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

Refer to NMFS No.:
WCRO-2021-03107

March 18, 2022

Jacalen Printz
Acting Chief, Regulatory Branch
Department of the Army
Corps of Engineers, Seattle District
P.O. Box 3755
Seattle, Washington 98124-3755

Re: Endangered Species Act Section 7 Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Wiley Slough Levee and Tidegate Repair, Skagit County, Washington. (6th Field HUC: 171100070204 North and South Fork Skagit River; USACE Number - NWS-2021-460).

Dear Ms. Printz:

On December 2, 2021, NOAA's National Marine Fisheries Service (NMFS) received your request for a written concurrence that the U.S Army Corps of Engineers (USACE) issuance of a permit to the Washington Department of Fish and Wildlife (WDFW) to repair the Wiley Slough Setback Dike, is not likely to adversely affect (NLAA) species listed as threatened or endangered under the Endangered Species Act (ESA). On December 14, 2021, NMFS notified the USACE that formal consultation was appropriate for this project. The USACE then responded with a request for formal consultation. This biological opinion is in response to your request was prepared by NMFS pursuant to section 7(a)(2) of the ESA, implementing regulations at 50 CFR 402.

The enclosed document contains a biological opinion prepared by NMFS pursuant to section 7(a)(2) of the Endangered Species Act (ESA) on the effects of the levee and tidegate repair project in the Skagit River delta. In this Opinion, the NMFS concludes that the action, as proposed, is not likely to jeopardize the continued existence of Puget Sound Chinook salmon, Puget Sound steelhead, or result in the destruction or adverse modification of designated critical habitat for these species. This document also documents our conclusion that the proposed action is not likely to adversely affect Southern Resident killer whales (SRKW) and their designated critical habitat.

Per your request, NMFS also reviewed the likely effects of the proposed action on essential fish habitat (EFH), pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1855(b)), and concluded that the action would adversely affect the EFH of Coho, Chinook, and Pink salmon. We have included the results of that review in Section 3 of this document.

Please contact Dave Price, consulting biologist at the Oregon Washington Coastal Office (david.price@noaa.gov), if you have any questions concerning this consultation, or if you require additional information.

Sincerely,

Assistant Regional Administrator
Oregon Washington Coastal Office

cc: Randel Perry, USACE

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

Wiley Slough Levee and Tidegate Repair
Skagit County, Washington

NMFS Consultation Number: WCRO-2021-03107

Action Agency: U.S. Army Corps of Engineers, Seattle District

Affected Species and NMFS' Determinations:

ESA-Listed Species	Status	Is Action Likely to Adversely Affect Species?	Is Action Likely To Jeopardize the Species?	Is Action Likely to Adversely Affect Critical Habitat?	Is Action Likely To Destroy or Adversely Modify Critical Habitat?
Puget Sound steelhead (*Oncorhynchus mykiss*)	Threatened	Yes	No	Yes	No
Puget Sound Chinook (*O. tshawytscha*)	Threatened	Yes	No	Yes	No
Southern Resident killer whale (*Orcinas orca*)	Endangered	No	No	No	No

Fishery Management Plan That Identifies EFH in the Project Area	Does Action Have an Adverse Effect on EFH?	Are EFH Conservation Recommendations Provided?
Pacific Coast Salmon (Puget Sound Chinook, Coho, and pink salmon)	Yes	No

Consultation Conducted By: National Marine Fisheries Service
West Coast Region

Issued By:

Administrator
Oregon Washington Coastal Office

Date: March 18, 2022

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1. INTRODUCTION

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

1.1 Background

The National Marine Fisheries Service (NMFS) prepared the biological opinion (opinion) and incidental take statement (ITS) portions of this document in accordance with section 7(b) of the Endangered Species Act (ESA) of 1973 (16 USC 1531 et seq.), and implementing regulations at 50 CFR 402.

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

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

1.2 Consultation History

On December 1, 2021, we received an informal consultation request from the USACE, along with the applicants' supporting documentation. On December 14, 2021, NMFS notified the USACE that formal consultation was warranted for this project. On that same date, the USACE requested that NMFS proceed for formal consultation for the proposed action and NMFS initiated the consultation.

The action area is within the geographic range of species listed as threatened or endangered under the ESA. The USACE initially determined that the proposed project "is not likely to adversely affect" Puget Sound (PS) Chinook salmon (*Oncorhynchus tshawytscha*), PS steelhead (*Oncorhynchus mykiss*), and their designated critical habitats, and that the project would have "no effect" on several other species. The NMFS determined that the project would adversely affect PS Chinook and PS steelhead and their designated critical habitats. NMFS also determined that the project was likely to affect, but not adversely affect Southern Resident killer whales (SRKW) and their designated critical habitat. NMFS conducted formal consultation on PS Chinook salmon, PS steelhead, and the critical habitats of these species. Section 2.12 documents our conclusion that the proposed action is not likely to adversely affect SRKW and their designated critical habitat. No conference is required for this action concerning the September 19, 2019, proposed rulemaking by the NMFS to revise designated critical habitat for SRKW on the outer coast of Washington (84 FR 49214), because the proposed additional critical habitat is located well outside of the action area.

Finally, the proposed action will adversely affect Essential Fish Habitat (EFH) for Chinook salmon, coho salmon (*O. kisutch*), and pink salmon (*O. gorbuscha*). A complete record of this consultation is on file electronically at West Coast Region office in Lacey, Washington.

The Wiley Slough restoration project has undergone previous Section 7 ESA consultation for the original project that removed the old levees and created the newer setback levee and replaced the old tidegate (NMFS No. 2007-00638). The term levee and dike are used interchangeably in this document. Additional adaptive management work of installing a modern fish-passable tidegate was also completed at the site (NMFS No. 2010-04498 implementation under the Fish Passage and Restoration Programmatic (FPRP) for the State of Washington). The restoration project re-established approximately 156 acres of tidal estuary that was previously diked and drained for farming. The previous/removed levees were likely originally constructed around the turn of the 20th century. A USACE survey map from 1912 shows early levee locations in this vicinity (http://www.skagitriverhistory.com/1979_Levee_Project_Issues_Page.htm). More project history is explained below.

1.3 Proposed Federal 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), and under the MSA, Federal action means any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken by a Federal Agency (50 CFR 600.910).

WDFW proposes to repair and correct deficiencies in the Wiley Slough Setback Dike, located on the Skagit Wildlife Area – Headquarters Unit on Fir Island, approximately 1.8 miles southwest from the town of Conway. The Wiley Setback Dike and Wiley Slough Tidegate are infrastructure associated with the 156-acre Wiley Slough Estuary Restoration Project in the Skagit River Delta, Skagit County, Washington. The Wiley Setback Dike was constructed in 2009 as part of an estuarine restoration project that removed several existing dikes and converted approximately 156 acres of agricultural lands back to estuary that previously was drained c1900 and farmed for about one hundred years. The proposed design will meet the USACE performance standards (Engineering Manual No. 1110-2-1913 Engineering Design and Construction of Levees, 2000) per the requirements of the USACE PL84-99 program. The dike performance standard (level of protection design criteria) is a 1 in 50 (2 percent annual chance event), combined tidal storm surge and river flood annual exceedance probability event, with wind setup, sea level rise, and 1-foot of freeboard (J. Baker pers comm January 10, 2022). This performance standard has not changed since the original setback levee was constructed. The proposed work will correct levee and tidegate deficiencies to meet the original performance standard for the restoration project.

Since the construction of the setback dike, there have been several overtopping and flooding events, which caused damage and stability concerns for the setback dike. The most recent flooding events of November 2021 required some emergency work to stabilize the dike. The dike requires repairs to address overtopping, seepage, and stability concerns. To meet the design standards, WDFW proposes to raise the elevation of the dike by up to four feet to a height of 16.75 feet, raise the level of protection at the tide gate over Wiley Slough to meet the design

standard of the levee system as described above, and modify access roads, ramps, and turnarounds along the dike to accommodate the levee work. The total project length is approximately 5,600 linear feet. The work will expanded width of the base/toe of the levee thus requiring modifications to the existing parking lot, including moving the vault toilet and re-grading the parking area.

WDFW would repair the damages that have been caused by previous overtopping events and bring the levee into compliance with the performance standards of the U.S. Army Corps of Engineers' and the Skagit County Consolidated Dike, Drainage and Irrigation Improvement District 22 (DD22). The purpose of these repairs is to maintain the health and functioning of the restored estuary and protect the agricultural and residential properties to the north from marine flooding, consistent with agricultural levee protection (i.e., this is *not* a 100-year USACE certified levee). Additionally, the parking area modifications will allow for a safer and more accessible recreation experience for the public visiting the Skagit Wildlife Area. Scope of work is as follows:

- Raise levee elevation. The dike fill crest will be raised to an elevation of 16.75 feet. An internal toe drain blanket and geosynthetic reinforcements will be installed along the landward side of the dike to meet recommended stability factors of safety. Riprap erosional protection will also be installed along the waterward face of the dike raise embankment. The dike's expanded footprint will require fill impacts to several palustrine wetlands extending to the dike's toe of slope. These impacts are necessary to provide safe fill slopes to accommodate dike repairs and future maintenance. Palustrine wetland impacts on the interior side of the dike will be mitigated through the purchase of credits from a qualified mitigation bank. Additionally, the Wiley Slough Estuary south of the dike will incur 87 square feet (SF) of permanent impacts associated with riprap placement. These impacts would be mitigated through the re-establishment of an equal amount of estuary onsite.
- Retrofit tidegate. A steel knee wall will be attached to the tide gate's waterward side and a concrete retaining wall will be installed at grade with the top of the dike along both sides of the tide gate to match the elevation of the raised dike across the tide gate and provide protection from overtopping events. All work will be performed in the dry and will adhere to the seasonal in-water work window provided for the Skagit River.
- Modify access roads, ramps, and turnarounds. Existing access areas will be enlarged and realigned to accommodate the movement of construction equipment along the dike. These areas will also be utilized for maintenance and flood fight purposes to provide DD22 with access to all areas of the dike and other structures they manage when they assume ownership of the Wiley Dike upon completion of this project.
- Relocate existing restroom. The existing restroom facilities will be relocated to accommodate the increased footprint of the dike surrounding the parking area. The restroom will be installed in a new location within the upgraded parking area. This element is above the high tide line.
- Regrade parking area. The dike's expanded footprint will mean that the parking area will need to be modified. As a part of this work the lot, which is subject to significant erosion from overtopping events, will be regraded. The parking area will also be modified to

allow for ADA access to the boat ramp entering Freshwater Slough (being permitted as a different project).
- Re-establish estuary and re-vegetate. The realignment of the dike along the parking area and the removal of bump outs on the western and eastern extents of the dike will allow for the re-establishment of approximately 10,744 SF of estuarine habitat.

Construction sequencing and timing of each stage (duration and dates):

The work sequence for the project will commence only upon receipt of required permits and within the dates of August 1 to September 30, as per the WDFW/USACE in-water work windows.

Work will occur both above and below the high tide line for the project area. By working at low tide, no work is anticipated to occur in water on the estuarine side. If in-water work is required, such as at the base of the tidegate or in scattered locations along the levee where limited ponding could still remain at low tide, fish protection and exclusion will occur in the following steps:

- Conduct work during the lowest possible tides within the permitted timeframe so as to avoid working in the water.
- For any areas that require work in water, WDFW staff or other qualified biologists will sweep the isolated area with a NOAA regulated 0.094-inch block net several times to push any remaining fish out of the isolated area.
- All fish capture and removal will comply with any provisions contained within the WDFW Hydraulic Project Approval (HPA). Relevant conditions provided by USFWS or NMFS that address this project will also be followed as outlined in a Biological Opinion from the Services. These conditions include timing of work, staging of equipment, grading, machinery used, sloping, planting, installation of dike material and access roads, fish protection methods, sediment control BMPs.

More details on project sequencing, BMPs, temporary erosion and sediment control, etc., and contained in the projects Biological Evaluation (WDFW 2021).

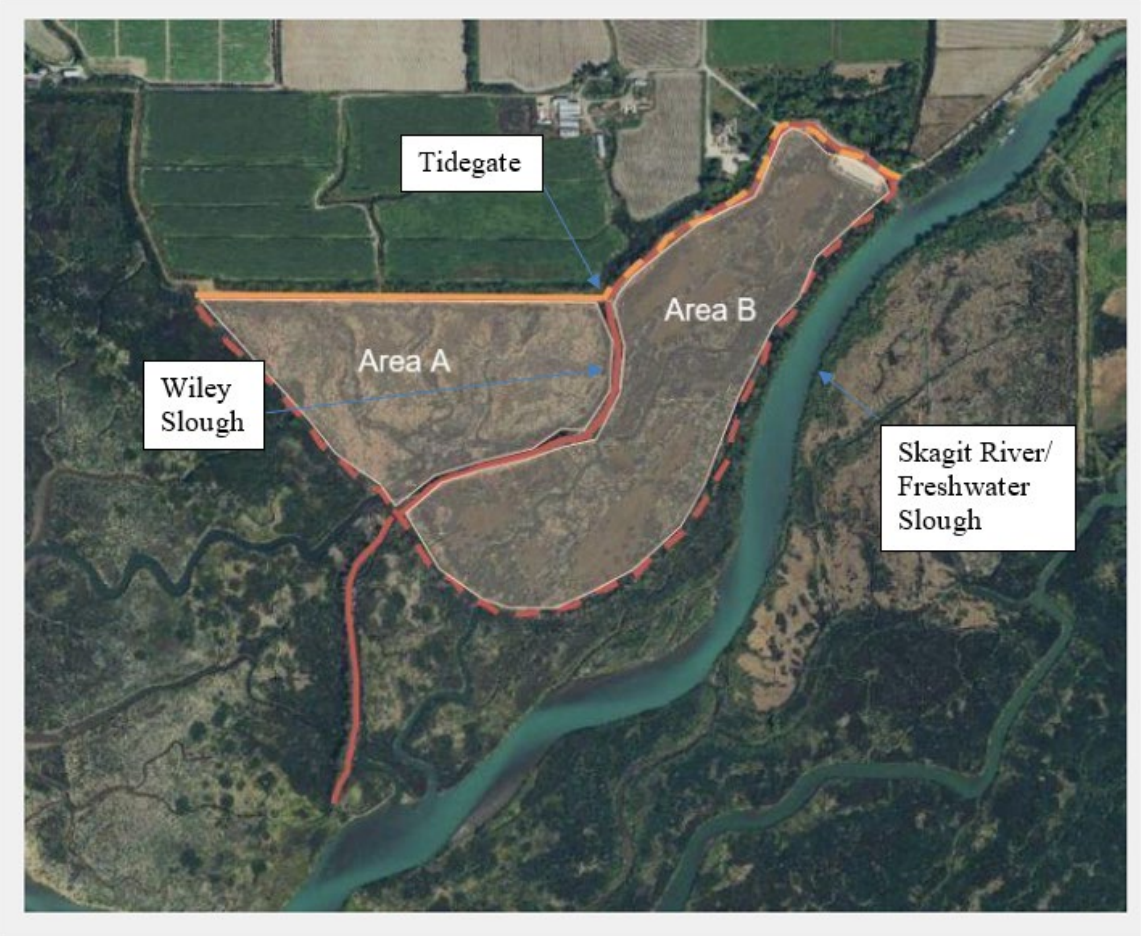

Figure 1. Wiley Slough Estuary Restoration. The light orange line shows the existing setback levee that will be raised. The setback levee was constructed in 2009 as part of the restoration project. Dashed black lines show old levee removed in 2009.

Project Area and Action Area

The action area means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). The action area is extended into the Puget Sound because juvenile salmonids pass through the project area on their way to sea. The action area for this project includes the lower portion of a distributary channel of the lower South Fork Skagit River from 100 feet upstream of the WDFW parking area into Puget Sound, Strait of Georgia, and Strait of Juan de Fuca. The distributary channel is known as Freshwater Slough. This action area includes the area of influence due to project disturbances in turbidity, edge habitat vegetation, and the influence on any migratory populations that use the river and the estuary. The Wiley Slough restoration site is part of Fir Island, an island between the North and South Forks of the Skagit River. Fir Island was tidal delta prior to diking and conversion of area to farmland c1900. It is now a 15 square mile island (approximately 9,600 acres) with multiple working farms. The action area includes the entirety of Fir Island because

the subject setback and tidegate are part of the levee system that protects Fir Island from tidal inundation and river and seawater flooding.

We conduct consultations with the USACE under section 7(a)(2) of the ESA, and its implementing regulations found at 50 CFR 402.

Table 1. Federal Register notices for final rules that list threatened and endangered species, designate critical habitats, or apply protective regulations to listed species considered in this consultation.

Species	ESU or DPS	Original Listing Notice	Listing Status Reaffirmed	Critical Habitat	Protective Regulations
Puget Sound Chinook salmon (*Oncorhynchus mykiss*)	Puget Sound	3/24/99 64 FR 14308 Threatened	8/15/11 76FR50448 Threatened	9/02/05 70 FR 52630 action area not included in designation	6/28/05 70 FR 37160
Steelhead (*O. mykiss*)	Puget Sound	5/11/07 72 FR 26722 Threatened	8/15/11 76FR50448 Threatened	2/24/16 (81 FR 9285)- action area not included in designation	9/25/08 73 FR 55451

2. ENDANGERED SPECIES ACT: BIOLOGICAL OPINION AND INCIDENTAL TAKE STATEMENT

The ESA establishes a national program for conserving threatened and endangered species of fish, wildlife, plants, and the habitat upon which they depend. As required by section 7(a)(2) of the ESA, each Federal agency must ensure that its actions are not likely to jeopardize the continued existence of endangered or threatened species, or adversely modify or destroy their designated critical habitat. Per the requirements of the ESA, Federal action agencies consult with NMFS and section 7(b)(3) requires that, at the conclusion of consultation, NMFS provides an opinion stating how the agency's actions would affect listed species and their critical habitats. If incidental take is reasonably certain to occur, section 7(b)(4) requires NMFS to provide an ITS that specifies the impact of any incidental taking and includes non-discretionary reasonable and prudent measures (RPMs) and terms and conditions to minimize such impacts.

2.1 Analytical Approach

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

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

The designation(s) of critical habitat for (species) use(s) the term primary constituent element (PCE) or essential features. The 2016 critical habitat regulations (50 CFR 424.12) replaced this term with physical or biological features (PBFs). The shift in terminology does not change the approach used in conducting a "destruction or adverse modification" analysis, which is the same regardless of whether the original designation identified PCEs, PBFs, or essential features. In this biological opinion, we use the term PBF to mean PCE or essential feature, as appropriate for the specific critical habitat.

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

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

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

2.2 Range-wide Status of the Species and Critical Habitat

This opinion examines the status of each species that would be adversely affected by the proposed action. The status is determined by the level of extinction risk that the listed species face, based on parameters considered in documents such as recovery plans, status reviews, and listing decisions. This informs the description of the species' likelihood of both survival and recovery. The species status section also helps to inform the description of the species' "reproduction, numbers, or distribution" as described in 50 CFR 402.02. The opinion also examines the condition of critical habitat throughout the designated area, evaluates the conservation value of the various watersheds and coastal and marine environments that make up

the designated area, and discusses the function of the essential PBFs that help to form that conservation value.

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

During the last century, average regional air temperatures in the Pacific Northwest increased by 1-1.4°F as an annual average, and up to 2°F in some seasons (based on average linear increase per decade; Abatzoglou et al. 2014; Kunkel et al. 2013). Warming is likely to continue during the next century as average temperatures are projected to increase another 3 to 10°F, with the largest increases predicted to occur in the summer (Mote et al. 2014). Decreases in summer precipitation of as much as 30 percent by the end of the century are consistently predicted across climate models (Mote et al. 2014). Precipitation is more likely to occur during October through March, less during summer months, and more winter precipitation will be rain than snow (ISAB 2007; Mote et al. 2013; Mote et al. 2014). Earlier snowmelt will cause lower stream flows in late spring, summer, and fall, and water temperatures will be warmer (ISAB 2007; Mote et al. 2014). Models consistently predict increases in the frequency of severe winter precipitation events (i.e., 20-year and 50-year events), in the western United States (Dominguez et al. 2012). The largest increases in winter flood frequency and magnitude are predicted in mixed rain-snow watersheds (Mote et al. 2014).

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

As more basins become rain-dominated and prone to more severe winter storms, higher winter stream flows may increase the risk that winter or spring floods in sensitive watersheds will damage spawning redds and wash away incubating eggs (Goode et al. 2013). Earlier peak stream flows will also alter migration timing for salmon smolts, and may flush some young salmon and

steelhead from rivers to estuaries before they are physically mature, increasing stress and reducing smolt survival (McMahon and Hartman 1989; Lawson et al. 2004).

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

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

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

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

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

2.2.1 Status of the Species

Table 2, below provides a summary of listing and recovery plan information, status summaries and limiting factors for the species addressed in this opinion. More information can be found in recovery plans and status reviews for these species. Acronyms appearing in the table include DPS (Distinct Population Segment), ESU (Evolutionarily Significant Unit), ICTRT (Interior Columbia Technical Recovery Team), MPG (Multiple Population Grouping), NWFSC (Northwest Fisheries Science Center), TRT (Technical Recovery Team), and VSP (Viable Salmonid Population).

Table 2. Listing classification and date, recovery plan reference, most recent status review, status summary, and limiting factors for each species considered in this opinion.

Species	Listing Classification and Date	Recovery Plan Reference	Most Recent Status Review	Status Summary	Limiting Factors
Puget Sound Chinook salmon	Threatened 6/28/05 (70 FR 37159)	Shared Strategy for Puget Sound 2007 NMFS 2006	NWFSC 2022, (Ford et al 2022)	All Puget Sound Chinook salmon populations continue to remain well below the TRT planning ranges for recovery escapement levels. Most populations also remain consistently below the spawner–recruit levels identified by the TRT as necessary for recovery. Across the ESU, most populations have increased somewhat in abundance since the last status review in 2016, but have small negative trends over the past 15 years. Productivity remains low in most populations. Hatchery-origin spawners are present in high fractions in most populations outside the Skagit River watershed, and in many watersheds, the fraction of spawner abundances that are natural-origin have declined over time. Habitat protection, restoration, and rebuilding programs in all watersheds have improved stream and estuary conditions despite record numbers of humans moving into the Puget Sound region in the past two decades. Biannual four-year work plans document the many completed habitat actions that were initially identified in the Puget Sound Chinook salmon recovery plan. The expected benefits will take years or decades to produce significant improvements in natural population viability parameters. Development of a monitoring and adaptive management program was required by NMFS in the 2007 supplement to the shared strategy recovery plan, and since the last review, the Puget Sound Partnership has completed this task; however, the program is still not fully functional, neither for providing assessment of watershed habitat restoration/recovery programs, nor for fully integrating the essentially discrete habitat, harvest, and hatchery programs. A recent white paper produced by the Salmon Science Advisory Group of the Puget Sound Partnership concludes that there has been "a general inability of monitoring to link restoration, changes in habitat conditions, and fish response at large-scales" (Puget Sound Partnership 2021). A number of watershed groups are in the process of updating their recovery plan chapters, and this includes prioritizing and updating recovery strategies and actions as well as assessing prior accomplishments. Overall, the Puget Sound Chinook salmon ESU remains at "moderate" risk of extinction, and viability is largely unchanged from the prior review.	• Degraded floodplain and in-river channel structure • Degraded estuarine conditions and loss of estuarine habitat • Degraded riparian areas and loss of in-river large woody debris • Excessive fine-grained sediment in spawning gravel • Degraded water quality and temperature • Degraded nearshore conditions • Impaired passage for migrating fish • Severely altered flow regime

Puget Sound steelhead	Threatened 5/11/07	NMFS 2019	NWFSC 2022 (Ford et al. 2022)	Consideration of the above analyses indicates that the viability of the Puget Sound steelhead DPS has improved somewhat since the PSTRT concluded that the DPS was at very low viability, as were all three of its constituent MPGs, and many of its 32 DIPs (Hard et al. 2015). Increases in spawner abundance were observed in a number of populations over the last five years (Figure 95). These improvements were disproportionately found within the Central & South Puget Sound and the Hood Canal & Strait of Juan de Fuca MPGs, primarily among smaller populations. The apparent reversal of strongly negative trends among winter-run populations in the White, Nisqually, and Skokomish Rivers abated somewhat the demographic risks facing those populations. Certainly, improvement in the status of the Elwha River steelhead (both winter- and summer-run) following the removal of the Elwha dams reduced the demographic and diversity risk for the DIP and the MPG. Improvements in abundance were not as widely observed in the Northern Cascades MPG. Foremost among the declines were summer- and winter-run populations in the Snohomish River basin. These populations figure prominently as sources of abundance for the MPG and DPS. Additionally, the decline in the Tolt River summer-run steelhead population was especially of concern given that it is the only population for which we have abundance estimates. The demographic and diversity risks to the Tolt River summer-run DIP are very high. In fact, all summer-run steelhead populations in the Northern Cascades MPG are likely at a very high demographic risk. In spite of improvements in some areas, most populations are still at relatively low abundance levels, with about a third of the DIPs unmonitored and presumably at very low levels. Continued limits on harvest will facilitate population rebuilding during “good” (high escapement) years and buffer against demographic risks under “bad” (low escapement) years. Artificial propagation programs have undergone major changes in both the quantity and quality of hatchery fish produced. The proposed termination of the non-native Skamania Hatchery-origin summer-run steelhead programs represents a major effort to reduce introgression, although the genetic legacy of past hatchery releases remains to be determined. The release of the domesticated Chambers Creek hatchery-origin winter steelhead continues in a limited number of basins. More importantly, integrated programs with locally sourced broodstocks have been established to assist in recovery. Risks to diversity from hatchery programs continue, but at a reduced level. Furthermore, self-sustaining natural populations of winter-run steelhead persist throughout the DPS, albeit at low abundances, and with a very limited risk of interaction with hatchery-origin steelhead. Overall,	• Continued destruction and modification of habitat • Widespread declines in adult abundance despite significant reductions in harvest • Threats to diversity posed by use of two hatchery steelhead stocks • Declining diversity in the DPS, including the uncertain but weak status of summer-run fish • A reduction in spatial structure • Reduced habitat quality • Urbanization • Dikes, hardening of banks with riprap, and channelization

Species	Listing Classification and Date	Recovery Plan Reference	Most Recent Status Review	Status Summary	Limiting Factors
				the status of summer-run steelhead populations, or the summer-run component of summer/winter populations, remains somewhat precarious. Information is absent for many populations, and, with the possible exception of the Elwha River, the remaining populations have critically low abundances and/or varying levels of genetic introgression by out-of-DPS sources. There are a number of planned, ongoing, and completed events that will likely benefit steelhead populations in the future, but have not yet effected changes in adult abundance. Among these are the removal of the diversion dam on the Middle Fork Nooksack River, passage improvements at Mud Mountain Dam, the ongoing passage program in the North Fork Skokomish River, and the planned passage program at Howard Hansen Dam. Dam removal in the Elwha River and the resurgence of the endemic winter and summer steelhead runs have underscored the benefits of restoring passage. The Elwha River scenario is perhaps somewhat unique in that upstream habitat is in pristine condition, and smolts emigrate into the Strait of Juan de Fuca, not Puget Sound or Hood Canal. Improvements in spatial structure can only be effective if done in concert with necessary improvements in habitat. Habitat restoration efforts are ongoing, but land development and habitat degradation, concurrent with increasing human population in the Puget Sound corridor, may result in a continuing net loss of habitat. Overall, recovery efforts in conjunction with improved ocean and climatic conditions have resulted in an increasing viability trend for the Puget Sound steelhead DPS, although the extinction risk remains “moderate.”	

2.2.1 Status of the Critical Habitat

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

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

A summary of the status of critical habitats, considered in this opinion, is provided in Table 3, below.

Table 3. Critical habitat, designation date, federal register citation, and status summary for critical habitat considered in this opinion

Species	Designation Date and Federal Register Citation	Critical Habitat Status Summary
Puget Sound Chinook salmon	9/02/05 70 FR 52630	Critical habitat for Puget Sound Chinook salmon includes 1,683 miles of streams, 41 square miles of lakes, and 2,182 miles of nearshore marine habitat in Puget Sounds. The Puget Sound Chinook salmon ESU has 61 freshwater and 19 marine areas within its range. Of the freshwater watersheds, 41 are rated high conservation value, 12 low conservation value, and eight received a medium rating. Of the marine areas, all 19 are ranked with high conservation value.
Puget Sound steelhead	2/24/16 81 FR 9252	Critical habitat for Puget Sound steelhead includes 2,031 stream miles. Nearshore and offshore marine waters were not designated for this species. There are 66 watersheds within the range of this DPS. Nine watersheds received a low conservation value rating, 16 received a medium rating, and 41 received a high rating to the DPS.

2.4 Status of the Species and Habitat in the Action Area

The Skagit River, located in northern Puget Sound, drains westward from the Cascade Mountains. The river basin encompasses over 3,100 square miles of watershed area. The project area is located in western Skagit County, at the mouth of the South Fork Skagit River in the Skagit delta. The topography of the larger Skagit Basin varies greatly due to its mountainous origins. Elevations range from sea level to over 3,000 feet at its headwaters. Elevation at the project site is at sea level. Precipitation is highly variable across the basin.

Total runoff from the basin averages approximately 12 million acre/feet per year (USGS 2018). The annual runoff pattern has two peaks, one occurring in November through January and the second in June. The peaks are driven by a combination of high rainfall or snowmelt and reservoir management operations. The Skagit River flows are regulated by Ross Dam and two smaller dams (Gorge Dam and Diablo Dam) near the town of Newhalem and by Baker Dam on the Baker River, which is a major tributary to the Skagit River. Other major tributaries to the Skagit River include the Sauk and Suiattle Rivers.

The Skagit River through the project reach provides migratory and rearing habitat for all of the salmon species that use the Skagit River, as well as habitat for a diversity of other aquatic and terrestrial species. Salmonid species in the project area include Chinook, pink, chum, steelhead, coho, sockeye, bull trout, rainbow trout, cutthroat trout, and kokanee (WDFW 2018a). The Skagit River, with its 2,900 tributaries, is the only river system outside of Canada and Alaska that supports all five species of Pacific salmon (WDOE 2016). While most Puget Sound river populations remain far below their recovery planning targets, the Skagit populations some are doing better. For instance, the recent 5-year abundance geomean for Suiattle River spring Chinook salmon is at 103 percent of its low productivity planning target for abundance. Upper Sauk River spring Chinook salmon and Upper Skagit River summer Chinook salmon are at 43 percent and 37 percent, respectively, of their low productivity planning targets.

The WDFW Priority and Habitats and Species List database (2018a) defines six stocks of Chinook that can be found within the project reach: 1) Upper Sauk (run: Spring, status: depressed), 2) Suiattle (run: Spring, status: healthy), 3) Cascade (run: Spring, status: depressed), 4) Upper Skagit (run: Summer, status: depressed), 5) Lower Skagit (run: Fall, status: depressed), and 6) Lower Sauk (run: Summer, status: depressed). Summer-run Chinook salmon are supplemented by hatchery releases upstream of the action area. The Skagit River has four life history strategies for wild Chinook. There are three ocean-type strategies: 1) Fry migrants, which migrate quickly to Skagit Bay after emergence, 2) Delta rearing migrants, which migrate quickly downstream after emerging, but rear in the estuary for several weeks to months, and 3) Parr migrants, which rear for a couple of months in freshwater before moving through the estuary.

The fourth life history strategy is the stream-type Chinook, or yearlings, which rear in freshwater for a period of over one year. Spring runs of Chinook tend to have a higher proportion of stream-type Chinook, roughly 50 percent. A study by Beamer et al. (2010) showed that the majority of juvenile Chinook rearing in freshwater portions of the Skagit River prefer pool, glide, and bank habitat. Smolt trap data in the mainstem of the lower Skagit River suggests that ocean-type

populations dominate the juvenile out-migration (Seiler et al. 1995, Myers et al. 1998); however, stream-type Chinook are present as well.

Juvenile outmigration occurs from March through late July. Adult upstream migration occurs from February through July for spring and summer Chinook and July through November for fall Chinook (USACE 2021).

The lower Skagit mainstem/tributaries Chinook stock spawning takes place in the mainstem Skagit River (miles upriver from the action area) and tributaries downstream from the Sauk River typically in October (SRSC and WDFW 2005). All other populations of Skagit River Chinook spawn further upstream in the Skagit River and its tributaries. The time of upstream migration of adults and spawning varies with stock. Very small number of upstream migrating adults could move through the action area during construction.

Skagit River steelhead include a winter and summer run. The project area is a migration corridor for upstream migrating adults and downstream movement of juveniles migrating to saltwater environments. Winter run steelhead enter the Skagit River as adults from November through April. Summer run steelhead return to freshwater from May to October (NMFS 2007). The spawning area of the mainstem population extends from roughly one mile upstream of the I-5 Bridge (RM 22.5) to the lower headwaters of the Skagit Basin (WDFW 2002). All other populations spawn in the headwaters of the river. Spawning typically occurs from March through June, but can be as early as January (NMFS 2007). Post-spawn adults exit the river from April through June. Summer steelhead reside for extended periods in deep pools (PSSTRT 2013). The majority of Skagit River steelhead migrate to the ocean after 2 years, with some doing so after 1 or 3 years (NMFS 2005a). Outmigration typically occurs from April to mid-May (NMFS 2007), although in the Skagit River system it has been documented to extend from March to August. In 2009 the Skagit spring steelhead fishery was closed after experiencing a historically low run of less than 3000 fish. Numbers rebounded a bit between 2012 and 2017, but then declined since their recent peak in 2014, with 3092 fish returning in 2020.

2022 Status Review

The Northwest Fisheries Science Center (NWFSC), and NMFS' West coast Regional Office (WCRO) completed the most recent status review of PS Chinook and PS steelhead in January 2022. The status review reports that, "In recent years, only five populations [of PS Chinook] have had productivities above zero. These are Lower and Upper Skagit, Lower and Upper Sauk, and Suiattle Rivers in the Whidbey Basin MPG."

For PS steelhead, the 2022 status review reports that "winter run DIPs in the Nooksack and Skagit basins exhibited slight increases in their average five-year abundances, although within the 2015-2019 period a negative trend in abundances is evident in the Skagit River populations. . . . The Skagit River data set, which represents five DIPs and may include some summer steelhead red counts, contains the majority of steelhead estimated in this MPG, with a geomean of 7,181. . . . Except for the Samish and Bellingham Tributaries DIP and perhaps the Nooksack and Skagit rivers, productivity (based on adult:adult ratios) for most populations was negative (in contrast to the five-year geomean trends), suggesting a downward trend into the near future."

Critical Habitat within the Action Area and the Skagit Chinook Recovery Plan

The portion of the Skagit River in the action area is a South Fork distributary channel know as Freshwater Slough. This slough and the delta estuary within the action area have been designated as critical habitat for PS Chinook salmon. PS steelhead critical habitat is designated within the channel of Freshwater Slough, ending approximately 1.2 miles downstream of the WDFW parking area at the Wiley Slough Restoration site. It does not extend into the marine waters as it does for PS Chinook salmon. Critical habitat is designated and mapped through official rule making and published in the Federal Register. In the project area, the mapping for PS Chinook still follows the old, removed levee footprint along the river and marine side of the restoration site (70 FR 52630 and 81 FR 9252). Official, mapped designated critical habitat boundaries do not automatically change as a result of restoration actions that re-establish or create new habitat or access to non-designated habitat. Therefore, within the project site, there is only a small area of designated critical habitat within the work area in the immediate vicinity of the far west and far east termini of the levee repairs where these repairs intersect the mapped critical habitat. The critical habitat designation does not extend into Wiley Slough within the restoration site. Approximately 1/3 of a mile of the Wiley Slough channel occurs on the seaward side of the tidegate and it has free passage into it from the Skagit estuary. The landward side of the tidegate is also not within designated critical habitat, although by design the tidegate provides for upstream fish passage so that PS Chinook juveniles may volitionally move into the slough behind the tidegate. The WDFW Salmonscape maps show this slough as "gradient accessible" to PS Chinook and other salmonids (WDFW 2022). Wiley Slough is a watercourse without headwaters that follows and/or replaces a historic natural watercourse that has been significantly channelized, relocated and/or constrained by dikes (Skagit TFI, 2010).

The critical habitat within action area provides Freshwater Migration and Freshwater Rearing habitat for both species at the mouth of the river (South Fork Skagit/Freshwater Slough) where it transitions into estuarine habitat. PS steelhead do not rely on delta estuary habitat to the extent that Chinook salmon rely on it for essential rearing habitat. PS steelhead outmigrants typically head quickly out to sea and do not linger in estuaries. The Skagit Chinook Recovery Plan identified delta rearing habitat as a limiting factor for PS Chinook salmon recovery; "At contemporary Chinook salmon population levels, limitations in current tidal delta habitat conditions are displacing juvenile Chinook salmon from tidal delta habitat to Skagit Bay habitat, and forcing a change in their life history type from tidal delta rearing to fry migrants. Literature values show that fry migrant survival is one order of magnitude lower than tidal delta rearing individuals."

The Wiley Slough restoration site re-established 156 acres of delta estuary. Monitoring of the restoration site shows that it can support between 74,105 to 367,613 additional Chinook smolts. The lower estimate is for the carrying capacity of the channel area only. The high estimate is from all wetted areas including ponding on marsh surface that is currently functioning as channel habitat (Beamer 2015). It is not known if the ponded areas will silt in over time and reduce the carrying capacity toward the smaller estimate. The marsh surface subsided after the land was re-flooded and it may silt in over time, but it's not known if, when, or over what time scale that might happen.

Also within the action area is the Fir Island Farm restoration site, a 131-acre estuary restoration to the west of the project area. To the east, Milltown Island is a 212-acre restoration site. The Milltown Island site is currently under a proposal to do some additional restoration actions to increase the benefits to Chinook salmon at the site. Island Unit/Deepwater Phase 2 is a 268 acre mid-channel farmed island in the South Fork, just to the east of Wiley Slough. WDFW is moving forward with plans to restore the Island Unit site back to estuary. On Fir Island to the west and north along the North Fork Skagit River, several other potential restorations site are identified, but there are no active proposals for these sites yet (Skagit HDM).

Distinguishing Effects of the Action versus Baseline Conditions

The effects of an action are the consequences to listed species or critical habitat that would not occur but for the proposed action and are reasonably certain to occur, whereas the environmental baseline refers to the condition of the listed species or its designated critical habitat in the action area without the consequences caused by the proposed action (50 CFR 402.02). In its current state, the setback levee is considered deficient in meeting USACE design criteria. The dike has overtopped 4 times in the last 5 years, most recently on November 14, 2021. According to WDFW, a more prolonged or higher water event has the potential to breach the dike, which would flood hundreds of acres on Fir Island (J. Baker pers comm December 1, 2021).

In distinguishing between effects of the action and baseline, we consider the existing, damaged/deficient levee to be in the baseline, along with the associated fish-passable tidegate, the 156 acres of re-established estuary seaward of the levee, and the existing farmland behind the levee together with the rest of the functioning levee system with which this setback levee functions. The farmland behind the levee was tidal delta more than 100 years ago before the original levees were constructed (SRSC and WDFW 2005). Therefore, , the rigid physical structure of the existing setback levee, albeit deficient in meeting the performance standard, and the tidegate prevent tidal waters from flooding the neighboring farmland, except during certain storm events when the levee overtops. With the proposed repairs (i.e., effects of the proposed action), the levee will overtop less often and the farmland will be protected from more storm events, up to the design criteria, and Fir Island will have reduced risk from sudden catastrophic levee failure. There will also be reduced need and frequency for emergency repairs during common storm events.

2.5 Effects of the Action

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

As described in Section 1.3, WDFW proposes to conduct levee and tidegate repairs at the Wiley Slough Restoration site. As described in Section 2.2, PS Chinook salmon and PS steelhead inhabit the action area

2.5.1 Effects on Listed Species

The proposed action will result in potential effects to fish from short term construction (fish removal/exclusion, noise, and turbidity). There will also be some short term habitat disturbance within the immediate footprint of the construction (vegetation loss, small spatial areas of wetland and estuary loss on the landward and seaward side of the levee with corresponding habitat mitigation). In the long term, the restoration site will continue to function in its current state and provide rearing habitat for PS Chinook salmon. Also in the long term, raising the height of the levee will decrease the frequency of levee overtopping events. The effects to fish associated with this include less likelihood of being swept into the farmland and stranded during flooding and reduced water quality effects from flooded farmland (potential turbidity, herbicide, and pesticide contamination of floodwaters). These effects are discussed in more detail below.

Fish Presence and Exclusion Protocol

WDFW will construct the levee and tidegate repairs between August 1 and September 30 when vulnerable life stages of PS Chinook and PS steelhead are highly unlikely to occur in the work area. By late summer/early fall PS Chinook salmon juveniles will have moved out of the estuary and will be headed out to sea. PS steelhead typically move through estuaries quickly and head out to sea in the spring/early summer. Adult salmonids typically start moving up river later in the late summer/fall when the first heavy fall rains begin. If a small number of returning adult salmonids are in the area, they will likely move quickly past the work area in the main channel and will not be delayed by the construction work (noise and turbidity described below) at the base of the levee on the eastern edge of the work area. For juvenile salmonids, if low numbers are still in the work area, very few would likely be in immediate work area because WDFW will work at low tide. If there are scattered ponded areas along the base of the levee or at the tidegate, WDFW will follow fish exclusion protocol as described in Section 1.3. The effects of fish exclusion are described below.

Harm Associated with Fish Exclusion

The proposed action includes protocol for fish capture and removal, if necessary, to reduce the overall number of fish exposed to the effects of construction. Even so, capture is a form of incidental take, and a small number of fish handled during capture can be inadvertently injured or killed by those activities. Overall, fish capture and handling will reduce injury and death from stranding, entrainment, and/or impingement during construction. Herding and seining would be the primary method utilized for fish salvage. No electrofishing will occur. During seining, care would be taken to run the seine along the bottom and along the bank. Fish inadvertently left within the construction zone could subsequently die. It is not possible to estimate the number of fish that may be in the work area and exposed to fish salvage efforts. As previously described, the number of PS Chinook salmon and PS steelhead in the action area is likely to be zero or extremely small relative to the local population during the in-water work window. Of this

already very small percentage of the population, an even smaller percentage is likely to be harmed by fish salvage efforts or evade capture and die within the work area.

Effects from Noise

WDFW will limit construction at the toe of the levee and tidegate on seaward/riverward side to low tide so that in-water construction with heavy machinery would not occur or be very minimal. This will limit the intensity of sound propagation into the water. Construction noise using heavy equipment has been measured in the range of 73 to 101 db (WSDOT 2018). NMFS fish injury thresholds for both continuous and pulsed sound are 183 db (for cumulative sound) and 206 db (for peak sound). These sound levels will not be produced by the project (i.e. no pile driving). The NMFS threshold for fish harassment is 150 dB which will also not be exceeded. The noise range will be further dampened by traveling through sediment before reaching open water. The low rumbling sound of the construction equipment is extremely unlikely to cause direct harm to fish because the low level sound pressure waves will be well below the threshold known to be harmful (WSDOT 2018). The sounds may startle fish and cause low level behavioral disturbance that is likely to be inconsequential to any individual salmonids that might occur within several hundred feet of the work area. Therefore, the noise effects of construction will likely cause low level disturbance to extremely small numbers juvenile fish but without direct harm or consequence. Any adult moving through the main river channel would likely pass by the work area without delay.

Turbidity/Sedimentation and Water Quality

Water quality is considered adversely affected by suspended sediments when turbidity is increased by 20 NTU for a period of 4 hours or more (Berg and Northcote 1985; Robertson et al. 2006). The effects of turbidity on fish are somewhat species and size dependent. In general, severity typically increases with sediment concentration and duration of exposure, and decreases with the increasing size of the fish. Bjornn and Reiser (1991) report that adult and larger juvenile salmonids appear to be little affected by the high concentrations of suspended sediments that may be mobilized during storm and snowmelt runoff episodes. However, empirical data from numerous studies report the onset of minor physiological stress in juvenile and adult salmon after one hour of continuous exposure to suspended sediment concentration levels between about 1,100 and 3,000 mg/L, or to three hours of exposure to 400 mg/L, and seven hours of exposure to concentration levels as low as 55 mg/L (Newcombe and Jensen 1996). The authors reported that serious non-lethal effects such as major physiological stress and reduced growth were reported after seven hours of continuous exposure to 400 mg/L and 24 hours of continuous exposures to concentration levels as low as about 150 mg/L. Given the BMPs and scope of work, the best available information indicates that construction-related turbidity concentrations would be too low and short-lived to cause more than very brief, non-injurious behavioral effects such as avoidance of the plume, mild gill flaring (coughing), and slightly reduced feeding rates in any PS Chinook salmon and PS steelhead that may be exposed to it. None of these potential responses, individually, or in combination would affect the fitness or meaningfully affect normal behaviors in exposed fish. Disturbed sediments will quickly dilute in concentration with tidal cycles and will be naturally ameliorated by the wetland/estuary vegetation at the base of the levee.

Furthermore, the project will not introduce new physical impediments to spawning, as sedimentation is only expected to occur within 100 feet of project activities and spawning occurs many miles upstream of the site outside of the action area. Erosion control BMPs and performing work in the dry make an increase in sedimentation unlikely and turbidity will be short lived and limited to a matter of hours as tidal cycles will rapidly dilute and dissipate disturbed sediments. Once the project is complete, the dike will be more resistant to flooding and overtopping events and will therefore reduce upland soil erosion from the farm fields and any associated fertilizers, herbicides, and insecticides.

Riparian Disturbance – Short- and Long-Term Effects

The increased width of the levee toe will result in permanent impacts to the palustrine wetlands in ditches and low ground on the landward side of the setback levee in the adjacent farm field. WDFW will mitigate for this loss of wetland area on the landward side of the levee through purchase of mitigation bank credits in the service area. This project will also result in 87 SF of permanent impacts to the Wiley Slough estuary, which will be mitigated onsite through the re-establishment of estuary at a ratio of 4:1. In addition, the project will result in a total increase of 10,744 square feet of estuary. In the short term, the vegetation disturbance/loss is inconsequential to listed species because it is spatially limited to the immediate footprint of the work area along the toe of the levee and base of the tidegate. This disturbance will not measurably reduce food resources or significantly alter habitat in a way that would reduce the fitness of individual fish or the overall carrying capacity of the restoration site. In the long term, the increase of 10,744 square feet of estuary habitat will increase carrying capacity of the restoration site for PS Chinook salmon juveniles.

Long-Term Effects of the Levee and Tidegate

The existence of the levee, tidegate, and farmland on Fir Island are part of the environmental baseline. The farmland behind the levee was tidal delta more than 100 years ago before the original levees were constructed (SRSC and WDFW 2005). Therefore, as a baseline condition, the rigid physical structure of the existing setback levee and tidegate prevent tidal waters from flooding the neighboring farmland, except during certain storm events when the levee overtops. With the proposed repairs, the levee will overtop less often and the farmland will be protected from more storm events, up to the design criteria (2 percent annual chance event), and the farmland will have increased protection from sudden catastrophic levee failure. There will also be reduced need and frequency for emergency repairs during common storm events. With reduced frequency of overtopping, there will be reduced risk to salmonid from being washed over the levee and stranded during flooding. In addition, less farmland flooding will reduce the potential for upland contaminants (herbicides, pesticides, soil) to wash into the slough during floods. The increase of 10,744 square feet of estuary will incrementally benefit PS Chinook salmon juveniles in perpetuity by creating additional delta rearing habitat.

The proposed levee and tidegate repairs will bring the facilities up to the performance standard of the levee system on Fir Island that supports agricultural land use. The proposed corrective measures will not lead to more intensive land use on Fir Island, such as residential subdivision.

The land will continue to be farmed into the foreseeable future and will continue to be compatible with any future restoration actions.

2.5.2 Effects on Critical Habitat

The effects to habitat are discussed in detail above as they relate to direct and indirect effects to listed fish. This section provides brief descriptions on how the action affects specific PBF's of critical habitat.

Critical habitat is designated and mapped through official rule making and published in the Federal Register. In the project area, the mapping for PS Chinook still follows the old levee footprint along the outer boundaries of the restoration site along the river and marine side. Therefore, within the project site, there is only a small area of designated critical habitat within the work area in the immediate vicinity of the levee on the far west and far east of the site where these intersect with the older, existing levees. For PS steelhead, the river in the project area is designated as critical habitat. From the parking area, the river is mapped as PS steelhead critical habitat and it extends 1.2 miles downstream in the tidal river. The PS steelhead designation does not extend further into the estuarine and marine waters. The designation ends the mouth of the Skagit River distributary channel in the action area known as Freshwater Slough (Lat 48.310713, Long -122.389592) (2/24/16 81 FR 9252). Therefore, there is a very small spatial area of critical habitat within the project area on the far east terminus of the levee work on the river side. The critical habitat designation for both species does not extend into Wiley Slough on the restoration site nor above the tidegate in Wiley Slough, although the slough is accessible behind the tidegate.

The essential PBFs of critical habitat for both species are listed below. The expected effects on those PBFs from the future work, including full application of the conservation/mitigation measures and BMPs, would be limited to the impacts to freshwater and estuarine PBFs of PS Chinook salmon and PS steelhead. Impacts on freshwater rearing and migration would apply similarly to both species.

1. Freshwater rearing sites:
    a. Floodplain connectivity – The existing levee and tidegate system disconnect the lower Skagit River from the delta farmland on Fir Island as a baseline condition. The effect of the project will be to reduce the frequency of overtopping events and reduce the potential for catastrophic levee failure. Less frequent overtopping events will expose listed salmonids to fewer events that may strand fish in floodwaters behind the levees and reduce the potential for contaminants to wash into floodwaters from flooding fields. With the design storm event of a 2 percent annual chance event, overtopping events will likely be rare and sporadic, and may continue to very rarely create hazards to salmonids from overtopping during flooding.
    b. Forage – The proposed action will increase the square footage of estuary in the restoration site by approximately 10,744 square feet. This will incrementally increase available forage for both salmonid species and delta rearing habitat for PS Chinook salmon.
    c. Natural cover – Incremental increase

d. Water quantity – No changes expected.
e. Water quality – Potentially reduced contaminants from less farmland flooding.

2. Freshwater migration corridors:
   a. Free of obstruction and excessive predation – no changes expected
   b. Water quantity – No changes expected.
   f. Water quality – Potentially reduced contaminants from less farmland flooding.
   c. Natural Cover – No changes expected.
3. Estuarine areas – The project will result in 10,744 square feet of additional estuary.
4. Nearshore marine areas – Effects will not extend into the marine nearshore.
5. Offshore marine areas – Effects will not extend into offshore areas.

2.6 Cumulative Effects

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

For this action, state or private activities in the vicinity of the project location are expected to cause cumulative effects in the action area. Additionally, future state and private activities in upstream areas are expected to cause habitat and water quality changes that will be expressed as cumulative effects in the action area. Our analysis considers: (1) how future activities in the Skagit Basin are likely to influence habitat conditions in the action area, and (2) cumulative effects caused by specific future activities in the vicinity of the project location.

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

Federally controlled actions (U.S. Army Corps of Engineers' permit actions in the aquatic action area) dominate current and future impacts in the action area for work directly in waters and Federal actions would require section 7(a)(2) consultation under the ESA. WDFW plans to restore 268 acres of estuary just east of the project site in the Skagit River delta at Island Unit. The diking districts are nonfederal entities responsible for maintaining and operating the Skagit levees and other flood control structures in the project area. These nonfederal entities will continue to maintain and operate the flood control structures. Agricultural use of the farmland on Fir Island is expected to continue indefinitely into the future.

In the Skagit Basin, agriculture, urbanization, water withdrawals, timber harvest, fishing, mining and other resource-based industries have caused many long-lasting environmental changes that

harmed ESA-listed species and their critical habitats. Those include basin-wide loss or degradation of stream channel morphology, spawning substrates, instream roughness and cover, estuarine rearing habitats, wetlands, floodplains, riparian areas, water quality (e.g., temperature, sediment, dissolved oxygen, contaminants), fish passage, and habitat refugia. Those changes reduced the ability of populations of ESA-listed species to sustain themselves in the natural environment by altering or interfering with their behavior in ways that reduce their survival throughout their life cycle. The environmental changes also reduced the quality and function of critical habitat PBFs that are necessary for successful spawning, production of offspring, and migratory access necessary for adult fish to swim upstream to reach spawning areas and for juvenile fish to proceed downstream and reach the ocean. The collective effects of these activities tend to be expressed most strongly in lower river systems, such as the lower reaches of the Skagit River, where the impacts of numerous upstream land management actions aggregate to influence habitat processes and water quality.

While widespread degradation of aquatic habitat associated with intense natural resource extraction is no longer common, ongoing and future land management actions are likely to continue to have a depressive effect on aquatic habitat quality in the Skagit River basin. As a result, recovery of aquatic habitat is likely to be slow in most areas and cumulative effects at the basin-wide scale are likely to have a neutral to negative impact on population abundance trends and the quality of critical habitat PBFs.

Although state, tribal and local governments have developed plans and initiatives to benefit ESA-listed salmon and steelhead, NMFS cannot consider them reasonably certain to occur in its analysis of cumulative effects until more concrete steps are taken in their implementation. Government actions are subject to political, legislative and fiscal uncertainties. These complexities make analysis of cumulative effects difficult.

There are some impacts that we predict are reasonably certain to occur into the future, such as construction and other habitat altering activities. To the extent that recovery actions are implemented and regulatory mechanisms are applied to on-going actions, adverse cumulative effects may be minimized, but will not be completely avoided. Restoration actions in the Skagit River delta are expected to occur periodically into the future as the recovery plan is implemented.

2.7 Integration and Synthesis

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

The current extinction risk for PS Chinook salmon is high, and the recovery goal for this ESU is to have very low extinction risk. The current extinction risk for PS steelhead is high with neither the summer- nor winter-run populations currently viable. The recovery goal for this DPS is to have very low extinction risk (Myers et al. 2015; NWFSC 2015, NMFS 2019, Ford et al. 2022). Adult PS Chinook salmon and PS steelhead from populations above the action area in the Skagit River basin migrate through this Skagit River distributary channel (Freshwater Slough) to reach their respective spawning and juveniles from these populations outmigrate to the ocean through the project area. Therefore, individuals from multiple populations of these two species could potentially be affected by the proposed action. Over the past several years, NMFS has engaged in various section 7 consultations on Federal projects affecting these populations and their habitats, and those effects have been taken into account in this opinion as part of the environmental baseline.

The environmental baseline is such that individual ESA-listed salmonids in the action area are exposed to degraded water quality, lack of suitable riparian and aquatic habitat, and restricted movement due to residential, industrial, commercial and agricultural development in the floodplain and delta and the constraints of the existing levee system, construction and maintenance of hydropower and river navigation infrastructure, and other changes in land use practices. These stressors, as well as those from climate change, already exist and are in addition to any adverse effects produced by the proposed action. Major factors limiting recovery of the ESA-listed salmonids considered in this opinion include degraded freshwater habitat; degraded water quality; degraded floodplain connectivity and function; reduced delta rearing habitat for PS Chinook salmon, reduced access to spawning and rearing habitats due to impaired passage at dams; altered streamflow; predation/competition; hatchery impacts; and disease.

The effects of the proposed action on the factors limiting recovery for the ESA-listed salmonids considered in this opinion include very minor, short term construction disturbance and long term habitat creation (10,744 square feet of delta estuary). The project re-enforces the existing setback levee that was installed as part of the Wiley Slough restoration to correct deficiencies in meeting the performance standard of the existing levee system. The project will maintain the functioning of the 156-acre restoration site and reduce flooding frequency on the adjacent farm land. The project re-enforces and raises the existing levee, but the project does not facilitate more intensive land use behind the levee because the work will bring the levee up to the existing standards (i.e. the project will match the existing level of protection of the rest of the levee system on Fir Island). Taken as a whole, the survival and recovery trajectory of ESA-listed salmonids will not be affected by the proposed action. This is primarily because the number of fish exposed to construction activities will be extremely small when compared to the total abundance of individuals within the populations affected by this action. Likewise, the long-term impacts of the proposed action including reduced overtopping of the levee and slightly increasing the square footage of delta rearing habitat essentially maintain existing baseline conditions in the action area, while supporting the Wiley Slough restoration site. The proposed action supports the existing Wiley Slough restoration site and is compatible with other restoration actions in the action area (Island Unit, Fir Island Farm, Milltown Island). In addition, the proposed action supports continued farming on Fir Island, but the level of protection of the levee provided by the project does not support more intensive land use on Fir Island. The land will likely remain as farmland indefinitely into the future and also be compatible with potential future restoration

actions on Fir Island. The project is not likely to result in any population-level effects within the Skagit River subpopulations and would have no measurable effect at the ESU and DPS level, although the PS Chinook populations continue to be suppressed by lack of available delta rearing habitat. This limiting factor is expected to be corrected over time as the Skagit Chinook Recovery Plan is implemented in the delta.

Critical habitat value for ESA-listed species in the lower reaches of the Skagit River is limited by spatial area of delta rearing habitat for PS Chinook salmon. In the vicinity of the action area habitat has been degraded due to past land use practices that converted delta estuary to drained farmland. Despite these impacts, the critical habitat in the action area has a high conservation value for PS Chinook salmon and PS steelhead due to its critical role as a migration corridor and juvenile rearing habitat.

The farm levee system suppresses all Skagit River PS Chinook subpopulations as a baseline condition by eliminating natural river delta estuary habitat. The result is less functional rearing habitat for juvenile fish and reduced carrying capacity of the habitat. At the watershed scale, the proposed action will not increase the extent of degraded habitat within the basin, nor add to the degradation of water quality, or further decrease limited rearing areas or limit access to rearing habitat over the long term. Even when cumulative effects and climate change are included, the proposed action will not negatively influence the function or conservation role of critical habitat at the watershed scale. Critical habitat for PS Chinook salmon and PS steelhead will remain functional, or retain the current ability for the PBFs to become functionally established, to serve the intended conservation role for the species, in this case, to provide migration and rearing habitat.

For all the reasons described in the preceding paragraphs of this section, the proposed action will not appreciably reduce the likelihood of both survival and recovery of the species in the wild by reducing its numbers, reproduction or distribution nor will the proposed action reduce the value of designated critical habitat for the conservation of the species.

2.8 Conclusion

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

2.9 Incidental Take Statement

Section 9 of the ESA and Federal regulations pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without a special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. "Harm" is further defined by regulation to include significant habitat modification or degradation that actually kills or injures fish or wildlife by significantly

impairing essential behavioral patterns, including breeding, spawning, rearing, migrating, feeding, or sheltering (50 CFR 222.102). "Incidental take" is defined by regulation as takings that result from, but are not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or applicant (50 CFR 402.02). Section 7(b)(4) and section 7(o)(2) provide that taking that is incidental to an otherwise lawful agency action is not considered to be prohibited taking under the ESA if that action is performed in compliance with the terms and conditions of this incidental take statement.

2.9.1 Amount or Extent of Take

The NMFS' ability to quantify the amount of take in numbers of fish can be difficult if not impossible to accomplish in the case of take in the form of harm, because the range of individual fish responses to habitat change is variable. Some will encounter changed habitat and merely react by seeking out a different place in which to express their present life history. Others might change their behavior, causing them to expend more energy, suffer stress, or otherwise respond in ways that impair their present or subsequent life histories. Yet others may experience changed habitat in a way that kills them. In such circumstances, we cannot provide an amount of take that would be caused by the proposed action, and rely instead on indicators of the extent of take due to habitat alteration as surrogates for the amount of take. Additionally, it is impossible to predict how many fish might be in the action area and exposed to fish exclusion measures, although it is highly likely to be an extremely small number as a percentage of the respective populations given the time of year of construction.

The best available indicators for the extent of take are:

1. For harm associated with temporary construction disturbance and fish exclusion, the take surrogate is the linear feet of levee repair which is approximately 5,600 linear feet and the permanent estuary impact is 87 SF. This take indicator operates as an effective re-initiation trigger.

This feature is the best to integrate the likely take pathways associated with this action, is proportional to the anticipated amount of take, and is the most practical and feasible indicator to measure. Exceedance of the limits would constitute an exceedance of authorized take that would trigger the need to reinitiate consultation.

2.9.2 Effect of the Take

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

Having added the effects of the action to the baseline, and considering the status of the species and cumulative effects, NMFS concludes that the take from the proposed action is not likely to jeopardize the continued existence of Puget Sound Chinook salmon or Puget Sound steelhead. Having added the effects of the action on PBFs to the baseline condition of the PBFs, and

considering the status of critical habitat and its conservation values, the NMFS concludes that the proposed action will not destroy or adversely modify designated critical habitat.

2.9.3 Reasonable and Prudent Measures

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

1. Minimize incidental take from construction.

2.9.4 Terms and Conditions

The terms and conditions described below are non-discretionary, and the USACE or any applicant must comply with them in order to implement the reasonable and prudent measures (50 CFR 402.14). The USACE 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 incidental take statement (50 CFR 402.14). If the entity to whom a term and condition is directed does not comply with the following terms and conditions, protective coverage for the proposed action would likely lapse.

1. To implement RPM No. 1, the USACE shall submit a fish salvage report and an as-built report with pictures for the repairs within 60 days following completion of construction.

2.10 Reinitiation of Consultation

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

2.11 Not Likely to Adversely Affect

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

As described in Section 1.2 and below, the NMFS has concluded that the proposed action would be not likely to adversely affect southern resident (SR) killer whales and their designated critical habitat. Detailed information about the biology, habitat, and conservation status and trends of SR killer whales can be found in the listing regulations and critical habitat designations published in the Federal Register, as well as in the recovery plans and other sources at: https://www.fisheries.noaa.gov/species-directory/threatened-endangered, and are incorporated here by reference.

The applicable standard to find that a proposed action is not likely to adversely affect listed species or critical habitat is that all of the effects of the action are expected to be discountable, insignificant, or completely beneficial. Beneficial effects are contemporaneous positive effects without any adverse effects to the species or critical habitat. Insignificant effects relate to the size of the impact and should never reach the scale where take occurs. Discountable effects are those extremely unlikely to occur. The effects analysis in this section relies heavily on the descriptions of the proposed action and project site conditions discussed in Sections 1.3 and 2.4, and on the effects analyses presented in Section 2.5.

Southern Resident Killer Whale

The proposed action will not have any direct effects on southern resident killer whales (SRKWs) or their critical habitat because all construction and associated short-term, direct impacts will take place in shallow waters areas outside of SRKW designated critical habitat (which is limited to deeper marine waters).

The project may, however, indirectly affect SRKW through the trophic web by affecting the quantity of prey available to SRKW. We therefore analyze that potential here but conclude that the effects to SRKW will be insignificant because construction effects of the action will only effect a tiny proportion of Skagit River Chinook juveniles that outmigrate through the Freshwater Slough distributary channel during a time of year when Chinook salmon are mostly absent from the delta. As described in Section 2.5, these temporally brief adverse effects will bear on far too few individual juvenile salmon to influence the VSP parameters or cause detectable effects to returning adult populations[1]. As a result, any project-related reduction in Chinook salmon availability for SR killer whales would be undetectable and thus insignificant. Therefore, the action is not likely to adversely affect SR killer whales. Likewise, the addition of 10,744 square feet of additional rearing habitat is too small to measurable increase adult returns and so would have no measurable benefit to SRKWs.

Southern Resident Killer Whale Critical Habitat

This assessment considers the intensity of expected effects in terms of the change they would cause in affected physical or biological features (PBFs) from their baseline conditions, and the severity of each effect, considered in terms of the time required to recover from the effect. Ephemeral effects are those that are likely to last for hours or days, short-term effects would likely to last for weeks, and long-term effects are likely to last for months, years or decades.

SR killer whale Critical Habitat: Designated critical habitat for SR killer whales includes marine waters of the Puget Sound that are at least 20 feet deep. The expected effects on SR killer whale critical habitat from completion of the proposed action, including full application of the

[1] Exact smolt to adult ratios are not known. Each individual juvenile fish already has a very high probability of not surviving to adulthood (Bradford 1995) under natural conditions. Salmonids produce very high numbers of offspring with very few surviving to adulthood and returning to spawn, but we also note that note that human-caused habitat degradation and other factors such as hatcheries and harvest exacerbate what would otherwise be natural causes of low survival such as natural variability in stream and ocean conditions, predator-prey interactions, and natural climate variability (Adams 1980, Quinones et al., 2014).

conservation measures and BMP, would be limited to the impacts on the PBFs as described below.

1. Prey species of sufficient quantity, quality, and availability to support individual growth, reproduction, and development, as well as overall population growth. The proposed action would cause no detectable reduction in prey availability and quality. Any effects on the prey species PBF would be insignificant.

Therefore, the proposed action is not likely to adversely affect SR killer whale critical habitat.

3. MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT ESSENTIAL FISH HABITAT 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 This analysis is based, in part, on the EFH assessment provided by USACE and descriptions of EFH for Pacific Coast salmon (PFMC 2014) contained in the fishery management plans developed by the PFMC and approved by the Secretary of Commerce.

3.1 Essential Fish Habitat Affected by the Project

The proposed action and action area for this consultation are described in the Introduction to this document. The action area includes areas designated as EFH for various life history stages of Chinook and Coho (*O. kisutch*), and PS pink salmon (PFMC 2014).

3.2 Adverse Effects on Essential Fish Habitat

- Based on information provided by the action agency and the analysis of effects presented in the ESA portion of this document, NMFS concludes that proposed action will have minor adverse effects on EFH designated for Chinook, pink, and Coho salmon. These effects include temporary construction disturbance. The project will also have long term positive effects associated with 10,744 square feet of additional delta estuary habitat.

3.3 Essential Fish Habitat Conservation Recommendations

The NMFS does not have conservation recommendations for this proposed action. This action supports the existing 156-acre Wiley Slough restoration site and it is compatible with future restoration actions in the Skagit River delta.

3.4 Statutory Response Requirement

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

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

3.5 Supplemental Consultation

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

4. DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW

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

4.1 Utility

Utility principally refers to ensuring that the information contained in this consultation is helpful, serviceable, and beneficial to the intended users. The intended users of this opinion are U.S. Army Corps of Engineers (USACE). Other interested users could include the WDFW, the Skagit

diking districts, Skagit County, and others interested in the conservation of the affected ESUs/DPS. Individual copies of this opinion were provided to the USACE. The format and naming adheres to conventional standards for style.

4.2 Integrity

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

4.3 Objectivity

Information Product Category: Natural Resource Plan

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

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

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

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

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