of the juveniles from any one cohort are likely to enter the marina and be exposed to predation in this particular action area. The vast majority of the fish are likely to swim directly out of Drayton Harbor with outgoing tides directly into Semiahnmoo Bay and not enter the action area.

Water quality is a component of PS Chinook salmon critical habitat. The removal of creosote piles and bulkhead timbers will incrementally reduce the biological availability of contaminants in the sediments and water column within the action area. In the long term, removal of creosote will reduce the level of this contaminant within the project area.

The implications that the proposed action has on the long-term survival and recovery of PS Chinook salmon are discussed further in Section 2.7 Integration and Synthesis.

2.6 Cumulative Effects

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

Some continuing non-Federal activities are reasonably certain to contribute to climate effects within the action area. However, it is difficult if not impossible to distinguish between the action area's future environmental conditions caused by global climate change that are properly part of the environmental baseline *vs.* cumulative effects. Therefore, all relevant future climate-related environmental conditions in the action area are described in the environmental baseline (Section 2.4). The marina is completely built out and not likely to increase in size. There may be future redevelopment in the uplands in the marina for which the State of Washington would require upgraded stormwater treatment. This may improve the water quality within the marina in the future.

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 diminish the value of designated or proposed critical habitat as a whole for the conservation of the species.

PS Chinook salmon are listed as threatened based on their overall reductions in abundance, diversity and spatial structure, and current limits to their productivity. For salmonids, shoreline conditions are a factor among many habitat conditions that are limiting productivity. All 19 nearshore marine zones (zones occupied by PS Chinook salmon; from extreme high water to a depth of 30 meter) are considered to have high conservation value even if conditions are degraded (NMFS 2005, Appendix A). The action area is within a constructed marina and is degraded as a baseline condition and will continue to be degraded for the life of the rebuilt and maintained structures. As a general matter, although an individual action in isolation may only impose small or localized impacts on the affected populations, when considered with the baseline and cumulative effects of watershed modifications, it may be identified as contributing to, or likely to perpetuate, broader suppressed population dynamics (Williams and Thom 2001). In this case, the scale of the effect is too small to have an effect on the local populations of PS Chinook salmon that spawn in California and Dakota creeks and rear in the Drayton Harbor and Semiahmoo Bay. These waterbodies have vast eelgrass beds, providing high quality rearing habitat for PS Chinook salmon.

In the long term, climate change may alter the habitat conditions in the action area in ways that we cannot reasonably predict with available data, but given the existing shoreline armoring and anticipated sea level rise, reduced intertidal habitat is likely to occur.

Because only a small number of PS Chinook salmon, relative to the affected local populations, would be adversely affected by the proposed action and because the action's long-term effects are spatially small, the project would not measurably affect productivity, diversity and spatial structure of the local California and Dakota creek PS Chinook salmon populations, and therefore would not alter the current trends of the larger ESU. The reasoning behind this conclusion is based on the fact that the loss of a very small number of juveniles from short term construction activities and long term poor habitat conditions within the action area, in proportion to the respective populations and availability of functioning habitat in the larger vicinity, is not likely to result in a measurable decrease in the number of returning adult spawners. Each individual juvenile fish already has a very high probability of not surviving to adulthood (Bradford 1995) and only a very small proportion of the population would be exposed to the proposed action. Ninety eight to 99 percent of salmonids do not survive to spawning adulthood (Bradford 1995). Salmonids naturally produce very high numbers of offspring with very few surviving to adulthood (note that human-caused habitat degradation and other factors such as hatcheries and harvest exacerbate what would otherwise be natural causes of low survival such as natural variability in stream and ocean conditions, predator-prey interactions, and natural climate variability) (Adams 1980, Quinones et al., 2014). In terms of adult-equivalents, i.e., the number of adult fish that reach spawning grounds as compared to the number of outmigrating juveniles, the very small number of juvenile fish that could be injured or killed by the proposed action would not equate to the loss of an adult spawner in any one cohort. Therefore, the relatively small number of juveniles adversely affected will not be enough to measurably affect the local abundance, productivity, or trends. No adverse effects are expected to occur to adult PS Chinook because adult spawners are not expected to in the action area. In other words, we expect that the total effects of the proposed action on individual fish identified in this opinion would be indiscernible at the local population level, and therefore inconsequential at the ESU level. Additionally, PS Chinook salmon, although currently well below historic levels, are distributed widely enough and are presently at high enough abundance levels that any adverse effects resulting from the proposed action would not have an observable effect on their spatial structure, productivity, abundance and diversity. Recovery planning actions identified in this vicinity focus on spawning and rearing habitat in Dakota and California creeks and improving shoreline conditions within Drayton Harbor and Semiahmoo Bay (e.g. removing bulkheads/installing soft shore armoring). Within the existing marina, soft shore armoring is not possible at the industrial facilities. Overall, the project does not change the baseline trajectory for recovery of the local populations (neither beneficial nor detrimental). Therefore, when considered in light of existing risk, baseline effects of poor habitat conditions within the marina, and cumulative effects, the proposed action does not increase risk to the affected population to a level that would reduce appreciably the likelihood for survival and recovery of the PS Chinook salmon ESU.

When considering critical habitat, the action's adverse effects are long-term but spatially very small, particularly in the greater landscape setting of Drayton Harbor and Semiahmoo Bay. Given the scale of impacts and the small size of the affected critical habitat in an already built environment relative to total area of natural critical habitat of PS Chinook salmon, we consider that the effects of the project would not impair the conservation value of PS critical habitat.

2.8 Conclusion

After reviewing and analyzing the current status of the listed species and critical habitat, the environmental baseline within the action area, the effects of the proposed action, the effects of other activities caused by the proposed action, and cumulative effects, it is NMFS' biological opinion that the proposed action is not likely to jeopardize the continued existence of Puget Sound Chinook salmon or destroy or adversely modify its designated critical habitat.

2.9 Incidental Take Statement

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

2.9.1 Amount or Extent of Take

In the biological opinion, NMFS determined that incidental take is reasonably certain to occur. Individual PS Chinook salmon would be present in and co-occur with the effects of the action. Take would occur during construction from pile driving and take would occur in the form of harm, where permanent (50 year) habitat modification reduces individual fitness and survival through reduced food supply and increase predation risk.

Incidental take from construction and habitat cannot be accurately quantified as a number of fish. The distribution and abundance of fish within the action area cannot be predicted based on existing habitat conditions, and because of temporal and dynamic variability in population dynamics in the action area. Neither can NMFS precisely predict the number of fish that are reasonably certain to respond adversely to habitat modifications resulting from the proposed action. When NMFS cannot quantify take in numbers of affected animals, we instead consider likely extent of changes in habitat quantity and quality to indicate the extent of take.

For take resulting from impact pile driving, we use geographic extent of sound pressure waves 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 sound pressure waves with increasing geographic extent. The take represented by this surrogate is equivalent to the maximum amount of take considered in our jeopardy analysis. Therefore, if the surrogate is exceeded, reinitiation of consultation will be required. This surrogate will function as an effective reinitiation trigger, because the extent of the noise is proportional to amount sheetpile (271 linear feet) and new pile (one). For take associated with harm from habitat alteration, the take surrogate is the 271 linear feet of new bulkhead. The extent of take will be exceeded if the total length of the bulkhead repair is greater than 271 linear feet. The COE has authority to conduct compliance inspections and to take actions to address non-compliance, including post-construction (33 CFR 326.4)

2.9.2 Effect of the Take

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

2.9.3 Reasonable and Prudent Measures

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

1. Minimize construction-related and permanent structure effects on intertidal and nearshore habitat function.

2.9.4 Terms and Conditions

The terms and conditions described below are non-discretionary, and the COE or any applicant must comply with them in order to implement the RPMs (50 CFR 402.14). The COE 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.

The following term and condition implements RMP number 1:

a. Implement the repairs as proposed including all BMPs and conservation measures described in the MFS and BE;
b. Work within the proposed in-water work window: All in-water work would only occur from July 16th – February 15th in any year the permit is valid;
c. Pile drive in the dry to the maximum extent practicable.
d. Submit an as-built report including pictures of the project (before and after) to NMFS (projectreports.wcr@noaa.gov and janet.curran@noaa.gov).

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). The NMFS is in the process of developing a nearshore/shoreline Habitat Equivalency Analysis (HEA).. The HEA model is still in draft form. Nonetheless, it can inform conservation actions for this proposal. The HEA model calculates credits (positive environmental actions) and debits (actions that degrade habitat or extend degraded conditions farther into the future. Debits and credits can also be translated into Discount Service Acre Years (DSAYs) for purposes of mitigation banking, where 100 debits is equal to -1.00 DSAYs (negative environmental effect) or 100 credits is equal to +1.00 DSAYs (positive environmental effect). For this project, removal of creosote is a positive environmental action that generates HEA credits (+DSAYs), while maintaining the built environment (installing new sheet pile with a presumed 50 year lifespan) generates HEA debits (-DSAYs). The balance of these credits and debits indicates the net effect of the project on nearshore habitat in mitigation or conservation terms. For this project, the debit and credit calculations are as shown below:

At Sawtooth North:

Removing the existing wooden bulkhead	+0.8161 DSAYs (or 81.61 mitigation credits)
Additional credit for removing creosote	+0.3458 DSAYs (or 34.58 mitigation credits)
Installing a new 105' sheet pile bulkhead	-1.6508 DSAYs (or 165.08 mitigation debits).

At Sawtooth:

Installing a new 166' sheet pile bulkhead	-2.6803 DSAYs (or 268.03 mitigation debits).
DSAY Balance for the project	**= -3.1692 DSAYs**

Note- if the creosote is removed instead of buried at Sawtooth, the project could generate another +1.9548 DSAYs, for a net balance of -1.2144 DSAYs (-3.1692+1.9548). However, the NMFS understands that complete

removal of creosote would be difficult because of the existing building location at the construction site. Another option to generate DSAY credits is to remove creosote piles elsewhere.

We recommend that the COE and the Port of Bellingham track the net negative DSAYs for the project and seek off site and/or out of kind habitat conservation actions or purchase mitigation banking credits to bring the project to a net zero balance.

2.11 Reinitiation of Consultation

This concludes formal consultation for this action. As 50 CFR 402.16 states, reinitiation of consultation is required and shall be requested by the Federal agency or by the Service where discretionary Federal agency involvement or control over the action has been retained or is authorized by law and 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 identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion, or (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

The main pathway of effect for Southern Resident killer whales (SRKW) for this project is sound disturbance from vibratory pile driving. Sound waves from vibratory pile driving can travel many miles, potentially disturbing normal behavioral patterns of SRKWs. For this action, is it highly unlikely that sound waves will travel outside of the enclosed marina, therefore SRKWs will not be exposed to effects of sound during pile driving, therefore this potential effect is discountable. The proposed project may affect the quantity of Southern Resident Killer Whale's preferred prey which is Chinook salmon. Any salmonid take, including Chinook salmon up to the aforementioned amount, and extent of take would result in no reduction in adult equivalent prey resources for SRKWs that may intercept these species within their range. Therefore, potential effects on the prey resources of SRKWs are insignificant.

The short and long-term effects to PS steelhead will be discountable because they are not dependent on shallow nearshore areas and thus will not be exposed to effects of the proposed action. Steelhead smolts are generally 2-3 years old and over 160 mm long by the time they marine waters. Puget Sound steelhead yearlings migrate quickly, within weeks, through Puget Sound and into the Straights and open ocean. They quickly move into off-shore waters and are not dependent on estuaries (Goetz et al. 2015). Although steelhead smolts have been found in low abundances in the marine nearshore between May and August (Brennan 2004, Fresh 2006), it is extremely unlikely that they would utilize the enclosed waters in the marina. As steelhead smolts are not nearshore-dependent, leave Puget Sound quickly, and are larger and more mobile than PS Chinook juveniles, we expect the effects to habitat from the project to be inconsequential to steelhead smolts. In addition, adult steelhead that return to spawn in California and Dakota creeks are expected to bypass the marina and swim directly from Semiahmoo Bay into Drayton Harbor. The risk of exposure of PS steelhead to any of the effects of the action is extremely unlikely and thus discountable.

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 descriptions of EFH for 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 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 salmon. Therefore, we have determined that the proposed action would adversely affect the EFH of Pacific coast salmon.

3.2 Adverse Effects on Essential Fish Habitat

Based on the analysis of effects presented in Section 2.5, the proposed action will cause small-scale adverse effects on this EFH because the sheetpile bulkhead alters intertidal habitat function by interrupting natural shoreline process which results in diminished prey availability for salmonids (benthic invertebrates) and increased predation risk to salmonids by predatory fish and birds.

3.3 Essential Fish Habitat Conservation Recommendations

The NMFS is in the process of developing a nearshore/shoreline Habitat Equivalency Analysis (HEA).. The HEA model is still in draft form. Nonetheless, it is nearing completion and can inform conservation actions for this proposal. The HEA model calculates credits (positive environmental actions) and debits (actions that degrade habitat or extend degraded conditions farther into the future. Debits and credits can also be translated into Discount Service Acre Years (DSAYs) for purposes of mitigation banking, where 100 debits is equal to -1.00 DSAYs (negative environmental effect) or 100 credits is equal to +1.00 DSAYs (positive environmental effect). For this project, removal of creosote is a positive environmental action that generates HEA credits (+DSAYs), while maintaining the built environment (installing new sheet pile with a presumed 50 year lifespan) generates HEA debits (-DSAYs). The balance of these credits and debits indicates the net effect of the project on nearshore habitat in mitigation or conservation terms. For this project, the debit and credit calculations are as shown below:

At Sawtooth North:

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DSAY Balance for the project **= -3.1692 DSAYs**

Note- if the creosote is removed instead of buried at Sawtooth, the project could generate another +1.9548 DSAYs, for a net balance of -1.2144 DSAYs (-3.1692+1.9548).

We recommend that the COE and the Port of Bellingham track the net negative DSAYs for the project and seek off site and/or out of kind habitat conservation actions or purchase mitigation banking credits to bring the project to a net zero balance to fully mitigate for long term effects to essential fish habitat of Pacific salmon.

3.4 Statutory Response Requirement

As required by section 305(b)(4)(B) of the MSA, the COE 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 COE 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 are the COE. Other interested users could include the Port of Bellingham. The document will be available within two weeks at the NOAA Library Institutional Repository [https://repository.library.noaa.gov/welcome]. The format and naming adheres to conventional standards for style.

4.2 Integrity

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

4.3 Objectivity

Information Product Category: Natural Resource Plan

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

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

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

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

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