UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
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Refer to NMFS No:
WCRO-2021-01863

October 19, 2021

Jacalen Printz
Acting Chief, Regulatory Branch
Seattle District, U.S. Army Corps of Engineers
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 Seattle Fire Station 5 Float Replacement and Reconfiguration (NWS-2020-1049)

Dear Ms. Printz:

This letter responds to your December 30, 2020, request for initiation of consultation with the National Marine Fisheries Service (NMFS) pursuant to Section 7 of the Endangered Species Act (ESA) for the U.S. Army Corps of Engineers (Corps) issuance of a permit to the City of Seattle (City) for the replacement and reconfiguration of the Seattle Fire Station 5 emergency services dock. Your request qualified for our expedited review and analysis because it met our screening criteria and contained required information on, and analysis of, your proposed action and its potential effects to listed species and designated critical habitat. Contained herein is a condensed biological opinion analyzing the effects of replacing the emergency services dock at Seattle Fire Station 5 in Elliot Bay, Washington.

We reviewed the Corps consultation request and related initiation package. Where relevant, we have adopted the information and analyses you have provided and/or referenced but only after our independent, science-based evaluation confirmed they meet our regulatory and scientific standards. Where necessary, we have supplemented the referenced material with additional information to analyze effects of the proposed action on listed species and their critical habitats. We adopt by reference the following documents and sections from the initiation package:

- Action Area definition – *Specific Project Information Form (SPIF)*: pages 1-2
- Environmental Baseline description – *Compensatory Mitigation Plan for the Seattle Fire Station 5 Float Replacement Urgent Repairs (Mitigation Plan)*: pages 5-8; and *Submerged Aquatic Vegetation Survey*: pages1-2
- Effects of the Action on Listed Species – *SPIF*: pages 9-13
- Effects of the Action on Critical Habitat – *SPIF*: pages 9-13 & Appendix B2 Effects, pages 4-6

Consultation History

On December 30, 2020, the Corps requested consultation with NMFS for a dock replacement project in Elliot Bay, Seattle, Washington for the Seattle Fire Department.

NMFS originally had planned to evaluate the Seattle Fire Station 5 dock replacement project as part of a future 2021 batched Biological Opinion. However, given the potential impacts to human health and safety, as the dock is critical to public emergency services, NMFS decided to consult on this project separately so as to expedite the process and minimize delays to emergency services. As part of this process the City of Seattle (the City) calculated project impacts and the value of proposed conservation offsets using the Puget Sound Nearshore Habitat Conservation Calculator (Conservation Calculator). The goal of utilizing the Conservation Calculator was to ensure that the accompanying offsets would result in neutral or positive habitat impacts (credits) rather than negative impacts (debits) and ensure the project would not jeopardize listed species recovery or adversely modify critical habitat.

On April 26, 2021, NMFS received a draft Conservation Calculator from the Corps and the City and subsequently participated in video calls on May 5 and 10, June 1, and July 22 with the City and the Corps to further refine Conservation Calculator inputs and discuss project details.

Additional correspondences occurred via email on June 8, 10, 14, 22, 24, and July 6, 19, 21, 23, and 27 to finalize the inputs and results of the Conservation Calculator.

On July 6, 2021, NMFS received an email from Washington State Ferries indicating WSF approval for use of a portion of Pier 48 as conservation offsets for the project.

Once the inputs to the Conservation Calculator were finalized, NMFS determined the information provided by the Corps and the City was complete and initiated formal ESA consultation on August 5, 2021.

The Corps determined that the proposed action ‘may affect, but is not likely to adversely affect’ (NLAA) ESA-listed species or their critical habitat (**Table 1**). While we concur with the Corps’ determination that the proposed action is not likely to adversely affect Puget Sound (PS) steelhead (*Oncorhynchus mykiss*), Puget Sound Georgia Basin (PS/GB) yelloweye rockfish (*Sebastes ruberrimus*), Southern Resident Killer Whales (SRKW) (*Orcus orcinus*), and humpback whales (*Megaptera novaeangliae*) as well as SRKW critical habitat we do find that the proposed action is ‘likely to aversely effect’ (LAA) PS Chinook (*O. tshawytscha*) and PS/GB bocaccio (*S. paucispinis*) and their respective critical habitat.

Table 1. Effect determinations made by the Corps and NMFS.

Species	Corps Listed Species Determination	Corps Critical Habitat Determination	NMFS Listed Species Determination	NMFS Critical Habitat Determination
PS Chinook	NLAA	NLAA	LAA	LAA
PS Steelhead	NLAA	N/A	NLAA	N/A
PS/GB Bocaccio	NLAA	NLAA	LAA	LAA
PS/GB Yelloweye Rockfish	NLAA	N/A	NLAA	N/A
SRKW	NLAA	NLAA	NLAA	NLAA
Humpback Whales	NLAA	N/A	NLAA	N/A

Proposed Action

Under the ESA, "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).

The proposed action is the Corps issuance of a permit to the City of Seattle for a dock replacement project located in Elliot Bay at 925 Alaskan Way, Seattle, Washington. The City intends to replace and reconfigure an existing float associated with Seattle Fire Station 5 with a larger structure to improve the stability and use for emergency services.

The impact of the additional overwater coverage (1,129 square feet) of the new float will be offset by the removal of 915 square feet of creosote treated decking and components of overwater structure on Pier 48, approximately 1,000 feet south of Fire Station 5. Additionally, fourteen 17.25-inch diameter creosote-treated wooden piles located at the offshore end of Pier 48 will be removed and transported via barge to an offsite disposal location. Vibratory pile removal methods would be used as part of the project. No impact driving would occur.

The removal of creosote-treated wood and piles at Pier 48 would eliminate approximately 78 tons of creosote from the Puget Sound nearshore environment. To further offset expected impacts of the proposed action, the City would utilize 13 credits of the 918 advanced conservation credits accrued by Seattle Parks and Recreation Department's removal of Pier 58 (Table 2). The use of these advanced conservation credits will help address the loss of ecosystem functions due to the modification of water bottoms, water quality, and shoreline. The project would occur during the in-water work window of July 15 to February 15 and take approximately 4 to 6 weeks to complete. The replacement float would be constructed offsite and transported via barge to the work location.

Moreover, the proposed action includes implementation of a marine mammal monitoring plan (MMMP) to ensure that marine mammals would not be exposed to harmful noise effects.

Table 2. Advanced conservation credits accrual and use for the city of Seattle.

Action	WCRO#	NWS #	Project	Basin	Date	Credits Used	Credits Accrued	Credits Available
Accrual Credits – creosote removal	2020-01361	2019-703-WRD	Pier 58 Removal	Central/ South PS	7/26/21	-	918.2	918.2
Used Credits – float replacement	2021-01863	2020-1049-WRD	Fire Station 5 Float Replacement	Central/ South PS	8/04/21	-13	0	905.2

Analytical Approach

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

This biological opinion relies on the definition of "destruction or adverse modification," which "means a direct or indirect alteration that appreciably diminishes the value of critical habitat for the conservation of a listed species. Such alterations may include, but are not limited to, those that alter the physical or biological features essential to the conservation of a species or that preclude or significantly delay development of such features" (81 FR 7214).

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

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

In conducting the jeopardy adverse modification analysis, NMFS also evaluated the proposed action using a Habitat Equivalency Analysis (HEA)[1] and the Puget Sound Nearshore Habitat Values Model (NHVM) adapted from Ehinger et al. 2015. An input calculator (Conservation Calculator) serves as a user-friendly interface to simplify model use. Ecological equivalency that forms the basis of a HEA is a concept that uses a common currency to express and assign a value to functional habitat loss and gain. Ecological equivalency is traditionally a service-to-service approach where the ecological functions and services for a species or group of species lost from an impacting activity are fully offset by the services gained from a conservation activity. In this case, we use this approach to calculate the "cost" and "benefit" of the proposed action, as well as the impacts of the existing environmental baseline, using the NHVM.

The NHVM includes a debit/credit factor of two applied to new structures to account for the fact that impacts on unimpaired habitat have been found to be more detrimental than future impacts to already impaired habitat at sites with existing structures (Roni et al. 2002). In other words, given the current condition of nearshore habitat, impacts from new structures on relatively unimpaired habitat would, for example, be more harmful than impacts resulting from the repair or replacement of existing structures, and the model accounts for this difference.

NMFS developed the NHVM based specifically on the designated critical habitat of listed salmonids in Puget Sound, scientific literature, and our best professional judgement. The model, run by inputting project specific information into the Conservation Calculator, produces numerical outputs in the form of conservation credits and debits. Credits indicate a gain of nearshore habitat quality, quantity, or function. Debits indicate a loss of nearshore habitat quality, quantity, or function. The model is designed to specifically address nearshore development and restoration projects. Use of the NHVM requires an assumption of the amount of time the proposed structure, and thus the resulting habitat impacts, will persist. For this consultation, and consistent with our application in NMFS 2020, we have applied an assumption that the replaced dock (float) will persist 40 years before requiring any additional action to ensure structural integrity.

As explained above, new or expanded projects account for greater impacts to an undeveloped environment and are thus calculated at a higher debit rate (2 times greater) than those calculated for replacement or repair projects; which assumes that some function has already been lost from the existing structure. In sum, outputs from the NHVM accounts for the following consequences of the action:

- Beneficial aspects of the proposed project, including any positive effects that would result from removing debris;

[1] A common "habitat currency" to quantify habitat impacts or gains can be calculated using Habitat Equivalency Analysis (HEA) methodology when used with a tool to consistently determine the habitat value of the affected area before and after impact. NMFS selected HEA as a means to identify section 7 project related habitat losses, gains, and quantify appropriate mitigation because of its long use by NOAA in natural resource damage assessment to scale compensatory restoration (Dunford et al. 2004; Thur 2006) and extensive independent literature on the model (Milon and Dodge 2001; Cacela et al. 2 2005; Strange et al. 2002). In Washington State, NMFS has also expanded the use of HEA to calculate conservation credits available from fish conservation banks (NMFS 2008, NMFS 2015)), from which "withdrawals" can be made to address mitigation for adverse impacts to ESA species and their designated CH.

- Minimization incorporated through project design improvements (e.g., credit is given for grating over water structures (OWS));
- Adverse effects that result from new OWS for would last for 40 years

Status of Species and Critical Habitat

We supplement the information on status of species and critical habitat with the following information:

We examined the status of each species that would be affected by the proposed action to inform the description of the species' "reproduction, numbers, or distribution" as described in 50 CFR 402.02. We also examined the condition of critical habitat throughout the designated area and discuss the function of the physical or biological features essential to the conservation of the species. The status of species and critical habitat are not described within the initiation package for the affected species (Table 1). Therefore, we provide descriptions of the status of the listed species adversely affected by the proposed action.

One factor affecting the status of ESA-listed species considered in this opinion, and aquatic habitat in general, is climate change. Climate change is likely to play an increasingly important role in determining the abundance and distribution of ESA-listed species in the Pacific Northwest and the conservation value of designated critical habitats. These changes will not be spatially homogeneous across the region. 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).

Decreases in summer precipitation exceeding 30 percent by the end of the century are consistently predicted across climate models (Mote et al. 2014). Precipitation is more likely to occur between October and March, decrease during summer months, and transition from snow to rain in the winter (ISAB 2007; Mote et al. 2013). Snowmelt is also likely to occur earlier causing lower stream flows in late spring, summer, and fall, and increasing water temperatures (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 frequency and magnitude are predicted in mixed rain-snow watersheds (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). Recent temperatures in all but two years since 1998 ranked above the 20th century average (Mote et al. 2014). 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).

The combined effects of warming air temperatures and decreasing spring through fall flows are expected to cause stream temperatures to rise. In 2015, high air temperatures and low flows

caused a 3.5-5.3°C increase in Columbia Basin streams and resulted in a peak temperature of 26°C in the Willamette River (NWFSC 2015). Overall, about one-third of the current cold-water salmonid habitat in the Pacific Northwest is expected to exceed key water temperature thresholds by the end of this century (Mantua et al. 2009).

Coastal waters in the Pacific Northwest are predicted experience increasing surface water temperatures, increasing but highly variable acidity, and increasing storm frequency and magnitude as a result of climate change (Mote et al. 2014). Elevated ocean temperatures have already been documented in the Pacific Northwest and are highly likely to continue during the next century, with some projections predicting sea surface temperatures to increase by 1.0-3.7°C by the end of the century (IPCC 2014). Increased ocean temperatures could cause habitat loss, a shift in species' ranges and abundances, and alter marine food webs, which in turn 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, greater amounts of carbon is absorbed by the oceans, altering the acidity of the water. Climate models project a 38 to 109 percent increase in acidity by the end of this century in all but the most stringent CO_2 mitigation scenarios (IPCC 2014). Ocean acidification is essentially irreversible and would take centuries to return to pre-industrial levels (IPCC 2014). Regional factors appear to be amplifying acidification in Northwest ocean waters, which is occurring earlier and more acutely than in other regions and is already impacting important local marine species (Barton et al. 2012; Feely et al. 2012). Acidification also affects sensitive estuary habitats, where organic matter and nutrient inputs further 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. Some predictions suggest sea levels may rise 10-32 inches by 2081-2100 (IPCC 2014) resulting in increased erosion, 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 would be disproportionately impacted by significant reductions in rearing habitat in some coastal areas (Glick et al. 2007). 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 including salmon, steelhead, rockfish, and SRKWs (Tillmann and Siemann 2011; Reeder et al. 2013).

The adaptability of threatened and endangered species is currently depressed due to reductions in population size, habitat quantity and diversity, and the loss of genetic variation. Without these natural sources of resilience, changes in local and regional climatic conditions are expected to reduce long-term viability and sustainability of populations in many West Coast ESUs (NWFSC 2015). New stressors generated by climate change, or existing stressors exacerbated by climate change, may have synergistic impacts on species and ecosystems (Doney et al. 2012), further inhibiting recovery of ESA-listed species.

Puget Sound Chinook Salmon

The Puget Sound Chinook salmon evolutionarily significant unit (ESU) was listed as threatened on June 28, 2005 (70 FR 37160). We adopted the Puget Sound salmon recovery plan (Shared Strategy for Puget Sound 2007; NMFS 2006) developed collaboratively by Shared Strategy for the Puget Sound and NMFS the for this ESU in January 2007. The recovery plan adopts ESU and population level viability criteria recommended by the Puget Sound Technical Recovery Team (PSTRT) (Ruckelshaus et al. 2002). The PSTRT's biological recovery criteria will be met when all of the following conditions are achieved:

- The viability status of all populations in the ESU is improved from current conditions, and when considered in the aggregate, persistence of the ESU is assured;
- Two to four Chinook salmon populations in each of the five biogeographical regions of the ESU achieve viability;
- At least one population from each major genetic and life history group historically present within each of the five biogeographical regions is viable;
- Tributaries to Puget Sound not identified as primary freshwater habitat for any of the 22 identified populations are functioning in a manner that is sufficient to support an ESU-wide recovery scenario;
- Production of Chinook salmon from tributaries to Puget Sound not identified as primary freshwater habitat for any of the 22 identified populations occurs in a manner consistent with ESU recovery; and
- Populations that do not meet the viability criteria for all VSP parameters are sustained to provide ecological functions and preserve options for ESU recovery.

Spatial Structure and Diversity. The PS Chinook salmon ESU includes all naturally spawning populations of Chinook salmon from rivers and streams flowing into Puget Sound including the Straits of Juan De Fuca from the Elwha River, eastward, including rivers and streams flowing into Hood Canal, South Sound, North Sound and the Strait of Georgia in Washington. The ESU also includes the progeny of numerous artificial propagation programs (NWFSC 2015). The PSTRT identified 22 extant populations, grouped into five major geographic regions, or major population groups (MPG), based on consideration of historical distribution, geographic isolation, dispersal rates, genetic data, life history information, population dynamics, and environmental and ecological diversity.

Between 1990 and 2014, the proportion of natural-origin spawners has trended downward across most of the ESU; Whidbey Basin is the exception, being the only MPG with consistently high fractions of natural-origin spawners. All other MPGs have either variable or declining spawning populations with high proportions of hatchery-origin spawners (NWFSC 2015). Overall, the new information on abundance, productivity, spatial structure and diversity since the 2010 status review supports no change in the biological risk category for PS Chinook salmon (NWFSC 2015).

Abundance and Productivity. Available data on total Chinook salmon abundance since 1980 indicate that although abundance trends have fluctuated between positive and negative for individual populations, there are widespread negative trends in natural-origin Chinook salmon spawner abundance across the ESU (NWFSC 2015). Productivity remains low in most

populations, and hatchery-origin spawners are present in high fractions in most populations outside of the Skagit watershed. Available data now shows that most populations have declined in abundance over the past 7 to 10 years. Further, 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 (NWFSC 2015).

Limiting Factors. Limiting factors for this species include:

- Degraded floodplain and in-river channel structure
- Degraded estuarine conditions and loss of estuarine habitat
- Riparian area degradation 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
- Altered flow regime

Puget Sound Georgia Basin Bocaccio

The PS/GB bocaccio rockfish distinct population segment (DPS) was listed as endangered on April 28, 2010 (75 FR 22276). In April 2016, we completed a 5-year status review that recommended the DPS retain its endangered classification (Tonnes et al. 2016), and we released a recovery plan in October 2017 (NMFS 2017b). Though PS/GB bocaccio were never a predominant segment of the multi-species rockfish population within the PS/GB, their present-day abundance is likely a fraction of their pre-contemporary fishery abundance. Historically, most PS/GB bocaccio within the DPS may have been spatially limited to several basins within the DPS and most abundant in the Central and South Sound with no documented occurrences in the San Juan Basin until 2008. The apparent reduction of populations of PS/GB bocaccio in the Main Basin[2] and South Sound represents a further reduction in the spatially limited distribution of PS/GB bocaccio, and adds significant risk to the viability of the DPS.

The VSP criteria described by McElhaney et al. (2000) identified spatial structure, diversity, abundance, and productivity as criteria to assess the viability of salmonid species because these criteria encompass a species' "reproduction, numbers, or distribution" as described in 50 CFR 402.02. These viability criteria reflect concepts that are well founded in conservation biology and are generally applicable to a wide variety of species because they describe demographic factors that individually and collectively provide strong indicators of extinction risk for a given species (Drake et al. 2010), and are therefore applied here for PS/GB bocaccio. Loss of nearshore habitat was identified in the 2017 recovery plan as a main factor contributing to extinction risk.

The nearshore is generally defined as habitats contiguous with the shoreline from extreme high water out to a depth no greater than 98 feet (30 m) relative to mean lower low water. This area generally coincides with the maximum depth of the photic zone and can contain physical or

[2] The U.S. portion of the Puget Sound/Georgia Basin that is occupied by yelloweye rockfish and PS/GB bocaccio can be divided into five areas, or Basins, based on the distribution of each species, geographic conditions, and habitat features. These five interconnected Basins are: (1) The San Juan/Strait of Juan de Fuca Basin, (2) Main Basin, (3) Whidbey Basin, (4) South Puget Sound, and (5) Hood Canal. 79 FR 68041: 11/13/2014

biological features essential to the conservation of many fish, including PS/GB bocaccio particularly larval and juvenile lifestages. Approximately 27 percent of Puget Sound's shoreline has been effected by armoring (Simenstad et al. 2010).

The alteration of Puget Sound shorelines has been found to impact a variety of marine life, ranging from invertebrate fauna (Sobocinski 2003) to surf smelt egg viability (Rice 2006). However, consequences of the alteration of Puget Sound shorelines on rockfish habitat such as kelp are less understood and in some areas significant declines in kelp quantity and diversity have been observed. Typically, areas with floating and submerged kelp (families *Chordaceae, Alariaceae, Lessoniacea, Costariaceae,* and *Laminaricea*) support the highest densities of most juvenile rockfish species (Matthews 1989; Halderson and Richards 1987; Carr 1983; Hayden-Spear 2006), providing structure for feeding and refuge from predation and marine currents resulting in overall energy conservation.

General Life History: The life history of PS/GB bocaccio includes a pelagic larval stage followed by a juvenile stage, and subadult and adult stages. As with other rockfish, PS/GB bocaccio fertilize their eggs internally and young are extruded as larvae that are about 4 to 5 mm in length. Females produce anywhere from several thousand to over a million offspring per spawning event (Love et al. 2002). The timing of larval parturition in PS/GB bocaccio is uncertain, but likely occurs within a five- to six-month window that is centered near March (Greene and Godersky 2012; NMFS 2017b; Palsson et al. 2009). Larvae are distributed by prevailing currents until they are large enough to actively swim toward preferred habitats, but they can pursue food within short distances immediately after birth (Tagal et al. 2002).

At about 3 to 6 months old and 1.2 to 3.6 inches (3 to 9 cm) long, juvenile PS/GB bocaccio gravitate to shallow nearshore waters where they settle and grow. Rocky or cobble substrates with kelp are commonly utilized, but sandy areas with eelgrass are also used for rearing (Carr 1983; Halderson and Richards 1987; Hayden-Spear 2006; Love et al. 1991 & 2002; Matthews 1989; NMFS 2017b; Palsson et al. 2009). Young of the year rockfish may spend months or more in shallow nearshore rearing habitats before transitioning toward deeper water habitats (Palsson et al. 2009). As PS/GB bocaccio grow, their habitat preference shifts toward deeper waters with high relief and complex bathymetry with rock and boulder-cobble substrate (Love et al. 2002), but they may also be found in areas with non-rocky substrates such as sand, mud, and other unconsolidated sediments (Miller and Borton 1980; Washington 1977). Adults are most commonly found in water depths between 131 to 820 feet (40 to 250 m) (Love et al. 2002; Orr et al. 2000). The maximum age of PS/GB bocaccio is unknown, but may exceed 50 years, and they reach reproductive maturity near age six.

Spatial Structure and Diversity: The PS/GB bocaccio DPS includes all inland marine waters east of the central Strait of Juan de Fuca and south of the northern Strait of Georgia. The waters of Puget Sound and Straits of Georgia can be divided into five interconnected basins that are largely hydrologically isolated from each other by relatively shallow sills (Burns 1985; Drake et al. 2010). Although most individuals of the PS/GB bocaccio DPS are believed to remain within the basin of their origin, including larvae and pelagic juveniles, some movement between basins occurs, and the DPS is currently considered a single population.

Abundance and Productivity: The PS/GB bocaccio DPS exists at very low abundance and observations are relatively rare. No reliable range-wide historical or contemporary population estimates are available for the PS/GB bocaccio DPS. It is believed that prior to contemporary fishery removals, each of the major PS/GB basins likely hosted relatively large, though unevenly distributed, populations of PS/GB bocaccio. They were likely most common within the South Sound and Main Basin, but were never a predominant segment of the total rockfish abundance within the region (Drake et al. 2010). The best available information indicates that between 1965 and 2007, total rockfish populations have declined by about 70 percent in the Puget Sound region, and that PS/GB bocaccio have declined by an even greater extent (Drake et al. 2010; Tonnes et al. 2016; NMFS 2017b).

Limiting Factors: Factors limiting recovery for PS/GB bocaccio include:

- Fisheries Removals (commercial and recreational bycatch)
- Derelict fishing gear in nearshore and deep-water environments
- Degraded water quality (chemical contamination, hypoxia, nutrients)
- Climate change
- Habitat disruption

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). We are adopting the action area definition on pages 1 and 2 of the SPIF provided in the consultation initiation package. The action area is defined as the nearshore area surrounding the Seattle Fire Station 5 dock work area in Elliot Bay.

The action area extends to the point that under water sound is propagated during the vibratory removal of creosote-treated timber piles and water quality is impacted by pile removal and barge operation. The City has estimated the action area to include a radius extending approximately 1,850 meters (6,066 feet) from the work site based on the anticipated noise levels generated during pile removal. NMFS agrees with the action area designation. For this consultation the action area includes effects associated with the replacement dock and the offsetting mitigation activities. The action area contains critical habitat designations for PS Chinook salmon, PS/GB bocaccio, and SRKW as well as Essential Fish Habitat (EFH) designations for Pacific salmon, pacific coast groundfish, and coastal pelagic species. PS steelhead and PS/GB yelloweye rockfish critical habitat are not designated within the action area.

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).

The applicant provides a definition of the environmental baseline on pages 5-8 of the Mitigation Plan included in the initiation package. To supplement the information provided by the applicant we provide additional context on the populations and subpopulations of listed species to highlight the importance of the habitat and physical and biological features (PBFs) of critical habitat in the action area to the survival and recovery of listed species.

The project occurs in the Puget Sound nearshore which can be generally described as the zone where marine water, fresh water, and terrestrial landscapes interact in a complex mosaic of habitats and processes. The nearshore environment typically provides important ecological functions for salmonids and rockfish including foraging, growth, and refuge from predation. However, the action area within Elliot Bay, has been highly developed and numerous overwater structures exist within the vicinity of the project (Mitigation Plan pages 5-7). The natural shoreline has been completely replaced by impervious surfaces thus nearshore riparian vegetation is absent. Recent submerged aquatic vegetation surveys and substrate mapping surveys revealed that the seafloor in Elliot Bay surrounding the project is predominantly silt and debris lacking other substrate types such as cobbles or gravels (Submerged Aquatic Vegetation Survey pages 1-2). Sea lettuce (*Ulva lactuca*), sugar kelp (*Saccharina latissimi*), bull kelp (*Nereocystis luetkeana*), and red algae (*Rhodophyta* spp.) have been observed in the area. Eelgrass was not observed during a recent survey conducted in fall 2020. Submerged aquatic vegetation was found exclusively in areas with adequate light; submerged aquatic vegetation was absent in areas with constant shade.

Specifically, PBFs of nearshore habitat for PS Chinook include complexity, absence of artificial obstructions, natural cover, adequate water, and high water-quality. The nearshore environment supports various life stages of PS Chinook salmon including growing and sexually maturing adults, migrating spawners, and rearing and growing juveniles. The Mitigation Plan provides a detailed description of current conditions in the action area relative to PS Chinook salmon PBFs on pages 5-8. Based on the current conditions described in the Mitigation Plan and our current understanding of the nearshore environment throughout the Puget Sound, improved habitat conditions in the action area would benefit PS Chinook salmon and help move the species towards recovery as described in the 2007 recovery plan (NMFS 2006).

NMFS has identified two PBFs, essential for the conservation of PS/GB bocaccio: (1) deepwater sites (>30 meters) that support growth, survival, reproduction, and feeding opportunities; and (2) nearshore juvenile rearing sites with sand, rock and/or cobbles to support forage and refuge and aquatic vegetation. The proposed action will affect nearshore bocaccio critical habitat but is unlikely to affect deepwater critical habitat. Based on the current conditions described in the Mitigation Plan and our current understanding of the nearshore environment throughout the Puget Sound, improvement of habitat in the action area would benefit PS/GB bocaccio and help move the species towards recovery as described in the 2017 recovery plan (NMFS 2017). Based on the natural history of SRKWs and their habitat needs, NMFS identified the following PBFs essential to conservation: (1) Water quality to support growth and development; (2) Prey

species of sufficient quantity, quality and availability to support individual and population growth as well as reproduction and development; and (3) Passage conditions to allow for migration, resting, and foraging. Water quality and prey species PBFs occur in the action area. Water quality in Puget Sound, in general, is highly degraded as described in the Puget Sound Partnership 2018-2022 Action Agenda and Comprehensive Plan (Puget Sound Partnership 2018). For example, toxins in Puget Sound persist and build up in marine organisms including SRKWs and their prey resources, despite bans in the 1970s of some harmful substances and continued cleanup efforts. Once in the environment these substances proceed up the food chain, accumulating in long-lived top predators like SRKWs. Most wild salmon stocks throughout the whales' geographic range are at fractions of their historic levels. Moreover, further reductions in prey salmon species, particularly Chinook salmon, will risk SRKW recovery and persistence.

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 area (*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 proposed action (modifications to the dock, the float, and the offsetting habitat measures) directly impacts the nearshore environment and PS Chinook salmon, PS/GB bocaccio, and SRKW critical habitat. The initiation package provides a detailed discussion and comprehensive assessment of the effects of the proposed action in the *Effect Determinations* (Pages 8-13) of the SPIF, and is adopted here (50 CFR 402.14(h)(3)). NMFS has evaluated this section and after our independent, science-based evaluation determined it meets our regulatory and scientific standards. The adverse effects of the proposed action modify habitat as follows:

- Temporarily elevated turbidity during pile removal, float removal and installation, and barge activity;
- Temporarily elevated underwater noise during in-water pile removal and vessel activity;
- Temporary disturbance of submerged aquatic vegetation due to barge activity and pile removal;
- Increase of 1,129 square feet of overwater shade at Seattle Fire Station 5 dock;
- Temporary reduction in prey abundance.

The offsetting measures of the proposed action have the following long term beneficial effects:

- Decrease of 915 square feet of overwater shade at Pier 48 as a result of conservation offsets;
- Increase of submerged aquatic vegetation habitat following removal of creosote piles and OWS at pier 48; and

Effects of Action on Critical Habitat

Nearshore or marine critical habitat for PS Steelhead, PS/GB yelloweye rockfish, and humpback whales are not designated in the action area.

Critical habitat for PS Chinook salmon and PS/GB bocaccio are located within the action area and are likely to be adversely affected by the proposed action for the following reasons:

- Degradation to water quality;
- Decline in forage and prey opportunities;
- Disruption of migration corridors; and
- Resuspension and accumulation of contaminants.

NMFS reviews proposed action effects on critical habitat by examining how PBFs are altered, the duration of such changes, and the influence of these alterations. If the effects are very unlikely, we consider them discountable. If the effect is likely, but of very low intensity and duration, the effects may be insignificant. In estuarine and marine areas, the PBFs of designated critical habitat common to PS Chinook salmon and PS/GB bocaccio are (1) water quality, (2) forage or prey, and (3) nearshore habitat conditions for suitable growth and maturation. Physical and biological features specific to SRKW critical habitat present in the action area include (1) sufficient water quality to support growth and development and (2) prey species of sufficient quantity, quality and availability to support individual growth, reproduction and development, as well as overall population growth.

We adopt much of the critical habitat effects analysis in the SPIF (pages 8-13), but supplement with additional information as necessary to assess the effects of the action on listed species critical habitat.

Water quality – The temporary water quality reductions from increased turbidity and corollary decrease in dissolved oxygen and re-suspended contaminants are expected to occur during and following installation of the new float and implementation of conservation offsets at Pier 48. Conditions are expected to return to baseline shortly after work ceases. Based on these factors, the temporary turbidity and dissolved oxygen changes from construction related impairment of this PBF will not reduce the conservation value of the habitat for salmon, salmon prey species or rockfish.

Intermittent reductions in water quality are expected to occur during creosote-treated timber pile removal and over the course of the useful life of the structure associated with vessel use and structure maintenance resulting in increased levels of contaminants and pollutants. The removal of creosote-treated piles can temporarily mobilize poly aromatic hydrocarbons (PAH) into the surrounding water and sediments (Smith et al. 2008; Parametrix 2011). Although, they tend to abate quickly as the contaminated materials settle out in the substrate and are diluted. For example, Smith et al. (2008) reported concentrations of total PAHs of 101.8 µg/l 30 seconds after creosote-pile removal and 22.7 µg/l after 60 seconds. Because exposure to such contaminants can have chronic or sublethal effects, this aspect of water quality degradation could temporarily impair the value of critical habitat for growth and maturation of listed species. Similarly, the frequent episodes of noise in the aquatic environment from vessel use associated with the

replaced float structure is likely to create a chronic condition that reduces the suitability of the habitat for key behaviors necessary for all listed species considered in this Opinion to thrive.

Enduring effects on water quality include chronic and system-wide introduction and extended existence of pollutants from emergency service vessels. Increased levels of PAHs, oils, and other contaminants will be widely dispersed, and can have detrimental effects at very low levels of exposure either directly or indirectly through the consumption of contaminated prey or by their own exposure in the water column. This will impair the value of critical habitat for growth and maturation of each of the listed species.

Accordingly, we consider the combined effects of temporary, intermittent, and enduring effects on water quality and determined an incremental but chronic diminishment of the water quality PBF for all of the listed species with designated critical habitat in the action area, throughout the new useful life period of the structure (40 years).

Forage and prey – Designated critical habitat for each species will experience temporary, episodic, and enduring declines in forage or prey communities (a PBF of Chinook, PS/GB bocaccio, and SRKW) when benthic sediments are suspended during float installation, barge activity, and pile removal. Prey availability for juvenile Chinook salmon and bocaccio would be reduced in the areas where suspended sediment settles out. Among prey fishes, short-term and intermittent exposure to reduced water quality could result in minor reductions in forage species via gill damage. Suspended sediment from pile removal or prop wash will eventually settle out and can smother benthic prey species. Moreover, if the sediments are contaminated, then sublethal toxicity of benthic prey species could also occur.

Designated critical habitat will experience enduring diminishment of SAV and benthic communities in rearing areas of juvenile PS/GB bocaccio, and migration areas of juvenile salmonids, underneath OWS. We anticipate SAV and epibenthic forage habitat will be diminished, or will fail to establish due to the shade produced by the replaced float. Similarly, SAV and epibenthic forage habitat can be negatively impacted when vessels are moored for extended periods of time or from prop wash of vessels leaving and arriving at the structure. SAV is important in providing cover and a food base for juvenile PS Chinook salmon and juvenile PS/GB bocaccio. Over water structures shade SAV (Kelty and Bliven 2003), which reduces primary productivity, and in turn incrementally reduces food sources for juvenile PS Chinook salmon and juvenile PS/GB bocaccio. The reduction in food sources includes epibenthos (Haas et al. 2002) as well as forage fish. The repeated episodes of disturbance, together with the enduring effects of the OWS, will create an incremental systemic decline in prey, with the potential to increase competition among every cohort of each population of each listed species utilizing the nearshore.

Migration and Passage – Designated critical habitat will experience enduring incremental diminishment of safe migration for juvenile Chinook salmon. In the marine nearshore, there is substantial evidence that OWS impede the movements of juvenile salmonids (Heiser and Finn 1970; Able et al. 1998; Simenstad 1999; Southard et al. 2006; Toft et al. 2007). For example, 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. These findings show that OWS can disrupt juvenile migration in the Puget Sound nearshore, reducing the value of the critical habitat for its designated purpose of juvenile salmonid migration in estuarine and nearshore ocean environments.

Migration values are not expected to be impaired for PS/GB bocaccio as they do not rely on the nearshore area for migration.

Habitat Conservation Offsets: The analysis offered in this biological opinion utilizes the Conservation Calculator with a target goal of no-net-loss of critical habitat functions. NMFS has determined that this proposed action would result in habitat loss equivalent to -13 debits (Table 2). However, the proposed action includes a transfer of advanced mitigation credits to reduce project debits to zero. The transfer of advanced mitigation credits addresses the enduring impacts to aquatic habitats and as required by the Corps under the Clean Water Act section 404. Specifically, the City will utilize conservation credits from Seattle Department of Parks and Recreation in conjunction with the removal of OWS and creosote-treated wooden piles at Washington State Ferries Pier 48 to provide compensatory conservation requirements for the SFD dock replacement project.

The proposed conservation offsets will address the loss of ecosystem functions due to the modification to the nearshore environment from the primary element of the proposed action. The conservation offsets included as part of the proposed action are intended to provide a small benefit to nearshore habitat conditions for salmon and rockfish by removing overwater structures at Pier 48, which may in turn improve production of benthic prey communities that support the fitness growth and maturation of salmonids and juvenile rockfish. While there will be a brief in-water disturbance of habitat values (sound, visual disturbance, suspended sediment, water quality reduction) the removal of creosote-treated piles at Pier 48 will create additional area to support the recruitment and establishment of submerged aquatic vegetation, which in turn creates additional refuge and forage habitat for juvenile rockfish and Chinook salmon. Additionally, removal of creosote timber piles will likely reduce accumulation of chemical compounds in nearshore and marine sediments the tissue of fish over the long-term (DNR 2014) by removing an in-water source.

Critical habitat Effects Summary - The chronic, episodic, and enduring diminishments of water quality, migration areas, shallow water habitat, forage base, and SAV will continue to incrementally degrade the function of critical habitat, for PS Chinook salmon and PS/GB bocaccio. At the same time, offsetting measures will incrementally improve areas of the nearshore environment by promoting SAV recruitment and establishment and improving water quality by removing creosote piles.

Effects of the Action on Listed Species

Effects on listed species are determined by exposure and response. Species must be present to be exposed to project effect. If present, exposure can vary by duration, intensity, and magnitude,

each of which can influence response. Response can also vary based on the species, and the lifestage, exposed.

Presence/exposure:
Only PS Chinook salmon and bocaccio rockfish are likely to be directly affected by the construction effects of the proposed action given their reliance on the Puget Sound nearshore. These species are both likely to be present at the juvenile lifestage. All other species are considered not likely to be adversely affected, and the rationale for this determination is described later in this document.

Chinook Salmon – Juvenile PS Chinook salmon generally emigrate from freshwater natal areas to estuarine and nearshore habitats from January to April as fry, and from April through early July as larger sub-yearlings. However, juveniles have been found in the Puget Sound nearshore between April and November (Rice et al. 2011). Additionally, a percentage of Chinook salmon rear in Puget Sound without migrating to ocean areas. The work window avoids peak juvenile Chinook salmon presence from mid-February through mid-July, but does not fully avoid exposure in January through the first half of February. The presence of adult PS Chinook salmon in Puget Sound overlaps with the proposed in-water construction window, and some data suggests that up to 70% of PS Chinook salmon may spend most of their adult life in the Puget Sound without migrating to the ocean (Kagley et al. 2016). However, adult PS Chinook salmon typically occupy water deeper than the location of the proposed action. Therefore, we do not expect the direct effects from the proposed action to create exposure at a level that would trigger an observable response among adult PS Chinook salmon though some adult PS Chinook salmon will experience temporary far reaching effects such as sound from pile removal, vessel noise and activity, and water quality degradation. Exposure to these effects among adult Chinook is expected to be at low intensity and for a brief duration, so those responses would be insignificant.

Bocaccio Rockfish – Larval rock fish presence peaks twice, once in spring and once in late summer. As described in the Species Status section larval and juvenile PS/GB bocaccio frequently utilize nearshore environments during both larval and juvenile lifestages. The in-water work window (July 15 to February 15) that is adhered to for salmon species makes it likely that during the late summer period a large numbers of larval PS/GB bocaccio would be exposed to construction effects. The presence of adult PS/GB bocaccio in the action area is extremely unlikely. Suitable habitat for this lifestage in the action area is extremely limited based on preferred habitat depths and features such as rugosity. However, given the ability of this species to move throughout the marine environment, we cannot conclude that they would not ever occur within the action area, during a construction or over the proposed structure's useful life. However, we expect exposure of adult rockfish to project effects to be extremely unlikely and therefore discountable.

Response to Water Quality Degradation – Elevated turbidity will temporarily degrade water quality as a result of the proposed action and directly affect juvenile PS Chinook salmon and larval and juvenile PS/GB bocaccio.

PS Chinook salmon frequent the nearshore environment of the Puget Sound and will consequently be exposed to effects of the proposed action including elevated turbidity and suspended sediments, reduced dissolved oxygen, and exposure to toxic contaminants (e.g., PAHs) during and following pile and pier removal and float installation. Exposure to concentrations of suspended sediments expected during the proposed in-water construction activities could elicit sublethal effects such as a short-term reduction in feeding rate or success, or minor physiological stress such as coughing or increased respiration. Impairment of normal patterns of behavior including rearing and migrating, potential injury such as gill abrasion, cough, bioaccumulation of contaminants, or other transitory health effects can also occur from exposure to elevated turbidity and suspended sediments. In estuaries state regulations (WAC173-201A-400) establish a mixing zone of 200 feet plus the depth of water over the discharge port(s) as measured during mean lower low water. As such we expect sediment disturbing activities (pile removal and barge activity) will cause elevated suspended sediment levels to reach background levels within a 200-foot radius from the point of suspended sediment generation. Listed fish and their prey resources can be harmed from a wide range of elevated sediment levels and expect that at the point where sediment levels return to background levels that the harm will cease.

Studies show that salmonids have an ability to detect and distinguish turbidity and other water quality gradients (Quinn 2005; Simenstad 1988), and that larger juvenile salmonids are more tolerant to suspended sediment than smaller juveniles (Servizi and Martens 1991; Newcombe and Jensen 1996). While juvenile PS Chinook salmon are likely to encounter suspended solids, increased turbidity, and low dissolved oxygen they can, to an extent, detect and avoid these areas. While we expect the duration and intensity of exposure of juvenile PS Chinook salmon to degraded water quality to be low we do expect individuals would have brief, minor adverse response, such as coughing, increased respiration, raised cortisol, or avoidance of turbid areas that would in turn increase their exposure to piscivorous fish as a consequence of the exposure.

PS/GB bocaccio, like PS Chinook salmon, are frequently found in the nearshore environment and will be exposed to degraded water quality conditions resulting from the proposed action. Rockfish in their larval and juvenile state are passively distributed with prevailing currents (Kendall and Picquelle 2003) and are less able to avoid areas with poor water quality due to their reduced swimming abilities (larval rockfish can swim at a rate of roughly 2 cm per second (Kashef et al. 2014)). While there is little information regarding the habitat requirements of rockfish larvae, other marine fish larvae biologically similar to rockfish are vulnerable to low dissolved oxygen levels and elevated suspended sediment which can alter feeding rates and cause abrasion to gills (Boehlert 1984; Boehlert and Morgan 1985; Morgan and Levings 1989). Because the work window would overlap with one peak in larval presence, it is possible that significant numbers would be present and adversely affected by degraded water quality resulting in harm.

Response to In-water Noise: While high levels of underwater sound can injure or kill fish and alter behavior (Turnpenny et al. 1994; Turnpenny and Nedwell 1994; Popper 2003; Hastings and Popper 2005) the proposed action does not include impact pile driving, but instead employs vibratory methods to remove wooden piles at Pier 48. Vibratory pile driving has a different sound profile that has fewer effects on fish.

With regard to vibratory removal methods and noise from construction vessels such as barges, the behavioral effects from exposure remains poorly understood for fishes, especially in the wild. Fewtrell (2003) observed fish exposed to air gun noise exhibited alarm responses from sound levels of 158 to 163 dB (re 1 μPa). More recently, Fewtrell and McCauley (2012) exposed fishes to air gun sound between 147-151 dB SEL and observed alarm responses in fishes. NMFS applies a conservative threshold of 150 dB rms (re 1 μPa) to assess potential behavioral responses of fishes from acoustic stimuli.

The above-discussed criteria specifically address fish exposure to impulsive sound. Stadler and Woodbury (2009) make it clear that the thresholds likely overestimate the potential for impacts on fish from non-impulsive sounds (e.g., vibratory pile driving and removal). Non-impulsive sounds have less potential to cause adverse effects in fish than impulsive sounds. Impulsive sources cause short bursts of sound with very fast rise times and the majority of the energy in the first fractions of a second. Whereas, non-impulsive sources cause noise with slower rise times and sound energy that is spread across an extended period of time; ranging from several seconds to many minutes in duration. Regarding noise from boat motors, some fish species have been noted to not respond to outboard engines, others respond with increased stress levels, and sufficient avoidance as to decrease density (Whitfield and Becker 2014).

In regards to the proposed action, non-impulsive vibratory pile removal methods are expected to be used for approximately 1.25 hours over the course of the project. The City predicts that pile removal methods will result in-water noise levels of approximately 158 dB_{RMS}. Given the brief period that vibratory pile removal methods will be employed we expect fish to be minimally affected and exhibit slight changes in behavior, largely avoidance of the habitat in the vicinity of the construction activity. Moreover, we expect similar changes in behavior as a result of noise from barge activity.

Juvenile PS Chinook salmon and larval and juvenile rockfish are at the highest risk of exposure because they are expected to be present longer in duration (Chinook salmon) or in much higher numbers (bocaccio), although it is highly uncertain how many of either species will be exposed. Not all exposed individuals will experience adverse effects; some will experience sublethal effects, such as temporary threshold shifts, some merely behavior responses such as startle. Because methods resulting in elevated acoustic conditions will only be employed for a short period we expect the occurrence of physical injury and death to exposed fish to be extremely unlikely. However, we do expect sublethal effects and behavior responses (startle, stress, avoidance) to result in harm to juvenile PS Chinook salmon and larval and juvenile PS/GB bocaccio.

Response to Temporary Prey Reduction – PS Chinook salmon and PS/GB bocaccio juveniles will experience temporary disruption of forage or prey communities. Benthic sediments will be suspended during barge activity, pile removal, and float installation temporarily reducing prey availability in the work footprint. Sediment is expected to settle shortly after work has been completed thus the effect would be temporary and prey communities are expected to recover quickly. However, the short-term reduction in forage and prey communities would cause juveniles to seek out other forage areas thus expending more energy and potentially increasing the risk of predation.

Response to the Habitat Benefits of the Offsetting Measures - PS Chinook salmon juvenile survival is directly linked to the quality of nearshore habitat. Campbell et al. (2017) has most recently added to the evidence and correlation of higher juvenile survival in areas where there is a greater abundance and quality of intact and restored estuary and nearshore habitat. Relatedly, there is emerging evidence that without sufficient estuary and nearshore habitat, significant life history traits within major population groups are being lost, largely due to higher rates of fry mortality in urbanized watersheds. By contrast, in watersheds where the estuaries are at least 50 percent functioning, fry out-migrants made up at least 30 percent of the returning adults, compared to the 3 percent in watersheds like the Puyallup and the Green Rivers, where 95 percent of the estuary has been lost (Campbell et al. 2017). Improved juvenile Chinook salmon survival may also lead to a small net benefit for SRKWs in the form of increased prey availability. If the survival of juvenile Chinook salmon improves, a small but incremental benefit to the habitat's role in providing adequate prey for SRKW may also increase slightly.

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. Cumulative effects are not addressed as part of the initiation package. As such we developed an evaluation of cumulative effects for this condensed opinion. Non-federal cumulative effects reasonably certain to occur in the action area include operation, maintenance, and use of the dock as well as future upland activities including commercial and residential development resulting from population growth, over fishing, commercial and recreational use of Elliot Bay, and global warming.

The human population in the PS region increased from about 1.29 million people in 1950 to about 4.2 million in 2020, and is expected to reach nearly 5 million by 2040 (Puget Sound Regional Council 2020). Thus, future private and public development actions are very likely to continue in and around Puget Sound. As the human population continues to grow, demand for agricultural, commercial, and residential development and supporting public infrastructure is also likely to grow. We believe the majority of environmental effects related to future growth will be linked to these activities, in particular land clearing, associated land-use changes (i.e., from forest to impervious, lawn or pasture), increased impervious surface, and related contributions of contaminants to area waters. Land use changes and development of the built environment that are detrimental to salmonid habitats are likely to continue under existing regulations. Though the existing regulations minimize future potential adverse effects on salmon habitat, as currently constructed and implemented, they still allow systemic, incremental, and additive degradation to occur.

Anticipated climate effects on abundance and distribution of PS Chinook salmon include a wide variety of climate impacts. The greatest risks will likely occur during incubation, when eggs are vulnerable to high mortality due to increased flooding and variability in seasonal flow (Ward et al. 2015). Crozier et al. (2019) identified early life stages such as incubating eggs as highly sensitive when exposed to more variable hydrologic regimes. Crozier et al (2019) also predicted

that 8% of spawning habitat will change from snow-dominated to transitional, and 16% will change from transitional to rain-dominated. These projections suggest that winter flooding will become more common, directly affecting incubating eggs. Stream temperature ranks high in the extent of change expected, which could increase pre-spawn mortality in low-elevation tributaries (Cristea and Burges 2010). Rising temperatures during late spring and summer may also impact Chinook salmon juveniles in estuary and riverine habitats. Most Puget Sound estuaries already surpass optimal summer rearing temperatures, and the expectation of additional warming would further degrade already degraded habitat (Crozier et al 2019, Appendix S3).

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 to the environmental baseline and the cumulative effects, taking into account the status of the species and critical habitat, 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.

Species – PS Chinook salmon are threatened species while bocaccio rockfish are endangered. The status of these species is driven in part by habitat conditions that limit productivity in the action area as a baseline condition, and habitat loss and degradation designation-wide. To this baseline, and cognizant of the status of species, we add the effects of the proposed action.

The anticipated effects during dock replacement, pier removal, and pile removal, will occur among rearing PS Chinook salmon and PS/GB bocaccio. They will be exposed to elevated turbidity, reduced forage opportunities, and elevated underwater sound. The effects are expected to be behavioral responses that abate quickly and are unlikely to result in injury or death for more than a few individuals (fishes). Bocaccio are not identified with component populations, so effects among individuals are considered at the species scale in this section. When we evaluate the addition of effects of temporary turbidity, sound, reduced forage, and chemical exposure to the baseline condition, we do not expect reductions in abundance of larvae or juveniles from these construction effects to alter adult abundance or productivity.

To the degree that juvenile PS Chinook salmon are exposed to water quality contamination from creosote, they could have a sublethal or delayed health responses. These effects will occur among Duwamish/Green River Chinook, as this system drains directly into Elliot Bay near the work site. Annual escapement estimate of Chinook salmon natural origin spawners returning to the Duwamish/Green River has been highly variable and decreasing since 1990 (WRIA9 2021). Projects that negatively affect total abundance of Duwamish/Green River Chinook salmon risk decrementing the viability of the population and ensuring recovery goals are not met. The Duwamish/Green River Chinook salmon 10-year VSP goals specify reaching 1,000 – 4,200 natural origin spawners and the 50-100-year goal is 27,000 (WRIA9 2021). Since 2005, annual adult spawner abundances have failed to meet those goals frequently dropping below 1,000 natural origin spawners. It is unlikely that the Seattle Fire station 5 float replacement project will

reduce population viability because only one cohort of Chinook juveniles would be negatively affected by the construction effects of the action. Additionally, the compensatory conservation offsets ensure that habitat conditions and overall carrying capacity are not reduced below baseline conditions by the permanent in-water effects of the dock originally proposed. In fact, small long-term habitat benefits are associated with the conservation offsets at Pier 48 and may slightly increase carrying capacity over time.

Critical Habitat PS Chinook – The critical habitat has high conservation value for PS Chinook salmon (CHART 2005) despite the current degraded conditions. Nearshore habitat modification has caused broad-scale ecological changes, reducing the ability of critical habitat to support PS Chinook salmon juvenile migration and rearing. The loss of submerged aquatic vegetation, including eelgrass and kelp, has reduced cover, an important feature of habitat for PS Chinook salmon. Degradation of sand lance and herring spawning habitat has reduced the quantity of the forage for PS Chinook salmon. Construction of overwater structures throughout Puget Sound has degraded PS Chinook salmon habitat by creating artificial obstructions to free passage in the nearshore marine area. Habitat modification reduces juvenile survival and in some cases, has eliminated PS Chinook salmon life history strategies that rely on rearing in nearshore areas during early life history. Under the current environmental baseline, nearshore habitat is not able to support optimal juvenile survival of PS Chinook salmon such that populations of this ESU can become viable.

The proposed action would have minor, positive and negative localized habitat effects. Additionally, the temporary effects on critical habitat do not occur at an intensity that will further limit the action area's role for growth, maturation, or movement of any of the fishes between important habitats. Cumulative effects including intensifying recreational use of water, and upland sources of contamination as human population increases, and climate change becomes more intense are likely to outweigh the conservation gain in this habitat, but do make the need for conservation gains more acute. When long and short term effects are considered together and added to the baseline, the proposed action does not further reduce the conservation value of the action area for PS Chinook salmon.

Critical Habitat Bocaccio – Changes to nearshore areas in Puget Sound have also reduced the ability of this habitat to support juvenile life stages of PS/GB bocaccio. Loss of submerged aquatic vegetation has reduced cover available for larval and juvenile rockfish. Changes in physical characteristics of nearshore areas and loss of water quality reduce the amount of prey available for juvenile rockfish. Although loss of nearshore habitat quality is a threat to bocaccio, the recovery plan for this species list the severity of this threat as low (NMFS 2017a). Other factors, such as overfishing, are more significant threats to PS/GB bocaccio. Moreover, due to the uncertainty associated with current population abundance estimates and the uncertainty of the total number of fish likely to be taken as a result of the action it is difficult to determine the impact on the population viability of Central and South basin bocaccio populations. However, because the adverse construction effects are short term only one cohort of juvenile bocaccio would be impacted and is unlikely to reduce the viability of the populations utilizing Elliot Bay. The long term effects on PBFs for bocaccio are neither positive nor negative because of the offsetting habitat measures.

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, compensatory conservation offsets, and cumulative effects, it is NMFS' biological opinion that the proposed action is not likely to jeopardize the continued existence of PS Chinook salmon, PS steelhead, PS/GB bocaccio, PS/GB yelloweye rockfish, or SRKW or destroy or adversely modify PS Chinook salmon, PS/GB bocaccio, or SRKW designated critical habitat.

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 incidental take statement.

Amount or Extent of Take

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

- Harm of PS Chinook salmon (juvenile) and PS/GB DPSs of bocaccio (larvae, juvenile) from temporary degraded water quality during construction actions.
- Harm of PS Chinook salmon (juvenile) and PS/GB DPSs of bocaccio (larvae, juvenile) from underwater noise caused by pile removal and vessel activity.
- Harm to PS Chinook (juvenile) and PS/GB DPSs of bocaccio (larvae, juvenile) due to a reduction in prey availability

For this Opinion, even using the best available science, NMFS cannot predict with meaningful accuracy the number of listed species that are reasonably certain to be harmed, injured, or killed by exposure to these stressors. The distribution and abundance of the fish that occur within the action area are affected by habitat quality, competition, predation, and the interaction of processes that influence genetic, population, and environmental characteristics. These biotic and environmental processes interact in ways that may be random or directional, and may operate across far broader temporal and spatial scales than are affected by a proposed action. Thus, the distribution and abundance of fish within the action area cannot be attributed entirely to habitat conditions, nor can NMFS precisely predict the number of fish that are reasonably certain to be injured or killed if their habitat is modified or degraded by the proposed action. Additionally,

NMFS knows of no device or practicable technique that would yield reliable counts of individuals that may experience these impacts.

In such circumstances, NMFS uses the causal link established between the activity and the likely extent of timing, duration and area of changes in habitat conditions to describe the extent of take as a numerical level. Many of the take surrogates identified below could be construed as partially coextensive with the proposed action; however, they also function as effective reinitiation triggers. If any of the take surrogates established here they are considered meaningful reinitiation triggers because the Corps has authority to conduct compliance inspections and to take actions to address non-compliance, including post-construction (33 CFR 326.4), and exceeding any of the surrogates would suggest a greater level of effect than was considered by NMFS in this analysis.

Extent of Take

The extent of harm to juvenile Chinook salmon and juvenile rockfish from, noise is that which occurs during 6 weeks of in water work, occurring after July 15 and before February 15. This extent of take is causally linked to harm because the timing (in-water work window) and duration (days) of in-water work affects the likely presence of fish (timing of work) and the potential numbers that could be exposed (duration of work). In water work that lasts for more than 6 weeks or occurs outside of the work window increase the numbers of fish exposed to harmful conditions, and would be an observable exceedance of take.
The extent of harm to juvenile Chinook salmon and juvenile rockfish from suspended sediments, turbidity, and elevated PAHs and reduced prey can be measured by the area where suspended sediments exceed background levels. The maximum extent of take from elevated suspended sediment is defined as within the 200-foot buffer around the outer boundaries of each of the project footprints. If suspended sediment are visible in an area beyond the 200-foot buffer, the number of fish exposed to harmful conditions would increase, and that would indicate exceedance of take.

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.

Reasonable and Prudent Measures

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

1. The Corps shall minimize incidental take of listed species resulting from suspended sediment and re-suspended contaminants during construction.
2. The Corps and applicants shall implement monitoring and reporting programs to confirm that the RPM’s are implemented as required and take exemption for the proposed action is not exceeded, and that the terms and conditions are effective in minimizing incidental take.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, the federal action agency must comply (or must ensure that any applicant complies) with the following terms and conditions. The Corps or any 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 CFS 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.

1. The following terms and conditions implement RPM 1 (suspended sediments and contaminants):
    a. Monitor suspended sediment and turbidity during and following construction activities. At point of compliance (per state permit), turbidity levels shall not exceed 5 nephelometric turbidity units (NTUs) more than background turbidity when the background turbidity is 50 NTUs or less, or there shall not be more than a 10 percent increase in turbidity when the background turbidity is more than 50 NTUs. Removing piles slowly and allowing sediment to slough off at, or near, the mudline and placing a ring of clean sand around the base of the pile to contain some of the sediment that would otherwise be suspended are effective methods for minimizing suspended sediments and turbidity.
    b. Dispose of removed creosote structures at approved facilities[3].

2. The following terms and conditions implement RPM 3 (Monitoring and Reporting). The Corps shall require the applicant to:
    a. Before work begins, all contractors working on site must receive a complete list of the Corps permit special conditions, this biological opinion's ITS, including the RPMs and terms and conditions intended to minimize the amount and extent of take resulting from in-water work.
    b. On the start date of the construction, the applicant (or designated agent) shall notify NMFS that construction has commenced: This notification should be sent to projectreports.wcr@noaa.gov and include:
        i. Email subject line: "NOTIFICATION OF START DATE **WCRO-2021-01863**"
        ii. Date project construction began
        iii. Corps NWS project number
    c. Provide documentation demonstrating the completion of proposed mitigation measures including creosote disposal receipts within 60 days of completing construction.

[3] https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Dangerous-waste-guidance/Dispose-recycle-or-treat/Hiring-a-contractor

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 Corps and the City of Seattle should identify and implement nearshore habitat enhancement or restoration activities in Elliot Bay, including the action area, that:

1. Improve the quality of riparian habitat and submerged aquatic vegetation to increase cover and forage for juvenile migration and rearing; and
2. Remove existing in-water structures such as docks, piles, bulkheads, or armoring that are no longer in use.

Please notify NMFS if the Corps or the City carries out these recommendations so that we will be kept informed of actions that intended to improve the conservation of listed species or their designated critical habitats.

Species and Critical Habitats Not Likely to be Adversely Affected

Steelhead – The proposed action is unlikely to affect juvenile PS steelhead as most typically emigrate from natal streams directly to the ocean in April and May (before the work occurs) spending little time in the nearshore zone (Goetz et al. 2015). Therefore, juvenile steelhead are not expected to be in high abundance in the action area during the proposed work window. Additionally, juvenile steelhead are typically larger when they migrate after spending more time growing in freshwater and have stronger swimming abilities. Consequently, they are able to avoid areas of degraded water quality more easily than smaller juvenile PS Chinook salmon. We accordingly consider their exposure to the effects of degraded water quality resulting from the proposed action will be non-lethal behavioral responses. Avoidance behavior does not significantly increase the likelihood of injury or death, as these larger juveniles are less likely than juvenile Chinook to be preyed upon as they enter deeper water. We therefore find the effects of the project on juvenile PS steelhead to be insignificant.

The presence of adult PS steelhead in Puget Sound overlaps with the in-water construction window. However, adult PS steelhead, like adult PS Chinook, occupy deep water and do not typically rely on nearshore habitats. Thus, we do not expect adult PS steelhead to be directly affected by the proposed action and any exposure to sound, vessel noise, or water quality degradation is expected to occur at low intensity and short duration, so that responses are also insignificant.

Yelloweye Rockfish – Larval rock fish presence typically peaks twice, once in spring and once in late summer. Unlike PS/GB bocaccio, larval and juvenile PS/GB yelloweye rockfish do not typically utilize the nearshore environment and are more likely to be found in areas with greater depth. Therefore, we find the likelihood of larval or juvenile PS/GB yelloweye rockfish to be

occupying the action area to be low. Similarly, the presence of adult PS/GB yelloweye in the action area is extremely unlikely. Suitable habitat for the adult lifestage is extremely limited based on preferred habitat depths and features such as rugosity. Although, given the ability of this species to move throughout the marine environment, we cannot conclude that they would not ever occur within the action area, during a construction action or over the proposed structure's useful life. However, we expect exposure of adult rockfish to project effects to be extremely unlikely. We find the likelihood of PS/GB yelloweye rockfish experiencing adverse effects from the proposed action to be highly unlikely and therefore discountable.

Southern Resident Killer Whales – Because the proponent intends to use monitoring and 'stop work' protocols if any SKRW are sighted, SRKW are unlikely to be injured or disturbed by sound pressure generated by vibratory pile driving methods used to remove creosote piles. NMFS uses conservative thresholds of sound pressure levels from broad band sounds that cause behavioral disturbance (160dB$_{RMS}$ re: 1µPa for impulse sound and 120 dB$_{RMS}$ re: 1µPa for continuous sound) and injury (for impulsive: peak SPL flat weighted 230 dB, weighted cumulative SEL 185 dB; for non-impulsive: weighted cumulative SEL 198 dB) (NMFS 2018). The City expects vibratory levels to reach 158 dB$_{RMS}$ during 75 minutes of pile removal. Temporary threshold shifts for SRKWs occur at 120 dB$_{RMS}$. Based on the accepted practical spreading loss model, noise from the action would attenuate at approximately 1,800 meters from the source (i.e., pile removal).

It is possible that SRKWs will be present in the action area during the work window, however, we consider it unlikely. "High use" areas for SRKW in winter were determined to be along the Washington coast, the west entrance to the Strait of Juan de Fuca, and the northern Strait of Georgia (Hanson et al. 2017; Emmons et al. 2019). However, there is considerable variability in the seasonal movements of SRKW. Considering that the action area extends approximately 1.8 km from the work site, SRKW would need to enter Elliot Bay in order to be directly exposed to project construction effects. Given the small area this represent relative to the species range and the entire Puget Sound we find it unlikely that SRKWs will be exposed to effects of the proposed action. For those reasons, we determine effects of the proposed action on SRKWs to be unlikely and therefore discountable.

Southern Resident Killer Whale Critical Habitat – While water quality will be briefly reduced by turbid conditions and brief chemical contamination with the removal of the creosote pilings, these diminishments will ameliorate shortly after work ceases, and the features will re-establish their baseline level of function. SRKW prey species, Chinook salmon, will be adversely affected by the proposed action as described above, but the numbers of individual fish affected, and the degree of these effects are unlikely to alter population level abundance of juvenile fish in a manner that will diminish prey availability of returning adult Chinook salmon. All effects on PBFs of SRKW critical habitat are insignificant.

Humpback Whales – We do not expect humpback whales to be present in the action area during construction. The implemented MMMP would also ensure that if humpback whales do enter the action area construction would cease until the whales have left the area. For these reasons, we expect project effects on humpback whales to be highly unlikely and therefore discountable.

Reinitiation of Consultation

Reinitiation of consultation is required and shall be requested by the Corps or by NMFS, where discretionary federal involvement or control over the action has been retained or is authorized by law and (1) The amount or extent of incidental taking specified in the ITS is exceeded, (2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (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 this biological opinion; or if (4) a new species is listed or critical habitat designated that may be affected by the identified action.

MAGNUSON-STEVENS FISHERY AND CONSERVATION ACT ESSENTIAL FISH HABITAT CONSULTATION

NMFS reviewed the proposed action for potential effects on essential fish habitat (EFH) designated under the Magnuson-Stevens Fishery Conservation and Management Act (MSA), including conservation measures and any determination the Corps made regarding the potential effects of the action. This review was conducted pursuant to section 305(b) of the MSA, implementing regulations at 50 CFR 600.920, and agency guidance for use of the ESA consultation process to complete EFH consultation. Section 305(b) of the MSA directs federal agencies to consult with NMFS on all actions or proposed actions that may adversely affect EFH.

The MSA (section 3) defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." Adverse effect means any impact that reduces quality or quantity of EFH, and may include direct or indirect physical, chemical, or biological alteration of the waters or substrate and loss of (or injury to) benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality or quantity of EFH. Adverse effects on EFH may result from actions occurring within EFH or outside of it and may include site-specific or EFH-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810). Section 305(b) also requires NMFS to recommend measures that can be taken by the action agency to conserve EFH.

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

The entire action area fully overlaps with identified EFH for Pacific Coast salmon, Pacific Coast groundfish, and coastal pelagic species. Designated EFH for groundfish and coastal pelagic species encompasses all waters along the coasts of Washington, Oregon, and California that are seaward from the mean high water line, including the upriver extent of saltwater intrusion in river mouths to the boundary of the U. S. economic zone, approximately 230 miles (370.4 km) offshore (PFMC 1998a,b). Designated EFH for salmonid species within marine water extends from the nearshore and tidal submerged environments within state territorial waters out to the full extent of the exclusive economic zone offshore of Washington, Oregon, and California,

north of Point Conception to the Canadian border (PFMC 1999). Groundfish, coastal pelagic, and salmonid fish species that could have designated EFH in the action area are listed in Tables 3, 4, and 5.

Additionally, Puget Sound is a Habitat Area of Particular Concern (HAPC), based on importance of the ecological function provided by the habitat. The environmental effects of the proposed project may adversely affect EFH for Pacific coast groundfish, coastal pelagic species, and Pacific coast salmon in the HAPC for these species.

Table 3. EFH Pacific coast groundfish species potentially in the action area.

Common Name	**Scientific Name**	**Common Name**	**Scientific Name**
Arrowtooth flounder	*Atheresthes stomias*	Pacific Ocean perch	*Sebastes alutus*
Big skate	*Raja binoculata*	Pacific sanddab	*Ctlharichthys sordidus*
Black rockfish	*Sebastes melanops*	Petrale sole	*Eopsetta jordani*
Bocaccio	*Sebastes Paucispinis*	Quillback rockfish	*Sebastes maliger*
Brown rockfish	*Sebastes auriculatus*	Ratfish	*Hydrolagus colliei*
Butter sole	*Isopsetta isolepis*	Redbanded rockfish	*Sebastes proriger*
Cabezon	*Scorpaenichthys marmoratus*	Rex sole	*Glyptocephalus zachirus*
California Skate	*Raja inomata*	Rock sole	*Lepidopsetta bilineata*
Canary rockfish	*Sebastes pinniger*	Rosethorn rockfish	*Sebastes helvomaculatus*
China rockfish	*Sebastes nebulosus*	Rosy rockfish	*Sebastes rosaceus*
Copper rockfish	*Sebastes caurinus*	Rougheye rockfish	*Sebastes aleutianus*
Curlfin sole	*Pleuronichthys decurrens*	Sablefish	*Anoplopoma fimbria*
Darkblotch rockfish	*Sebastes crameri*	Sand sole	*Psettichthys melanistictus*
Dover sole	*Microstomus pacificus*	Sharpchin rockfish	*Sebastes zacentrus*
English sole	*Parophrys vetulus*	Shorts pine thornyhead	*Sebastolobus alascanus*
Flathead sole	*Hippoglossoides elassodon*	Spiny dogfish	*Squalus acanthias*
Greenstriped rockfish	*Sebastes elongatus*	Splitnose rockfish	*Sebastes diploproa*
Hake	*Merluccuys productus*	Starry flounder	*Platichthys stellatus*
Kelp greenling	*Hexagrammos decagrammus*	Tiger rockfish	*Sebastes nigrocinctus*
Lingcod	*Ophiodon elongatus*	Vermilion rockfish	*Sebastes miniatus*
Longnose skate	*Raja rhina*	Yelloweye rockfish	*Sebastes ruberrimus*
Pacific cod	*Gadus macrocephalus*	Yellowtail rockfish	*Sebastes llavidus*

Table 4. EFH coastal pelagic species potentially in the action area.

Common Name	**Scientific Name**
Market Squid	*Latigo opalescens*
Norther Anchovy	*Engraulis mordax*
Jack Mackerel	*Trachurus symmetricus*
Pacific Mackerel	*Scomber japonicas*
Pacific sardine	*Sardinops sagax*

Table 5. EFH Pacific salmon species in the action area.

Common Name	Scientific Name
Chinook salmon	*Oncorhynchus tshawytscha*
Coho Salmon	*Oncorhynchus kisutch*
Pink Salmon	*Oncorhynchus gorbuscha*

The effects of the proposed project on ESA-listed species are described in the effects analysis section above. The same mechanisms of effect are likely to affect all Pacific coast groundfish, coastal pelagic species, and Pacific coast salmon to varying degrees. These adverse effects include:

1. Water quality –temporarily degraded water quality as a result of sound, turbidity, re-suspended contaminants, decreased dissolved oxygen, and other pollutants.
2. Forage reduction – disturbance and shading of submerged aquatic vegetation and resulting reduction in submerged aquatic vegetation density and abundance, and related primary production. Designated EFH will experience temporary, episodic, and enduring declines in forage or prey communities.
3. Elevated underwater noise during pier and pile removal.

The chronic, episodic, and enduring diminishments of EFH created by nearshore in water and overwater structures to water quality, migration areas, shallow water habitat, forage base, and SAV has and will continue to incrementally degrade the function of EFH. The effects further constrain the carrying capacity for life stages (larval and juvenile) for multiple species within the action area.

Essential Fish Habitat Conservation Recommendations

Fully implementing these EFH Conservation Recommendations would protect, by avoiding or minimizing the adverse effects described in the previous section.

1. Comply with Washington state water quality standards by conducting water quality monitoring during pile removal activities. At point of compliance (per state permit), turbidity levels shall not exceed 5 NTUs more than background turbidity when the background turbidity is 50 NTUs or less, or there shall not be more than a 10 percent increase in turbidity when the background turbidity is more than 50 NTUs.
2. To minimize incidental take from suspending sediment during structure removal and construction, implement the best management practices and conservation measures and employ a suspended sediment (turbidity) monitoring plan. Some conservation measures included:
    a. Remove piles slowly to allow sediment to slough off at, or near, the mudline.
    b. Shake or vibrate the pile to break the bond between the sediment and pile. Doing so causes much of the sediment to slough off the pile at the mudline, thereby minimizing the amount of suspended sediment.
    c. Place a ring of clean sand around the base of the pile. This ring will contain some of the sediment that would normally be suspended.

As required by section 305(b)(4)(B) of the MSA, the Corps must provide a detailed response in writing to NMFS within 30 days after receiving these EFH CRs. 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 CRs unless NMFS and the federal agency have agreed to use alternative timeframes for the federal agency response. The response must include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with the CRs, 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 CRs 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 CRs accepted.

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

This letter underwent pre-dissemination review using standards for utility, integrity, and objectivity in compliance with applicable guidelines issued under the Data Quality Act (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001, Public Law 106-554). The biological opinion will be available through NOAA Institutional Repository https://repository.library.noaa.gov/. A complete record of this consultation is on file in the Oregon Washington Coastal Office in Lacey, Washington.

Please direct questions regarding this letter to Forrest Carpenter in the Oregon Washington Coastal Office in Lacey, Washington (360-790-0222 or forrest.carpenter@noaa.gov) .

Sincerely,

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

cc: Daniel Krenz, USACE
Kevin Sahara, City of Seattle

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