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

NMFS Tracking Number: WCR-2018-8908 March 6, 2018

Michael Francis
Chief, Environmental Compliance Section
Walla Walla District, U.S. Army Corps of Engineers
201 North Third Avenue
Walla Walla, Washington 99362-1876

Re: Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the St. Hilaire Brothers and East Improvement District: Columbia River Pumping Station and Intake Project, Columbia River Mile (301.7), Cold Springs Wash–Lake Wallula (6th Field HUC #170701010206) Umatilla County, Oregon

Dear Mr. Francis:

Thank you for your letter of February 1, 2018, requesting initiation of consultation with NOAA's National Marine Fisheries Service (NMFS) pursuant to section 7 of the Endangered Species Act of 1973 (ESA) (16 U.S.C. 1531 *et seq.)* for the St. Hilaire Brothers and East Improvement District: Columbia River Pumping Station and Intake Project (Project).

The enclosed document contains a biological opinion (opinion) prepared by NMFS pursuant to section 7(a)(2) of the ESA on the effects of the Project.

As required by Section 7 of the ESA, NMFS provided an incidental take statement (ITS) with the opinion. Although the proposed action includes constructing a facility for pumping water, the action will not reduce flows in the Columbia River as compared to conditions without the proposed action. Reductions in diversions at other locations will offset all diversions at the new pumping facility. Thus, incidental take from flow reductions is not expected and is not authorized in the ITS for this opinion. The ITS describes reasonable and prudent measures (RPMs) NMFS considers necessary or appropriate to minimize incidental take associated with this action. The take statement sets forth nondiscretionary terms and conditions, including reporting requirements that the federal agency and any person who performs the action must comply with to carry out the RPMs. Incidental take from actions that meet these terms and conditions will be exempt from the ESA take prohibition.

In this opinion, NMFS concludes that the proposed action is not likely to adversely affect the Snake River sockeye salmon (*Oncorhynchus nerka*) or their designated critical habitat. NMFS also concludes that the action, as proposed, is not likely to jeopardize the continued existence of

ESA-listed Upper Columbia River (UCR) spring-run Chinook salmon (*O. tshawytscha*), UCR steelhead (*O. mykiss*), Middle Columbia River (MCR) steelhead, Snake River Basin steelhead, Snake River spring/summer-run Chinook salmon, or Snake River fall-run Chinook salmon. NMFS also determined that the action will not destroy or adversely modify designated critical habitats for these species.

This document includes two conservation recommendations to avoid, minimize, or otherwise offset potential adverse effects on essential fish habitat (EFH). These conservation recommendations are a subset of the ESA take statement's terms and conditions. Section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) requires federal agencies to provide a detailed written response to NMFS within 30 days after receiving an EFH conservation recommendation.

If the response is inconsistent with the EFH conservation recommendation, the U.S. Army Corps of Engineers (Corps) must explain why, including the justification for any disagreements over the effects of the action and the recommendation. 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, in your statutory reply to the EFH portion of this consultation, we ask that you clearly identify the number of conservation recommendations accepted.

Please contact Rebecca Viray of the Interior Columbia Basin Office at (541) 975-1835 ext. 222 or electronic mail at Rebecca.Viray@noaa.gov if you have any questions concerning this consultation, or if you require additional information.

Sincerely,

for Barry A. Thom
Regional Administrator

Enclosure
cc: John Hook, Corps

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

St. Hilaire Brothers and East Improvement District:
Columbia River Pumping Station and Intake Project,
Columbia River Mile 301.7

Cold Springs Wash – Lake Wallula (6th Field HUC #170701010206)

Umatilla County, Oregon

NMFS Consultation Number: WCR-2018-8908

Action Agency: U.S. Army Corps of Engineers (Corps)

Affected Species and Determinations:

ESA-Listed Species	Status	Is Action Likely to Adversely Affect Species or Critical Habitat?	Is Action Likely to Jeopardize the Species?	Is Action Likely to Destroy or Adversely Modify Critical Habitat?
Upper Columbia River spring-run Chinook salmon	Endangered	Yes	No	No
Upper Columbia River Steelhead	Threatened	Yes	No	No
Middle Columbia River Steelhead	Threatened	Yes	No	No
Snake River fall-run Chinook salmon	Threatened	Yes	No	No
Snake River summer/spring-run Chinook salmon	Threatened	Yes	No	No
Snake River Basin steelhead	Threatened	Yes	No	No
Snake River sockeye salmon	Endangered	No	No	No

Fishery Management Plan that Describes EFH in the Project Area	Does action Have an Adverse Effect on EFH?	Are EFH Conservation Recommendations Provided?
Pacific Coast salmon	Yes	Yes

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

Issued By:

for Barry A. Thom
Regional Administrator

Date: March 6, 2018

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ACRONYM GLOSSARY

BA	Biological Assessment
BMP	Best Management Practice
CFR	Code of Federal Regulations
cfs	cubic feet per second
yd^3	cubic yards
CHART	Critical Habitat Analytical Review Team
Corps	U.S. Army Corps of Engineers
DPS	Distinct Population Segment
dB	Decibels
DCH	Designated Critical Habitat
DQA	Data Quality Act
EFH	Essential Fish Habitat
EID	Eastside Irrigation District
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FCRPS	Federal Columbia River Power System
fps	feet per second
FR	Federal Register
HUC	Hydrologic Unit Code
ICRD	Interior Columbia Recovery Domaine
ICTRT	Interior Columbia Basin Technical Recovery Team
ISAB	Independent Scientific Advisory Board
ITS	Incidental Take Statement
MCR	Middle Columbia River
MPG	Major Population Group
MSA	Magnuson-Stevens Fishery Conservation and Management Act
NMFS	National Marine Fisheries Service
NWFSC	Northwest Fisheries Science Center
ODEQ	Oregon Department of Environmental Quality
ODFW	Oregon Department of Fish and Wildlife
OHWM	Ordinary High Water Mark
opinion	Biological Opinion
OWRD	Oregon Water Resource Department
PBF	Physical or Biological Features
PCE	Primary Constituent Element
PCP	Pollution Control Plan
PFMC	Pacific Fishery Management Council
POD	Point of Diversion
rms	Root Mean Square
RPM	Reasonable and Prudent Measure
SEL	Sound Exposure Level
SPL	Sound Pressure Level
TRT	Technical Recovery Team
TSS	Total Suspended Solids

UCR	Upper Columbia River
U.S.C.	United States Code
USFWS	United States Fish and Wildlife Service
USGCRP	U.S. Global Change Research Program
VSP	Viable Salmonid Population

LIST OF TABLES

1.0 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 U.S.C 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 through NMFS' Public Consultation Tracking System. A complete record of this consultation is on file at Columbia Basin Area Office at Ellensburg, Washington.

1.2 Consultation History

On February 1, 2018, NMFS received a request for individual ESA and MSA consultations from the U.S. Army Corps of Engineers (Corps) for the St. Hilaire Brothers and East Improvement District: Columbia River Pumping Station and Intake Project (Project). The Corps authority for permitting this action is covered under Section 10 of the Rivers and Harbors Act (33 U.S.C. 403), Section 404 of the Clean Water Act (33 U.S.C. 1344) and the Corps' real estate license concerning property under their authority. The request concerns the Corps' proposal to permit the expansion of the St. Hilaire Brothers pumping station and construct a new irrigation pumping station for the Eastside Irrigation District (EID), and for the habitat mitigation, which includes removal of concrete and debris in the Columbia River.

Prior to receiving the consultation request from the Corps, we engaged in early consultation with Campbell Consultants to review the draft proposed action and the initial draft Biological Assessment (BA). The proposed action includes expansion of the existing pump station and installation of the new EID pump station. The new EID pump station will consolidate and transfer surface irrigation water rights for nine farms. The Oregon Water Resource Department (OWRD) administers, and has jurisdiction over, all existing and new water rights in the State of Oregon. The proposed water rights consolidation will require flow mitigation by the OWRD. In addition, the project proposes the construction of the upland pipeline crossing on the McNary Wildlife Refuge administrated by the United States Fish and Wildlife Service (USFWS) and the

removal of concrete debris to provide shallow water restoration to mitigate loss of shoreline habitat from the building of the new pump station.

The following chronology documents key points of the 2017–2018 consultation process, which culminated in this biological opinion for NMFS-listed species.

1. An initial draft BA prepared by Campbell Consultants was provided to NMFS on November 1, 2017. We reviewed the draft and provided early comments.
2. On January 9, 2018, NMFS received an email from the Corps representative informing of the project and beginning consultation discussions.
3. On January 25, 30 and 31, 2018, NMFS engaged in phone and email correspondence[1, 2] with the Corps' biologist and the environmental coordinator assigned to the project to discuss timeframes and the request to complete the expedite consultation to meet the applicants proposed funding deadlines.
4. The Corps submitted a draft BA on January 26, 2018.
5. NMFS received a final BA from the Corps on February 1, 2018, and formal consultation was initiated at that time.

The Corps has determined the proposed action is likely to adversely affect the Upper Columbia River (UCR) spring-run Chinook salmon (*Oncorhynchus tshawytscha*), Snake River spring/summer-run Chinook salmon, and Snake River fall-run Chinook salmon evolutionarily significant units (ESUs); as well as UCR steelhead (*O. mykiss*), Middle Columbia River (MCR) steelhead, and Snake River Basin steelhead distinct population segments (DPSs), and designated critical habitat for all six species. The Corps also found the proposed action would adversely affect designated EFH for Chinook salmon and coho salmon. NMFS has prepared this opinion in response to the Corps request for formal consultation. The Corps also determined the Project would not likely adversely affect Snake River sockeye salmon or its designated critical habitat.

1.3 Proposed Action

"Action" means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by federal agencies (50 CFR 402.02).

"Interrelated actions" are those that are part of a larger action and depend on the larger action for their justification. "Interdependent actions" are those that have no independent utility apart from the action under consideration (50 CFR 402.02). Associated with the Project is the construction of an upland irrigation pipeline on state, county, and private lands not included, which is interrelated to the proposed action. The private upland pipeline does not cross any streams or waterways near listed species or their critical habitat.

[1] Emails exchanged between John Hook, USACE Biologist to Rebecca Viray NMFS biologist on January 25, 2018; and phone conversation on January 31, 2018.

[2] Emails exchanged between Anneli Colter, USACE Environmental Coordinator to Rebecca Viray NMFS biologist on January 25, 2018; and phone conversation on January 30, 2018.

The Corps proposes to permit the St. Hilaire Brothers to expand the existing irrigation pumping station, and construct a new irrigation pumping station and intake located along the MCR (Lake Wallula) at river mile 301.7, in Umatilla County, Oregon. The St. Hilaire Brothers own and operate the existing irrigation pumping station, which provides irrigation water to JSH Farms, Umatilla County. The intake and pump station will be located adjacent to the existing facility and will consolidate the transfer of existing, and new, mitigated surface irrigation water rights to a centralized point of diversion (POD). The new, adjacent pumping station will be owned and operated by EID, which is comprised of nine farms that collectively own over 28,000 acres. The new EID pumping station will also be able to provide water to an additional 29 farms representing an additional 19,000 acres.

The proposed expansion of the existing St. Hilaire Brothers pumping station will include installation of three new pumps and a new discharge pipe which will increase the station's withdrawal capacity from 61.4 cubic feet per second (cfs) to 100 cfs (an additional 38.6 cfs). The new EID pumping station will include a new station deck, ten new pumps, a new intake pipe and intake screens, and a new discharge pipe (Figure 1). The new intake screens will be designed to be compliant with NMFS standards[3].

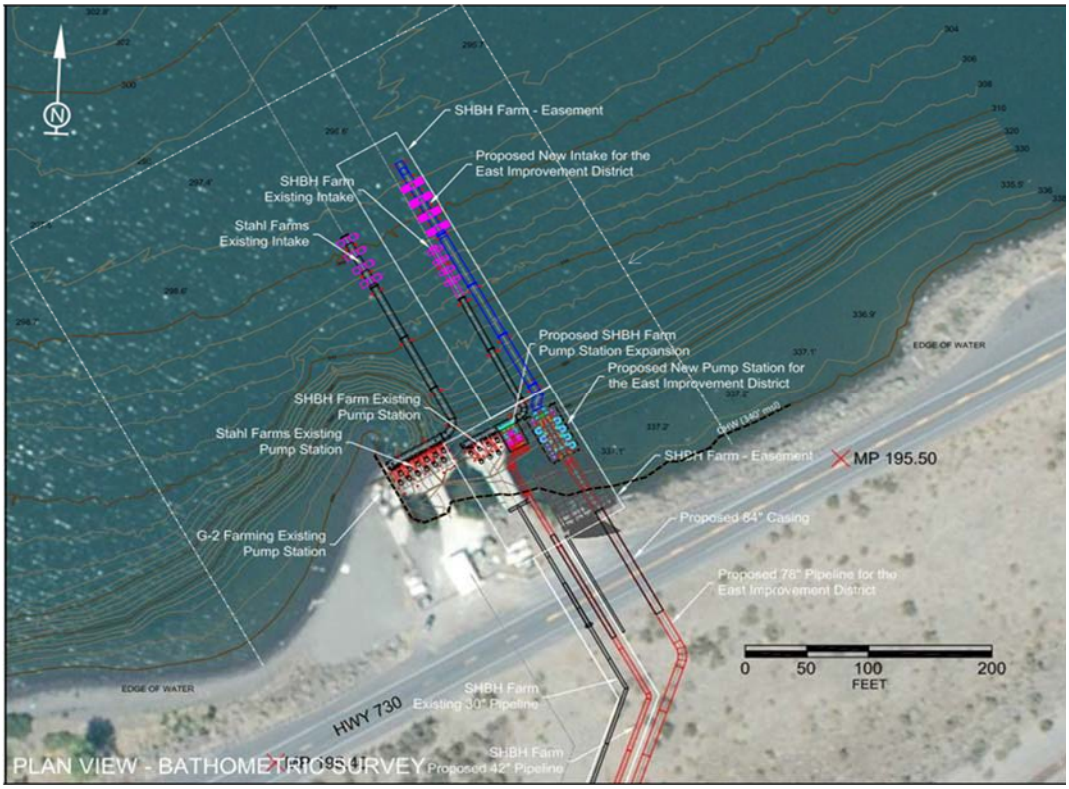

Figure 1: Project Site. Existing Pump Stations and Proposed New Intake Expansion.

[3] Email correspondence dated July 7, 2017 from Jeffrey Brown, NMFS hydraulic Engineer to Rebecca Viray, NMFS Fish Biologist concerning the project meeting NMFS fish passage criteria approval.

The expansion at the St. Hilaire pump station and the new EID station will coincide with the transfer of current permitted water withdrawal rights, POD transfers, and new mitigated protected instream water rights to the EID station. All water withdrawals for both stations (38.6 cfs for St. Hilaire Brothers and 200 cfs for EID) will be through transfer of existing surface irrigation water rights totaling 200.00 cfs. There will be no new instream withdrawal rights issued for irrigation purposes. For this reason, the proposed action will not authorize any water rights that would increase consumptive uses. In addition, the OWRD will require the issuance of 94.11 cfs of new mitigated instream water rights (see Table 1). The 55.51 cfs of available water rights (*i.e.,* beyond the 238.6 cfs withdrawal capacity) will allow the owners flexibility in transferring water rights based on seasonal use. All new water rights[4] will be mitigated "bucket for-bucket" at or above the point of impact, as required through the OWRD water-use permit application process (OAR 690-033-0120). If at any point, the required instream water rights are not mitigated the irrigation withdrawals will cease.

Table 1. Summary of Irrigation Water Rights.

Owner	Water Rate (CFS)	Water Right Status	Current Withdrawal Location
Hale Farms, LLC	18.19	Permitted & Certificated	Columbia River at the project site (Stanfield H.B. Farms pump station)
Hale Farms, LLC / Echo Irrigation District	50.00*	Permitted	Columbia River at the project site (Stanfield H.B. Farms pump station)
Lloyd and Lois Percy / St. Hilaire Brothers Hermiston Farm, LLC	52.60*	Permitted	Columbia River at the project site (St. Hilaire Bros. pump station)
Mike Hawman	23.18	Permitted & Certificated	Columbia River 0.4 miles upstream of the project site
Randy Rupp	15.62*	Permitted	Columbia River at the project site (St. Hilaire Bros. pump station)
Royale Columbia Farms, Inc.	40.41	Permitted & Certificated	Columbia River at the project site (G2 pump station)
East Improvement District	94.11	New water rights	Mitigated per OWRD requirements through certificated water rights that are legally protected instream
Total	**294.11**		

[4] Phone conversation between Rebecca Viray (NMFS) and Kim Ogren (OWRD) on February 7, 2018, regarding the status of the water right permits, transfers and mitigation requirements.

Upon project completion, the intake pumps will be operated consistent with state water rights and will typically be in operation during the months of April through October. The maximum allowable water withdrawal rates for the St. Hilaire Brothers and EID pumping stations will be 100 cfs and 200 cfs, respectively. The actual amount pumped during any given season is dependent on the water requirements during that year.

In-Water Construction of Pump Stations

The proposed project will expand the existing St. Hilaire pump station, and construct the new EID intake and pump station, and associated structures. The project will result in 1,028 cubic yards (covering an area of 0.095 acres) of permanent fill, and 398 cubic yards (covering an area of 0.029 acres) of permanent substrate removal below the OHWM of the Columbia River, resulting in a net fill of 630 cubic yards (covering an area of 0.066 acres).

The existing St. Hilaire pump station deck will expand approximately 15 feet to the east to accommodate the new pump cans. The expanded station deck will be constructed using metal grates placed over a steel frame, and will be supported over water by 16 new steel H-piles. The total overwater area covered by the expanded station deck and new discharge pipe will be approximately 538 square feet (0.012 acres), of which, approximately 404 square feet (0.009 acres) will be grated to allow for 60 percent light penetration. The proposed 42-inch diameter discharge pipe will be trenched underground through upland as it leaves the project site, and will eventually tie into an existing irrigation pipe approximately 0.5 miles to the south. A new 450-ft gravel access pad will provide upland access to the new station from existing roadways.

At each new pump can location, a 60-inch diameter by 7.5-foot-long section of sleeve pipe will be positioned vertically and driven a foot into the riverbed using a vibratory hammer. The riverbed material inside the pipes will be suctioned out. As material is removed, the pipe will be driven further down until the desired depths are achieved. The suctioned bed material will be side cast back into the river within the existing easement.

The new EID pumping station will include 18 pilings, 64 H-piles, and 54 sheet piles to build the new station deck; ten new pumps, a new intake pipe, four new intake screens, and a new 42-inch diameter discharge pipe (see the BA, Figures 4). The new intake screens will mount on a 78-inch diameter by 70-foot-long steel manifold. The manifold will be supported on five cradles and supported by a pair of 12.75-inch diameter steel piles. The manifold will then transition to an 84-inch diameter by 170-foot-long section of intake pipe supported on another four cradles, and secured by a pair of steel piles. The intake pipe will then continue another 38 feet as a second manifold. This manifold will support an additional five cradles, secured between pairs of steel H-piles. The manifold will connect to ten pump cans, five on each side of the manifold, through 30-inch diameter “pup” pipes. Each pump can will be 42 inches in diameter by 21 feet tall. The new pumping station and intake will extend approximately 350 feet out from the shoreline of the Columbia River.

Each of the four new intake screens will measure 5 feet in diameter by approximately 19 feet in length, and will be affixed with NMFS-approved slotted fish screen (0.069-inch openings) to

insure juvenile salmonids are not impinged or entrained in the intake. The intake screens will also be equipped with an airburst system to facilitate the cleaning of the screens and maintain the appropriate approach velocity in compliance with NMFS criteria. This airburst system will include a compressor, an air vessel, stainless steel lines to each screen, control valves, and a monitoring and control system.

A vibratory hammer will install all new steel pilings, sheet piles and H-piles 20 feet into the substrate. Each pile will require approximately 15 to 30 minutes of vibratory hammer use. Vibratory hammer use at both the St. Hilaire Farm pump station and the EID station is estimated to total duration up to 76 hours, or up to 9.5 days[5] for the project. Operators will use best management practices (BMP) as described in the conservation measures to minimize potential affects to any fish in the area.

Upland Pipeline

The proposed action will include the construction of the discharge pipeline for a half mile in upland lands on the McNary National Wildlife Refuge. The upland pipeline will be trenched through Right-of-Way easements held by both the St. Hilaire Farm and EID with the USFWS. The upland pipeline will continue onto private lands after leaving the McNary Refuge. Construction activities of the upland pipeline will not be in waterways with listed salmonids or on Designated Critical Habitat (DCH).

Habitat Restoration

The proposed project will result in the permanent displacement of 0.066 acre of aquatic habitat within the MCR (Lake Wallula). In addition, the proposed new station decks and new discharge pipes will result in approximately 0.084 acre of new overwater structures.

The following measures are proposed to minimize the potential effects to salmonids from the new station and intake structures and improve conditions of the shallow water habitat near the shoreline:

- Approximately 3,000 square feet (0.069 acres) of existing concrete and asphalt debris associated with the old Highway 30 in Boardman (located approximately 33 miles downstream of the project area) will be removed from below the OHWM of the Columbia River (see Figure 2).

[5] Email between Eric Campbell, (Campbell Environmental Consultants) to Rebecca Viray, (NMFS) on February 6, 2018, regarding total duration of pile driving.

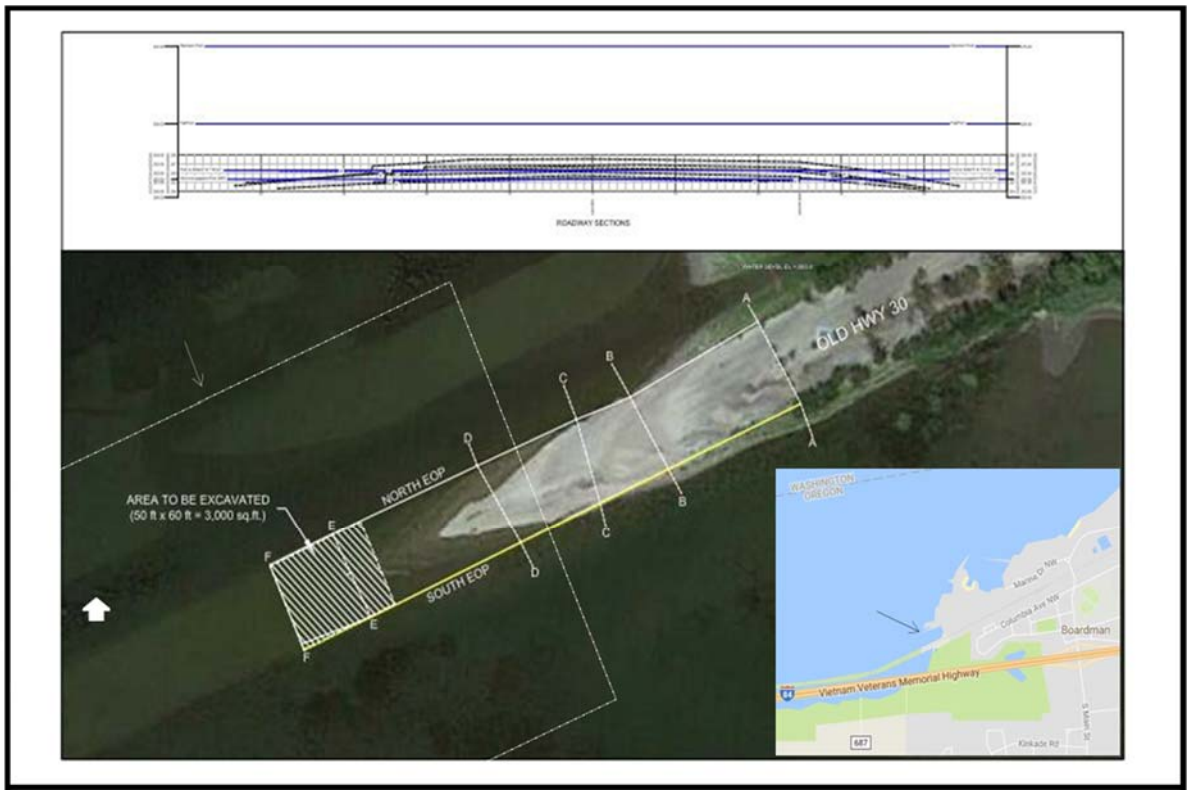

Figure 2: Proposed Habitat Restoration Site.

Removal of the concrete/asphalt debris will be conducted using an excavator, operating from the roadway. The excavator will start at the far end of the proposed mitigation area and work backwards toward the shoreline. The debris will be transferred to a dump truck and carried offsite to an upland disposal location. Removal of the concrete/asphalt debris will increase the available substrate area and open water below the OHWM of the Columbia River, therefore providing viable shallow water habitat near the shoreline. Water depths within the mitigation area range between 1 to 4 feet.

Conservation Measures

Appropriate conservation measures are incorporated into the proposed project design to minimize and avoid adverse effects to ESA-listed species, their designated critical habitat, and EFH. These measures will include the following:

- All project work conducted below the OHWM of the Columbia River will occur between December 1 and February 28 of the Oregon Department of Fish and Wildlife (ODFW) preferred in-water work window for the MCR (December 1 to March 31) (ODFW 2008); a period when ESA-listed salmonids are least likely to occur within the project action area. It is anticipated that the proposed project will require approximately eight to twelve weeks of in-water work.
- All heavy equipment (*i.e.*, crane and excavator) will access the project site via existing roadways, parking areas, disturbed upland areas, and/or floating barges.

- All steel piles will be installed with a vibratory hammer, therefore reducing potential hydroacoustic impacts to fish. No impact hammer pile driving will be required.
- The contractor will initiate daily "soft-start" procedures to provide a warning and/or give animals near piling installation and removal activities a chance to leave the area prior to a vibratory hammer operating at full capacity, thereby exposing fewer animals to loud underwater and airborne sounds.
- The contractor will initiate noise from vibratory hammers for 15 seconds at reduced energy followed by a 30-second waiting period. The procedure shall be repeated two additional times.
- All excavated/dredged materials and leave surface will be suitable and approved for in-water disposal based on the Sediment Evaluation Framework.
- A Pollution Control Plan (PCP) will be prepared by the Contractor and carried out commensurate with the scope of the project that includes the following:
    - BMPs to confine, remove, and dispose of construction waste.
    - Procedures to contain and control a spill of any hazardous material.
    - Steps to cease work under high flow conditions.
- All conditions of the Oregon Department of Environmental Quality (ODEQ)'s 401 Water Quality Certification will be followed.
- Only enough supplies and equipment to complete the project will be stored on site.
- All equipment will be inspected daily for fluid leaks; any leaks detected will be repaired before operation is resumed.
- Before operations begin, and as often as necessary during operation, all equipment that will be used below the OHWM will be steam cleaned until all visible oil, grease, mud, and other visible contaminates are removed.
- Stationary power equipment operated within 150 feet of the Columbia River will be diapered to prevent leaks.
- New pump station intake screens will be equipped with a self-monitoring system that will measure hydraulic head and reduce intake velocities as necessary to maintain an approach velocity of 0.2 feet per second (fps), in compliance with NMFS criteria.
- New pump station intake screens will be placed more than 20 feet below the OHWM, therefore reducing potential impacts to migrating juvenile salmonids.
- Approximately 0.037 acre (64 percent) of the new overwater station decks will be grated to allow for 60 percent light penetration.
- Waterproof lighting equipped with a daylight sensor will be installed under the overwater portions of the new concrete deck (0.046 acres) at the new EID pumping station to provide under deck lighting during the daytime in order to detract salmonid predators.

- All new water rights will be mitigated “bucket-for-bucket” at or above the point of impact, as required through the OWRD water-use permit application process (OAR 690-033-0120).

2.0 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 on which they depend. Section 7(a)(2) of the ESA requires federal agencies to consult with the USFWS, NMFS, or both, to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or adversely modify or destroy their designated critical habitat. Section 7(b)(3) requires that at the conclusion of consultation, the Service provide an opinion stating how the agencies’ actions will affect listed species or their critical habitat. If incidental take is expected, Section 7(b)(4) requires the provision of an ITS specifying the impact of any incidental taking, and including RPMs to minimize such impacts.

The Corps determined the proposed action is not likely to adversely affect Snake River sockeye salmon or its critical habitat. Our concurrence is documented in the "Not Likely to Adversely Affect" Determinations section (Section 2.12).

2.1 Analytical Approach

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

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

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

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

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

2.2 Rangewide Status of the Species and Critical Habitat

This opinion examines the status of each species and designated critical habitat that would be affected by the Project. Status of the species is the level of risk that the listed species face based on parameters considered in documents such as recovery plans, status reviews, and ESA listing determinations. The species status section helps to inform the description of the species' current "reproduction, numbers, or distribution" as described in 50 CFR 402.02.

Six ESA-listed species and designated critical habitats occur in the action area and were considered in this opinion (see Table 2). All adults and juveniles of both species migrate through the area and juveniles of all species are likely to rear there. The action area is also designated as EFH for Chinook salmon and coho salmon (Pacific Fishery Management Council (PFMC) 1999).

Table 2. Federal Register (FR) notices for final rules that list threatened and endangered species, designate critical habitats, or apply protective regulations to listed species considered in this consultation. Listing status: "T" means listed as threatened, "E" means listed as endangered under the ESA.

Species	Listing Status	Critical Habitat	Protective Regulations
Chinook salmon (*Oncorhynchus tshawytscha*)			
Upper Columbia River spring-run	E 6/28/05; 70 FR 37160	9/02/05; 70 FR 52630	ESA section 9 applies
Snake River spring/summer-run	T 6/28/05; 70 FR 37160	10/25/99; 64 FR 57399	6/28/05; 70 FR 37160
Snake River fall-run	T 6/28/05; 70 FR 37160	12/28/93; 58 FR 68543	6/28/05; 70 FR 37160

Species	Listing Status	Critical Habitat	Protective Regulations
Steelhead (*O. mykiss*)			
Middle Columbia River	T 1/05/06; 71 FR 834	9/02/05; 70 FR 52630	6/28/05; 70 FR 37160
Upper Columbia River	T 1/05/06; 71 FR 834	9/02/05; 70 FR 52630	2/01/06; 71 FR 5178
Snake River Basin	T 1/05/06; 71 FR 834	9/02/05; 70 FR 52630	6/28/05; 70 FR 37160

More detailed information on the status and trends of these ESA-listed resources and their biology and ecology can be found in the listing regulations and critical habitat designations published in the Federal Register (Table 2). Another source of information is the most recent 5-year review of ESA-listed Pacific salmonid species (81FR33468), which was published on December 21, 2015 (NWFSC 2015).

Climate change affects salmon and their habitat throughout Washington, Oregon, and Idaho. Several studies have revealed that climate change has the potential to affect ecosystems in nearly all tributaries throughout the state (Battin, Wiley *et al*. 2007, Independent Scientific Advisory Board (ISAB) 2007). While the intensity of effects will vary by region (ISAB 2007), climate change is generally expected to alter aquatic habitat (water yield, peak flows, and stream temperature). As climate change alters the structure and distribution of rainfall, snowpack, and glaciations, each factor will in turn alter riverine hydrographs. Given the increasing certainty that climate change is occurring and is accelerating (Battin, Wiley *et al.* 2007), NMFS anticipates salmonid habitats will be affected. Climate and hydrology models project significant reductions in both total snow pack and low-elevation snow pack in the Pacific Northwest over the next 50 years (Mote and Salathé 2009); changes that will shrink the extent of the snowmelt-dominated habitat available to salmon. Such changes may restrict our ability to conserve diverse salmon life histories.

Climate change is expected to make recovery targets for these salmon populations more difficult to achieve. Habitat action can address the adverse impacts of climate change on salmon. Examples include restoring connections to historical floodplains and freshwater and estuarine habitats to provide fish refugia and areas to store excess floodwaters, protecting and restoring riparian vegetation to ameliorate stream temperature increases, and purchasing or applying easements to lands that provide important cold water or refuge habitat (Battin, Wiley *et al.* 2007, ISAB 2007).

2.2.1 Status of Listed Species

For Pacific salmon and steelhead, NMFS commonly uses four parameters to assess the viability of the populations that, together, constitute the species—abundance, productivity, spatial structure, and diversity (McElhany *et al.* 2000). These "viable salmonid population" (VSP) criteria therefore encompass the species' "reproduction, numbers, or distribution" as described in 50 CFR 402.02. When these parameters are collectively at appropriate levels, they maintain a population's capacity to adapt to various environmental conditions and allow it to sustain itself in the natural environment. These parameters or attributes are substantially influenced by habitat and other environmental conditions.

"Abundance" generally refers to the number of naturally-produced adults (*i.e.,* the progeny of naturally-spawning parents) in the natural environment.

"Productivity," as applied to viability factors, refers to the entire life cycle; *i.e.,* the number of naturally-spawning adults (*i.e.,* progeny) produced per naturally-spawning parental pair. When progeny replace or exceed the number of parents, a population is stable or increasing. When progeny fail to replace the number of parents, the population is declining. McElhany *et al.* (2000) use the terms "population growth rate" and "productivity" interchangeably when referring to production over the entire life cycle. They also refer to "trend in abundance," which is the manifestation of long-term population growth rate.

"Spatial structure" refers both to the spatial distributions of individuals in the population and the processes that generate that distribution. A population's spatial structure depends fundamentally on accessibility to the habitat, on habitat quality and spatial configuration, and on the dynamics and dispersal characteristics of individuals in the population.

"Diversity" refers to the distribution of traits within and among populations. These range in scale from DNA sequence variation at single genes to complex life history traits (McElhany *et al*. 2000).

In describing the range-wide status of listed species, we rely on viability assessments and criteria in Interior Columbia Basin Technical Recovery Team (ICTRT) documents and recovery plans, when available, that describe VSP parameters at the population, major population group (MPG), and species scales (*i.e.,* salmon ESUs and steelhead DPSs). For species with multiple populations, once the biological status of a species' populations and MPGs have been determined, NMFS assesses the status of the entire species.

Considerations for species viability include having multiple populations that are viable, ensuring that populations with unique life histories and phenotypes are viable, and that some viable populations are both widespread to avoid concurrent extinctions from mass catastrophes and spatially close to allow functioning as meta-populations (McElhany *et al.* 2000).

Interior Columbia Recovery Domain

Species in the Interior Columbia Recovery Domain (ICRD) include UCR spring-run Chinook salmon, Snake River spring/summer-run Chinook salmon, Snake River fall-run Chinook salmon, Snake River sockeye salmon, UCR steelhead, MCR steelhead, and Snake River Basin steelhead. The ICTRT identified 82 populations of those species based on genetic, geographic (hydrographic), and habitat characteristics (Table 3). In some cases, the ICTRT further aggregated populations into MPGs based on dispersal distance and rate, and drainage structure, primarily the location and distribution of large tributaries (ICTRT 2003). All 82 populations identified use the mainstem of the Columbia River and the Columbia River estuary, or part thereof, for migration, rearing, and smoltification. As indicated in section 1.2 of this document, Snake River sockeye salmon will not be addressed.

Table 3. Affected Populations of ESA-listed salmon and steelhead in the Interior Columbia Recovery Domain.

Species	Populations
UCR spring-run Chinook salmon	3
Snake River spring/summer-run Chinook salmon	28
Snake River fall-run Chinook salmon	1
UCR steelhead	4
MCR steelhead	17
Snake River Basin steelhead	24

On May 26, 2016, NMFS published the results of an ESA 5-year review for 17 ESUs of salmon and 10 DPSs of steelhead in the Federal Register (81FR33468). NMFS reviewed new information on the viability of these species, ESA section four listing factors, and efforts being made to protect the species. NMFS concluded that the information did not indicate a change in the biological risk category for all salmon and steelhead in the Mid-Columbia, Upper Columbia, and Snake River sub-domains since the time of the last status review. The listing status remained unchanged (Northwest Fisheries Science Center (NWFSC) 2015).

The ICTRT recommended viability criteria that follow the VSP framework (McElhany, Busack et al. 2006) and described biological or physical performance conditions that, when met, indicate a population or species has a 5 percent or less risk of extinction over a 100-year period (ICTRT 2007).

Overall viability risk scores (high to low) are based on combined ratings for the abundance and productivity, and spatial structure, and diversity metrics. The abundance and productivity score considers the ICTRT's estimate of a populations' minimum threshold population, natural spawning abundance and the productivity of the population. Productivity over the entire life cycle and factors that affect population growth rate provide information on how well a population is "performing" in the habitats it occupies during the life cycle. Estimates of population growth rate that indicate a population is consistently failing to replace itself are an indicator of increased extinction risk. The four metrics (abundance, productivity, spatial structure, and diversity) are not independent of one another and their relationship to sustainability depends on a variety of interdependent ecological processes (Wainwright, Chilcote et al. 2008).

Upper Columbia River Spring-run Chinook Salmon ESU

The UCR spring-run Chinook salmon ESU is not currently meeting the viability criteria (adapted from the ICTRT) in the Upper Columbia Spring Chinook salmon and Steelhead Recovery Plan.

Abundance and Productivity. These characteristics of viable populations remain at "high" risk for each of the three populations in this ESU (see Table 4). The 10-year geometric mean abundance of adult natural origin spawners has increased for each population relative to the levels for the 1981–2003 series, but the estimates remain below the target abundance thresholds. Estimated productivity (spawner-to-spawner return rate at low to moderate escapements) was on average lower over the current period than for the previous period, except for the Entiat population. This indicates that UCR spring-run Chinook salmon populations are not replacing

themselves. Increases in natural origin abundance relative to the extremely low spawning levels observed in the mid-1990s are encouraging; however, average productivity levels remain extremely low. The combinations of current abundance and productivity for each population result in a "high" risk rating.

Spatial Structure and Diversity. This ESU includes all naturally spawned populations of Chinook salmon in all river reaches accessible to Chinook salmon in Columbia River tributaries upstream of Rock Island Dam and downstream of Chief Joseph Dam in Washington (excluding the Okanogan River). The ESU also includes six artificial propagation programs. A historic population in the Okanogan River was extirpated (ICTRT 2005).

The composite spatial structure and diversity risk for all three populations in this ESU are at "high" risk. The spatial processes component is "low" for the Wenatchee River and Methow River populations and "moderate" for the Entiat River (loss of production in lower section increases effective distance to other populations). All three of the populations in this ESU are at "high" risk for diversity, driven primarily by chronically high proportions of hatchery-origin spawners in natural spawning areas and lack of genetic diversity among the natural-origin spawners (Ford 2011).

Table 4. Summary of the UCR spring-run Chinook salmon population status and ICTRT viability criteria. (Ford 2011).

	Abundance and Productivity Metrics				Spatial Structure and Diversity Metrics			
Population	Abundance Threshold	Natural Spawning Abundance 2005-2014	Productivity 2005-2014	Integrated Abundance/ Productivity Risk	Natural Process Risk	Diversity Risk	Integrated Spatial Structure/ Diversity Risk	Overall Viability Rating
Wenatchee	2000	545	0.60	High	Low	High	High	High Risk
Methow	2000	379	0.46	High	Low	High	High	High Risk
Entiat	500	166	0.94	High	Moderate	High	High	High Risk

Overall, the viability of the UCR spring-run Chinook salmon ESU has likely improved somewhat since the last status review, but the ESU is still clearly at "high" risk of extinction (NWFSC 2015).

Status Summary

Several factors—both population- and habitat-related—have caused this ESU to decline to the point that it is likely to become extinct in the foreseeable future. Ford (2011) found all three populations to still be at high risk with regard to their viability. While there has been some improvement in some areas, particularly since the historic lows of the 1990s, the general outlook in terms of all four criteria is that the ESU is still at high risk of becoming extinct and the species is not currently viable (Ford 2011, NWFSC 2015).

Snake River Spring/Summer-run Chinook Salmon ESU

This ESU is not currently considered to be viable with each of the populations facing a "high" risk of extinction (Ford 2011).

Abundance and Productivity. Population level status ratings remain at "high" risk across all MPGs within the ESU. Although recent natural spawning abundance estimates have increased, all populations remain below minimum natural origin abundance thresholds (see Table 5). Spawning escapements in the most recent years in each series are generally well below the peak returns but above the extreme low levels in the mid-1990s. Relatively low natural production rates and spawning levels below minimum abundance thresholds remain a major concern across the ESU.

The ability of Snake River spring/summer-run Chinook salmon populations to be self-sustaining through normal periods of relatively low ocean survival remains uncertain. Factors cited by Good *et al*. (2005) remain as concerns or key uncertainties for several populations. As a result of the current high risk facing this ESU's component populations, the Snake River spring/summer-run Chinook salmon MPGs do not meet the ICTRT viability criteria for the ESU (*i.e.,* all five MPGs must be viable for the ESU to be viable).

Spatial Structure and Diversity. This ESU includes all naturally-spawned populations of spring/summer-run Chinook salmon in the mainstem Snake River, Tucannon River, Grande Ronde River, Imnaha River, and Salmon River subbasins; and progeny of fifteen artificial propagation programs. The ICTRT identified 28 extant and four extirpated populations of Snake River spring/summer-run Chinook salmon, and aggregated these into MPGs (ICTRT 2007, Ford 2011). Spatial structure and diversity among the component populations ranges from low to moderate risk for all but six populations. See Table 5.

Table 5. Summary of the Snake River spring/summer-run Chinook salmon population status and ICTRT viability criteria. (NWFSC 2015)

	Abundance and Productivity Metrics				Spatial Structure and Diversity Metrics			
Population	Abundance Threshold	Natural Spawning Abundance	Productivity	Integrated Abundance/ Productivity Risk	Natural Process Risk	Diversity Risk	Integrated Spatial Structure/ Diversity Risk	Overall Viability Rating
Lower Snake River MPG								
Tucannon River	750	267	0.69	High	Low	Moderate	Moderate	High Risk
Grande Ronde/Imnaha MPG								
Wenaha River	750	399	0.93	High	Low	Moderate	Moderate	High Risk
Lostine/ Wallowa River	1000	332	0.98	High	Low	Moderate	Moderate	High Risk
Minam River	750	475	0.94	High	Low	Moderate	Moderate	High Risk

	Abundance and Productivity Metrics				Spatial Structure and Diversity Metrics			
Population	Abundance Threshold	Natural Spawning Abundance	Productivity	Integrated Abundance/ Productivity Risk	Natural Process Risk	Diversity Risk	Integrated Spatial Structure/ Diversity Risk	Overall Viability Rating
Catherine Creek	1000	110	0.95	High	Moderate	Moderate	Moderate	High Risk
Upper Grande Ronde River	1000	43	0.59	High	High	Moderate	High	High Risk
Imnaha River	750	328	1.20	High	Low	Moderate	Moderate	High Risk
South Fork Salmon River MPG								
Little Salmon River	750	Insufficient Data	Insufficient Data	Insufficient Data	Low	Low	Low	High Risk
South Fork mainstem	1000	791	1.21	High	Low	Moderate	Moderate	High Risk
Secesh River	750	472	1.25	High	Low	Low	Low	High Risk
EF/Johnson Creek	1000	208	1.15	High	Low	Low	Low	High Risk
Middle Fork Salmon River MPG								
Chamberlin Creek	750	641	2.26	Moderate	Low	Low	Low	Maintained
Big Creek	1000	164	1.10	High	Very Low	Moderate	Moderate	High Risk
Lower MF Salmon	500	Insufficient Data	Insufficient Data	High	Moderate	Moderate	Moderate	High Risk
Camas Creek	500	38	0.80	High	Low	Moderate	Moderate	High Risk
Loon Creek	500	54	0.98	High	Low	Moderate	High	High Risk
Upper MF Salmon	750	71	.50	High	Low	Moderate	Moderate	High Risk
Sulphur Creek	500	67	0.92	High	Low	Moderate	Moderate	High Risk
Bear Valley Creek	750	474	1.37	High	Very Low	Low	Low	High Risk
Marsh Creek	500	253	1.21	High	Low	Low	Low	High Risk
Upper Salmon River MPG								
N. Fork Salmon River	500	Insufficient Data	Insufficient Data	High	Low	Low	Low	High Risk
Lemhi River	2000	143	1.30	High	High	High	High	High Risk
Pahsimeroi River	1000	267	1.37	High	Moderate	High	High	High Risk
Upper Salmon-lower mainstem	2000	108	1.18	High	Low	Low	Low	High Risk
East Fork Salmon River	1000	347	1.08	High	Low	High	High	High Risk
Yankee Fork	500	44	0.72	High	Moderate	High	High	High Risk
Valley Creek	500	121	1.45	High	Low	Moderate	Moderate	High Risk

	Abundance and Productivity Metrics				Spatial Structure and Diversity Metrics			
Population	Abundance Threshold	Natural Spawning Abundance	Productivity	Integrated Abundance/ Productivity Risk	Natural Process Risk	Diversity Risk	Integrated Spatial Structure/ Diversity Risk	Overall Viability Rating
Upper Salmon main	1000	411	1.22	High	Low	Low	Low	High Risk

Status Summary

Several factors—both population- and habitat-related—have caused this ESU to decline to the point that it is likely to become endangered in the foreseeable future. While there has been some improvement in a number of areas, particularly the 10-year average abundance, it is not enough to prevent them from being threatened. Ford (2011) rated every population in the ESU (all 28 of them) as being at "high risk" when the four VSP parameters were combined into an overall score for each. In general, those ratings were driven by high-risk ratings for the abundance and productivity parameters.

Snake River Fall-run Chinook Salmon ESU

Given the combination of current abundance and productivity and spatial structure and diversity ratings, the overall viability rating for the Snake River fall-run Chinook salmon would be rated as "viable." The overall risk rating is based on a low risk rating for abundance/productivity and a moderate risk rating for spatial structure/diversity. For abundance/productivity, the rating reflects remaining uncertainty that current increases in abundance can be sustained over the long run. While natural-origin spawning levels are above the minimum abundance threshold of 4,200 (Table 6), and estimated productivity is also high, the estimates are not high enough to account for the uncertainty buffer needed to achieve a rating of very low risk (NWFSC 2015).

Abundance and Productivity. The recent increases in natural origin abundance are encouraging. However, hatchery origin spawner proportions have increased dramatically in recent years on average; 78 percent of the estimated adult spawners have been hatchery origin over the most recent brood cycle. The apparent leveling of natural returns in spite of the increases in total brood year spawners may indicate that density dependent habitat effects are influencing production or that high hatchery proportions may be influencing natural production rates. The abundance and productivity risk rating for the population is "low" (see Table 6). The population is at moderate risk for diversity and spatial structure.

Spatial Structure and Diversity. The ESU includes all naturally spawned populations of fall-run Chinook salmon in the mainstem Snake River below Hells Canyon Dam, and in the Tucannon River, Grande Ronde River, Imnaha River, Salmon River, and Clearwater River, as well as four artificial propagation programs. The ICTRT identified three populations of this species, although only the lower mainstem population exists at present because of the Hells Canyon Dam complex, which completely blocks passage.

Table 6. Summary of the Snake River fall-run Chinook salmon population status and ICTRT viability criteria. (NWFSC 2015)

	Abundance and Productivity Metrics				Spatial Structure and Diversity Metrics			
Population	Abundance Threshold	Natural Spawning Abundance 2005-2014	Productivity 1990-2009	Integrated Abundance/ Productivity Risk	Natural Process Risk	Diversity Risk	Integrated Spatial Structure/ Diversity Risk	Overall Viability Rating
Snake River	4,200	6,418	1.5	Low	Low	Moderate	Moderate	Moderate

Status Summary

Several factors—both population- and habitat-related—have caused this ESU to decline to the point that it is likely to become endangered in the foreseeable future. While there has been some improvement in terms of both abundance and productivity in recent years, it is not enough to prevent them from being threatened and they are currently considered to be at moderate risk with regard to the VSP parameters (Ford 2011, NWFSC 2015).

Upper Columbia River Steelhead DPS

Overall, the viability of the UCR steelhead DPS has likely improved somewhat since the last status review, but the DPS is still in a condition that, but for continued hatchery supplementation, places it at "high" risk of extinction (NWFSC 2015) in the next 100 years.

Abundance and Productivity. UCR steelhead populations have increased in natural origin abundance in recent years, but productivity levels remain low (see Table 7). The proportions of hatchery origin returns in natural spawning areas remain extremely high across the DPS, especially in the Methow and Okanogan river populations. The modest improvements in natural returns in recent years are primarily the result of several years of relatively good natural survival in the ocean and tributary habitats.

Spatial Structure and Diversity. This DPS includes all naturally-spawned anadromous steelhead populations below natural and manmade impassable barriers, in streams in the Columbia River Basin upstream from the Yakima River, Washington, to the U.S.–Canada border. It includes six artificial propagation programs. The Crab Creek anadromous component is functionally extirpated (ICTRT 2007).

With the exception of the Okanogan population, the UCR populations are rated as "low" and "moderate" risk for spatial structure. The "high" risk ratings for spatial structure and diversity are largely driven by chronic high levels of hatchery spawners within natural spawning areas and lack of genetic diversity among the populations.

Table 7. Summary of the UCR steelhead population status and ICTRT viability criteria. (NWFSC 2015)

	Abundance and Productivity Metrics				Spatial Structure and Diversity Metrics			
Population	Abundance Threshold	Natural Spawning Abundance 2005-2014	Productivity 2005-2014	Integrated Abundance/ Productivity Risk	Natural Process Risk	Diversity Risk	Integrated Spatial Structure/ Diversity Risk	Overall Viability Rating
Wenatchee	1000	1025	1.207	Low	Low	High	High	Maintained
Methow	1000	651	0.371	High	Low	High	High	High Risk
Entiat	500	146	0.434	High	Moderate	High	High	High Risk
Okanogan	750	189	0.154	High	High	High	High	High Risk

Status Summary

Several factors—both population- and habitat-related—have caused this DPS to decline to the point that it is likely to become endangered in the foreseeable future. While there has been some improvement in a number of areas, particularly in the realm of recent returns, it is not enough to prevent them from being threatened. Overall, Ford et al. (2011) found this species to be at high risk for all four VSP parameters in all four of its populations.

Mid-Columbia River Steelhead DPS

There have been improvements in the viability ratings for some of the component populations, but the MCR steelhead DPS is not currently meeting the viability criteria (see Table 8) in the MCR steelhead recovery plan (NMFS 2009). In addition, several of the factors cited by Good *et al.* (2005) remain as concerns or key uncertainties.

Abundance and Productivity. Natural origin spawning estimates of populations have been highly variable with respect to meeting minimum abundance thresholds. Straying frequencies into at least the Lower John Day River population are high. Returns to the Yakima River Basin and to the Umatilla and Walla Walla Rivers have been higher over the most recent brood cycle, while natural origin returns to the John Day River have decreased. Out-of-basin hatchery stray proportions, although reduced, remain very high in the Deschutes River Basin. The estimates of total Distinct Population Segment (DPS) abundance indicates that the DPS is not at immediate risk of extinction, however, a number of populations still have an overall viability rating of high risk.

Spatial Structure and Diversity. This DPS includes all naturally-spawned populations of steelhead (and their progeny) in streams from above the Wind River, Washington, and the Hood River, Oregon (exclusive), upstream to, and including, the Yakima River, Washington, excluding steelhead from the Snake River Basin. Seven artificial propagation programs are considered part of the DPS. The ICTRT identified 20 populations within four MPGs in Washington and Oregon.

Table 8. Summary of the MCR steelhead population status and ICTRT viability criteria. (NWFSC 2015)

	Abundance and Productivity Metrics				Spatial Structure and Diversity Metrics			
Population	Abundance Threshold	Natural Spawning Abundance 2000-2009	Productivity 2000-2009	Integrated Abundance/ Productivity Risk	Natural Process Risk	Diversity Risk	Integrated Spatial Structure/ Diversity Risk	Overall Viability Rating
East Side Cascades MPG								
Fifteenmile Creek	500	356	1.84	Moderate	Very Low	Low	Low	Maintained
Klickitat	1000	Insufficient Data	Insufficient Data	Moderate?	Low	Moderate	Moderate	Maintained ?
Eastside Deschutes	1000	1,749	2.52	Low	Low	Moderate	Moderate	Viable
Westside Deschutes	1500 (1000)	634	1.16	High	Low	Moderate	Moderate	High Risk
Rock Creek	500	Insufficient Data	Insufficient Data	Moderate?	Moderate	Moderate	Moderate	High Risk?
John Day River MPG								
Upper Mainstem	1000	641	1.32	Moderate	Very Low	Moderate	Moderate	Maintained
North Fork	1000	1896	2.48	Very Low	Very Low	Low	Low	Highly Viable
Middle Fork	1000	1,736	3.66	Low	Low	Moderate	Moderate	Viable
South Fork	500	697	2.01	Low	Very Low	Moderate	Moderate	Viable
Lower Mainstem	2250	1,270	2.67	Moderate	Very Low	Moderate	Moderate	Maintained
Yakima MPG								
Satus Creek	1000 (500)	1127	1.93	Low	Low	Moderate	Moderate	Viable
Toppenish Creek	500	2.52	1.59	Low	Low	Moderate	Moderate	Viable
Naches River	1500	1,244	1.83	Moderate	Low	Moderate	Moderate	Maintained
Upper Yakima	1500	246	1.87	Moderate	Moderate	High	High	High Risk
Walla Walla MPG								
Umatilla River	1500	2379	1.20	Moderate	Moderate	Moderate	Moderate	Maintained
Touchet River	1000	382	1.25	High	Low	Moderate	Moderate	High
Walla Walla River	1000	877	1.65	High	Moderate	Moderate	Moderate	Maintained

Status Summary

Several factors—both population- and habitat-related—have caused this species to decline to the point that it is likely to become endangered in the foreseeable future. While there has been some improvement in a number of areas, particularly with regard to the MCR steelhead's productivity and strong natural component, it is not enough to prevent them from being threatened. Nonetheless, there is some cause for optimism in that the biological requirement risk factors for the species are currently moderate to low in almost every population (Ford 2011, NWFSC 2015).

Snake River Basin Steelhead DPS

The DPS, as a whole, is not currently considered viable.

Abundance and Productivity. The level of natural production in the two populations with full data series and the Asotin Creek index reaches is encouraging, but the status of most populations in this DPS remains highly uncertain (see Table 9). Population-level natural origin abundance and productivity inferred from aggregate data and juvenile indices indicate that many populations are likely below the minimum combinations defined by the ICTRT viability criteria. The relative proportion of hatchery fish in natural spawning areas near major hatchery release sites is highly uncertain. Due to the high-risk population ratings, uncertainty about the viability status of many populations, and overall lack of population data, none of the MPGs are considered viable.

Spatial Structure and Diversity. The DPS includes all naturally-spawned anadromous steelhead populations below natural and manmade impassable barriers in streams in the Snake River Basin of southeast Washington, northeast Oregon, and Idaho, as well six artificial propagation programs. The ICTRT identified 24 extant populations in five MPGs (NWFSC 2015).

Table 9. Summary of the Snake River Basin steelhead population status and ICTRT viability criteria (NWFSC 2015).

	Abundance and Productivity Metrics				Spatial Structure and Diversity Metrics			
Population	Abundance Threshold	Natural Spawning Abundance 2005-2014	Productivity 1999-2008	Integrated Abundance/ Productivity Risk	Natural Process Risk	Diversity Risk	Integrated Spatial Structure/ Diversity Risk	Overall Viability Rating
Lower Snake River MPG								
Tucannon River	1000	Insufficient Data	Insufficient Data	High	Low	Moderate	Moderate	High Risk?
Asotin River	500		Insufficient Data	Moderate	Low	Moderate	Moderate	Maintained?
Grande Ronde River MPG								
Lower Grande Ronde	1000	Insufficient Data	Insufficient Data	Very Low	Low	Moderate	Moderate	Maintained?
Joseph Creek	500	1,839	1.86	Very Low	Very Low	Low	Low	Highly Viable
Upper Grande Ronde	1500	1,649	3.15	Viable	Very Low	Moderate	moderate	Viable
Wallowa River	1000	Insufficient Data	Insufficient Data	High	Very Low	Low	Low	Moderate

continued,

	Abundance and Productivity Metrics				Spatial Structure and Diversity Metrics			
Population	Abundance Threshold	Natural Spawning Abundance 2005-2014	Productivity 1999-2008	Integrated Abundance/ Productivity Risk	Natural Process Risk	Diversity Risk	Integrated Spatial Structure/ Diversity Risk	Overall Viability Rating
Imnaha River MPG								
Imnaha	1000	Insufficient Data	Insufficient Data	Moderate	Very Low	Moderate	Moderate	Moderate?
Clearwater River MPG								
Lower Mainstem Clearwater	1500	2,099	2.36	Moderate	Very Low	Low	Low	Maintained?
South Fork Clearwater	1000	Insufficient Data	Insufficient Data	High	Low	Moderate	Moderate	High Risk?
Lolo Creek	500	Insufficient Data	Insufficient Data	High	Low	Moderate	Moderate	High Risk?
Selway River	1000	1,650	2.33	Moderate	Very Low	Low	Low	Maintained
Lochsa River	1000			Moderate	Very Low	Low	Low	Maintained

	Abundance and Productivity Metrics				Spatial Structure and Diversity Metrics			
Population	Abundance Threshold	Natural Spawning Abundance 2005-2014	Productivity 1999-2008	Integrated Abundance/ Productivity Risk	Natural Process Risk	Diversity Risk	Integrated Spatial Structure/ Diversity Risk	Overall Viability Rating
almon River								
Little Salmon River	500	Insufficient Data	Insufficient Data	Moderate	Low	Moderate	Moderate	Maintained?
South Fork Salmon River	1000	1,028	1.80	Moderate	Very Low	Low	Low	Maintained?
Secesh River	500			Moderate	Low	Low	Low	Maintained?
Chamberlain Creek	500	Insufficient Data	Insufficient Data	Moderate	Low	Low	Low	Maintained?
Lower Middle Fork Salmon River	1000	Insufficient Data	Insufficient Data	Moderate	Very Low	Low	Low	Maintained?
Upper Middle Fork Salmon River	1000	Insufficient Data	Insufficient Data	Moderate	Very Low	Low	Low	Maintained?
Panther Creek	500	Insufficient Data	Insufficient Data	Moderate	High	Moderate	High	High Risk?
North Fork Salmon River	500	Insufficient Data	Insufficient Data	Moderate	Low	Moderate	Moderate	Maintained?
Lemhi River	1000	Insufficient Data	Insufficient Data	Moderate	Low	Moderate	Moderate	Maintained?
Pahsimeroi River	1000	Insufficient Data	Insufficient Data	Moderate	Moderate	Moderate	Moderate	Maintained?
East Fork Salmon River	1000	Insufficient Data	Insufficient Data	Moderate	Very Low	Moderate	Moderate	Maintained?
Upper Mainstem Salmon River	1000	Insufficient Data	Insufficient Data	Moderate	Very Low	Moderate	Moderate	Maintained?

*Question mark (?) = uncertain due to lack of data, only a few years of data, or large gaps in the data series.

Status Summary

Several factors—both population- and habitat-related—have caused this DPS to decline to the point that it is likely to become endangered in the foreseeable future. While there have been some improvements in the species' status in recent years (particularly since the lows of the early 1990s), it is not enough to prevent them from continuing to be threatened. In general, almost all of the populations in this DPS are considered to be at low to moderate risk for factors relating to spatial structure and diversity, and moderate to high risk for factors relating to abundance and productivity. Only one population out of 24 (Joseph Creek) is known to have exceeded the ICTRT's viability criterion for returning spawners.

2.2.2 Range-wide Status of Critical Habitat

In this section, we examine the range-wide status of designated critical habitat for the affected salmonid species. Each of the species considered in this opinion has habitat designated as critical. Except for reaches in the uppermost areas of their geographical range, most areas of critical habitat for these species are co-extensive. Each species has a number of watersheds identified as comprising its designated critical habitat. The status of critical habitat is based primarily on a watershed-level analysis of conservation value that focused on the presence of ESA-listed species and physical features that are essential to their conservation. NMFS organized information at the 5th field hydrologic unit code (HUC) watershed scale because it corresponds to the spatial distribution and site fidelity scales of salmon and steelhead populations (McElhany et al. 2000).

The analysis for the 2005 designations of salmon and steelhead species was completed by Critical Habitat Analytical Review Teams (CHARTs) that focused on large geographical areas corresponding approximately to recovery domains (NMFS 2005).The designation of critical habitat for ESA-listed salmon and steelhead uses the term PCE or essential features. The new critical habitat regulations (81 FR 7214) replace this term with physical or biological features (PBFs). The shift in terminology does not change the approach used in conducting a ‘‘destruction or adverse modification’’ analysis, which is the same regardless of whether the original designation identified primary constituent elements, physical or biological features, 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.

Each watershed was ranked using a conservation value attributed to the quantity of stream habitat with PCEs, physical or PBFs, the present condition of those PBFs, the likelihood of achieving PBF's potential (either naturally or through active restoration), support for rare or important genetic or life history characteristics, support for abundant populations, and support for spawning and rearing populations. In some cases, our understanding of these interim conservation values has been further refined by the work of Technical Recover Teams (TRTs) and other recovery planning efforts that have better explained the habitat attributes, ecological interactions, and population characteristics important to each species.

NMFS reviews the status of designated critical habitat affected by the Proposed Action by examining the condition and trends of PBFs throughout the designated area. These PBFs vary slightly for some species, due to biological and administrative reasons, but all consist of site types and site attributes associated with life history events (Tables 10 and 11).

Table 10. Physical or biological features of critical habitat designated for ESA-listed salmon and steelhead species considered in the opinion (except Snake River spring/summer run Chinook salmon and Snake River fall-run Chinook salmon), and corresponding species life history events.

Primary Constituent Elements (Physical or Biological Features)		**Species Life history Event**
Site Type	**Site Attribute**	
Freshwater spawning	Substrate Water quality Water quantity	Adult spawning Embryo incubation Alevin growth and development
Freshwater rearing	Floodplain connectivity Forage Natural cover Water quality Water quantity	Fry emergence from gravel Fry/parr/smolt growth and development
Freshwater migration	Free of artificial obstruction Natural cover Water quality Water quantity	Adult sexual maturation Adult upstream migration and holding Kelt (steelhead) seaward migration Fry/parr/smolt growth, development, and seaward Migration
Estuarine areas	Forage Free of artificial obstruction Natural cover Salinity Water quality Water quantity	Adult sexual maturation and "reverse smoltification" Adult upstream migration and holding Kelt (steelhead) seaward migration Fry/parr/smolt growth, development, and seaward Migration
Nearshore marine areas	Forage Free of artificial obstruction Natural cover Water quantity Water quality	Adult growth and sexual maturation Adult spawning migration Nearshore juvenile rearing
Offshore marine areas	Forage Water quality	Adult growth and sexual maturation Adult spawning migration Subadult rearing

Table 11. Physical or biological features of critical habitat designated for Snake River spring/summer run Chinook salmon, Snake River fall-run Chinook salmon, and corresponding species life history events.

Primary Constituent Elements		**Event Species Life History**
Site	**Site Attribute**	
Spawning and juvenile rearing areas	Cover/shelter Food (juvenile rearing) Riparian vegetation Space (Chinook, coho) Spawning gravel Water quality Water quantity	Adult spawning Embryo incubation Alevin growth and development Fry emergence from gravel Fry/parr/smolt growth and development

Primary Constituent Elements		Event Species Life History
Site	**Site Attribute**	
Adult and juvenile migration corridors	Cover/shelter Food (juvenile) Riparian vegetation Safe passage Space Substrate Water quality Water quantity Water temperature Water velocity	Adult sexual maturation Adult upstream migration and holding Kelt (steelhead) seaward migration Fry/parr/smolt growth, development, and seaward migration
Areas for growth and development to adulthood	Ocean areas – not identified Nearshore juvenile rearing	Subadult rearing Adult growth and sexual maturation Adult spawning migration

Habitat quality in tributary streams in the ICRD range from excellent in wilderness and roadless areas to poor in areas subject to heavy agricultural and urban development (Wissmar, Smith et al. 1994, NMFS 2009). Critical habitat throughout much of the ICRD has been degraded by intense agriculture, alteration of stream morphology (*i.e.,* channel modifications and diking), riparian vegetation disturbance, wetland draining and conversion, livestock grazing, dredging, road construction and maintenance, logging, mining, and urbanization. Reduced summer stream flows, impaired water quality, and reduction of habitat complexity are common problems for critical habitat in developed areas.

Migratory habitat quality in this area has been severely affected by the development and operation of the Federal Columbia River Power System (FCRPS) dams and reservoirs in the mainstem Columbia River, Bureau of Reclamation tributary projects, and privately-owned dams in the Snake and Upper Columbia River basins. For example, construction of Hells Canyon Dam eliminated access to several likely production areas in Oregon and Idaho, including the Burnt, Powder, Weiser, Payette, Malheur, Owyhee, and Boise river basins (Good et al. 2005), and Grand Coulee and Chief Joseph dams completely block anadromous fish passage on the upper mainstem Columbia River. Hydroelectric development modified natural flow regimes, resulting in higher water temperatures, changes in fish community structure leading to increased rates of piscivorous and avian predation on juvenile salmon and steelhead, and delayed migration for both adults and juveniles. Physical features of dams such as turbines can also kill migrating fish. In-river survival is inversely related to the number of hydropower projects encountered by emigrating juveniles.

Similarly, development and operation of extensive irrigation systems and dams for water withdrawal and storage in tributaries have drastically altered hydrological cycles. A series of large regulating dams on the middle and upper Deschutes River affect flow and block access to upstream habitat, and have extirpated one or more populations from the Cascades Eastern Slope major population (ICTRT 2003). Similarly, operation and maintenance of large water reclamation systems such as the Umatilla Basin and Yakima Projects have significantly reduced flows, degraded water quality, and physical habitat in this domain.

Many stream reaches designated as critical habitat in the ICRD are over-allocated under state water law, with more allocated water rights than existing streamflow conditions can support. Withdrawal of water, particularly during low-flow periods that commonly overlap with agricultural withdrawals, often increases summer stream temperatures, blocks fish migration, strands fish, and alters sediment transport (Spence *et al.* 1996). Reduced tributary stream flow has been identified as a major limiting factor for all listed salmon and steelhead species in this area except Snake River fall-run Chinook salmon (NMFS 2007, NMFS 2011).

Despite these degraded habitat conditions, the HUCs that have been identified as critical habitat for these species are largely ranked as having high conservation value. Conservation value reflects several factors, including: 1) how important the area is for various life history stages, 2) how necessary the area is to access other vital areas of habitat, and 3) the relative importance of the populations the area supports relative to the overall viability of the ESU or DPS. The Lower Snake River corridor and Columbia River corridor, within which the action area, are ranked as high conservation value. The CHART noted that this corridor connects every watershed and population for all listed ESUs/DPSs with the ocean, and is used by rearing and migrating juveniles, and migrating adults of every component population.

2.2.3 Climate Change

Climate change has negative implications for designated critical habitats in the Pacific Northwest (Climate Impacts Group 2004; Scheuerell and Williams 2005; Zabel *et al.* 2006; ISAB 2007). Average annual Northwest air temperatures have increased by approximately 1ºC since 1900, or about 50 percent more than the global average over the same period (ISAB 2007). The latest climate models project a warming of 0.1 ºC to 0.6 ºC per decade over the next century. According to the ISAB, these effects pose the following impacts over the next 40 years:

- Warmer air temperatures will result in diminished snowpacks and a shift to more winter/spring-run rain and runoff, rather than snow that is stored until the spring-run/summer melt season.
- With a smaller snowpack, these watersheds will see their runoff diminished earlier in the season, resulting in lower stream-flows in the June through September period. River flows in general and peak river flows are likely to increase during the winter due to more precipitation falling as rain rather than snow.
- Water temperatures are expected to rise, especially during the summer months when lower stream-flows co-occur with warmer air temperatures.

These changes will not be spatially homogeneous across the entire Pacific Northwest. Low-lying areas are likely to be more affected. Climate change may have long-term effects that include, but are not limited to, depletion of important cold water habitat, variation in quality and quantity of tributary rearing habitat, alterations to migration patterns, accelerated embryo development, premature emergence of fry, and increased competition among species (ISAB 2007).

The earth's oceans are also warming, with considerable interannual and inter-decadal variability superimposed on the longer-term trend (Bindoff 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 (Scheuerell and Williams 2005, Zabel *et al.* 2006, U.S. Global Change Research Program (USGCRP) 2009). Warming oceans, rising seas and ocean acidification are affecting marine ecosystems, fisheries populations and coastal communities, and local economies. (NOAA Fisheries 2016). Thus, ocean conditions adverse to salmon and steelhead may be more likely under a warming climate (Zabel *et al.* 2006).

Climate change may alter ecosystems and hydrographs as already described; these impacts may create difficulties for achieving recovery targets for threatened and endangered salmon and steelhead. To mitigate for the effects of climate change on listed salmonids, the ISAB (2007) recommends planning now for future climate conditions by implementing protective tributary, mainstem, and estuarine habitat measures, as well as protective hydropower mitigation measures. In particular, the ISAB (2007) suggests increased summer flow augmentation from cool/cold storage reservoirs to reduce water temperatures or to create cool water refugia in mainstem reservoirs and the estuary; and the protection and restoration of riparian buffers, wetlands, and floodplains.

2.3 Action Area

"Action area" means all areas affected directly or indirectly by the federal action and not merely the immediate area involved in the action (50 CFR 402.02).

The area is primarily used as a migration corridor for all six species of salmon and steelhead considered in this opinion. Juvenile salmonids may remain in slow water areas of the mainstem Columbia River for an extended period for rearing as they move downstream, and upstream migrating adults will rest and hold for short periods, generally in deep pools.

For the purposes of this analysis, the action area includes the in-water project site, as well as riparian, uplands, downstream, upstream, and other areas that are likely to be affected by the proposed action, both directly and indirectly.

The proposed action area is defined as the location of the in-water, shoreline, riparian, and upland areas surrounding the St. Hilaire Brothers pump station, the new EID pump station and associated pipelines (the 0.6-acre easement); and the habitat restoration area (0.069 acres) located downstream 33 miles. The in-water effects of the action beyond the project footprint are based on the potential for downstream turbidity and sedimentation associated with the excavation, disposal, and pile installation at the pump station and at the downstream restoration area. Effects from vibratory pile driving are anticipated to occur up to 72 ft from installed piles. This is within the potential extent of effects due to sedimentation and turbidity. There is potential for suspended sediments to extent up to 300 ft around and 500 ft downstream of both the in-water work areas (pump station site and restoration site); however, it is anticipated water quality effects from turbidity will dilute and disperse to background levels into the Columbia River.

2.4 Environmental Baseline

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

In order to understand what is affecting a species, it is first necessary to understand the biological requirements of the species. Each stage in a species' life history has its own biological requirements (Groot and Margolis 1991; Spence *et al.* 1996). Generally speaking, anadromous fish require clean water with cool temperatures and access to thermal refugia, dissolved oxygen near 100 percent saturation, low turbidity, adequate flows and depths to allow passage over barriers to reach spawning sites, and sufficient holding and resting sites. Anadromous fish select spawning areas based on species-specific requirements of flow, water quality, substrate size, and groundwater upwelling. Embryo survival and fry emergence depend on substrate conditions (*e.g.*, gravel size, porosity, permeability, and oxygen concentrations), substrate stability during high flows, and, for most species, water temperatures of 13ºC or less. Habitat requirements for juvenile rearing include seasonally suitable microhabitats for holding, feeding, and resting. Migration of juveniles to rearing areas, whether the ocean, lakes, or other stream reaches, requires free access to these habitats.

The environmental baseline material in this opinion is generally similar to the discussion in the Status of Critical Habitat section above because the action area includes a large section of the Columbia River. Current conditions within much of the mainstem Columbia River are degraded relative to historic conditions; a reflection of a multitude of actions whose effects frame the environmental baseline in the action area. Dams and their associated reservoirs, such as the reservoir that is the action area in this consultation, influence rearing and migrating salmon and steelhead. A substantial fraction of the mortality experienced by juvenile outmigrants through the portion of the migratory corridor affected by the FCRPS occurs in the reservoirs. This includes about half of the mortality of in-river migrating juvenile spring-run Chinook salmon and steelhead (NMFS 2008). The altered habitats in the reservoir reduce smolt migration rates and create more favorable habitat conditions for fish predators, including native northern pikeminnow, nonnative walleye, and smallmouth bass.

In the Columbia River, dams have changed food web interaction both directly and indirectly. Impoundments have directly increased predation risk for anadromous salmon smolts by delaying downstream migration, thereby prolonging their exposure to piscivorous birds and fishes. Impoundments have also changed trophic interaction indirectly by creating extensive new habitat that favors some native piscivorous fishes like northern pikeminnow, and providing new opportunities for non-native piscivores like walleye and smallmouth bass (ISAB 2011). In addition, new and poorly understood food webs have developed in run-of-the-river reservoirs, and they may not support the energetic needs of spring-migrating salmon or other native organisms. Moreover, future changes in run-of-the-river food webs can be expected as new non-native species become more fully established, and these additions also may have unanticipated effects on the nutritional condition and fitness of migrating juvenile salmon (ISAB 2011).

In addition, numerous anthropogenic features or activities in the action area (*e.g.,* dams, marinas, docks, roads, railroads, bank stabilization, and landscaping) have become permanent fixtures on the landscape, and have displaced and altered native riparian habitat. Consequently, the potential for normal riparian processes (*e.g.,* litter fall, channel complexity, and large wood recruitment) to occur is diminished and aquatic habitat has become simplified. Shoreline development has reduced the quality of nearshore salmon and steelhead habitat by eliminating native riparian vegetation, displacing shallow water habitat with fill materials, and by further disconnecting the Columbia River from historic floodplain areas. Furthermore, riparian species that evolved under the environmental gradients of riverine ecosystems are not well suited to the present hydraulic setting of the action area (*i.e.,* static, slackwater pools), and are thus often replaced by invasive, non-native species. The riparian system is fragmented, poorly connected, and provides inadequate protection of habitats and refugia for sensitive aquatic species.

Specifically at the project site, there are several separate pump station facilities adjacent to the existing irrigation pump station expansion along the Columbia River shoreline. The shoreline, shallow water habitat, and natural vegetation is altered with in-water structures, rock, and riprap. The hydrological dam has created reservoir conditions in the action area, with daily fluctuations in water level. Several irrigation pump stations withdraw water for agricultural purposes and are adjacent to the proposed Project site. Water will continue to be withdrawn using the existing facilities whether or not the pump station and new intake pump station is expanded. The existing water withdrawals are part of the current environmental baseline for the site. The transfer and consolidation of existing water rights, change in point of diversion and new water withdrawals associated with the Project will require instream flow augmentation under the jurisdiction of the OWRD and will result in an overall "zero net increase" in water withdrawals from the Columbia River.

These shoreline developments and alterations have reduced rearing habitat suitability (*e.g.,* less habitat complexity, reduced forage base), reduced spring water velocities (which hampers downstream migration by smolts), and created better habitat for juvenile salmonid predators (*e.g.,* birds, and native and non-native fish). These factors further limit habitat function by reducing cover, attracting predators and reducing foraging efficiency for juvenile salmonids. We are unaware of any fish surveys in the action area specifically, but it likely serves as rearing habitat and as a migration corridor for juvenile UCR spring-run Chinook salmon and potentially juvenile UCR steelhead. However, project activities will occur during the winter recommended in-water work period, when adults do not typically occupy the area. An occasional adult steelhead could be present year round in the mainstem Columbia River. However, it is highly unlikely adult steelhead will migrate along the shoreline habitat where the proposed facility expansion will be located.

2.5 Effects of the Action on the Species and their Designated Critical Habitat

Under the ESA, "effects of the action" means the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, which will be added to the environmental baseline (50 CFR402.02). Indirect effects are those that are caused by the proposed action and are later in

time, but still are reasonably certain to occur. The future use of the proposed structures are indirect effects of the proposed action.

The effects analysis considers the response of fish in the action area from project construction activities and changes in water quality, increased noise from pile driving, loss of shallow water habitat, and changes in habitat conditions. The analysis identifies the lifestages that will encounter these effects, because lifestage is a determinant in the range of response to various effect exposures. The effects anticipated include actions that will lead to modified behavior, increased predation, and habitat-modifying effects that are all likely to cause injury or death of individual fish directly and indirectly. Beneficial effects include improved shoreline habitat and an increase in benthic habitat from the removal of concrete debris along the shoreline at the habitat restoration site.

2.5.1 Species in the Action Area

Fish presence in the action area consists of different-sized groups and age classes of salmon and steelhead that rear and migrate throughout the McNary Reservoir (Lake Wallula). In general, juvenile salmon of different sizes often have different behavior, disposition to migrate, and distribution in reservoirs (Peven 1987), which will influence the degree to which effects of the project are experienced by individual fish. It is also known that some juvenile steelhead and Chinook salmon overwinter in Lake Wallula. A few adult steelhead could be present year-round in the mainstem Columbia River. However, we do not anticipate adult steelhead migrating along the nearshore habitat of the action area during the in-water work window.

The majority of adult Chinook salmon migrate through the action area between April and October. Those passing John Day Dam from April 1 to June 5 are considered spring-run. Those passing June 6 to August 5 are considered summer-run, and those passing after August 6 are considered fall-run (Columbia Basin Research 2013). Adult steelhead migrate through the action area throughout the year in small numbers, but the majority of adults move through between June and October. In a study by Johnson *et al.* (2008), the vast majority of adult steelhead and Chinook salmon migrated at a depth between 6 and 15 feet in mainstem reservoirs, and frequently altered their depth in the water column. In another study, Hughes (2004) noted that smaller fish swim closer to stream bank than larger fish, and very few adult fish swim in the thalweg of the channel during upstream migration. Since project activities will occur from December 1 to February 28, a period not typically occupied by adults at any time, NMFS does not expect adult salmon or steelhead to be affected by the proposed action.

Ocean-type salmon migrate downstream through the action area as subyearling juvenile fish, generally leaving natal areas within days to weeks following their emergence from the gravel. Subyearling Chinook salmon express two peak movements downriver, between April and June, and then from mid-June through August. Although there is considerable variability in the freshwater migration timing of salmon and steelhead, the progeny of upper river tributaries, such as Snake River fall-run Chinook salmon, typically enter the Columbia River later, rearing for weeks to months after arrival. Some remain in freshwater for extended periods until reaching a larger size (more than 75 millimeters) (Levy and Northcote 1982, Levings, Mcallister *et al*. 1986, MacDonald, Levings *et al.* 1988). While peak movement of juvenile salmonid outmigration does

not overlap with project construction, all individuals will be exposed to the long-term effects of the existence of the new in- and overwater structures from this proposed action and the associated indirect effects.

Subyearling Chinook salmon generally remain close to the water surface, favoring water column habitat less than 6 feet deep and where currents do not exceed 0.1 fps. They seek lower energy areas where waves and currents do not require them to expend considerable energy to remain in position while they consume invertebrates that live on or near the substrate. These areas typically have fine-grain substrates supporting benthic prey production.

Older juvenile salmon and steelhead (+1 age class) use a variety of habitats including nearshore, off-channel, mid-channel, and deep-water habitats. Dauble *et al.* (1989) observed that spring-run Chinook salmon smolts were often abundant just after sunset in shallow nearshore areas (<30 cm deep) of low current velocity. While Beeman and Maule (2006) observed a difference in daytime swim depth between yearling steelhead and yearling Chinook salmon, with steelhead migrating at a mean depth of 6 feet and Chinook salmon migrating at a mean depth of 10 feet. A study by Timko *et al*. (2011) recorded juvenile steelhead migrating in the top five to 15 feet of the water column in the Priest Rapids Project (which is located upstream of the project area).

In addition, investigations in the Snake River Basin indicate that about half of the subyearling Chinook salmon observed in the Snake River are actually spring-run Chinook salmon (Marshall, Blankenship *et al.* 2000). Connor *et al.* (2001) found that some spring-run Chinook salmon migrated up to 500 miles downstream of their natal rearing areas, vastly expanding the amount of habitat available to these fish. They also found that many of these subyearling-type spring-run Chinook salmon dispersed into shoreline areas of the mainstem, presumably for foraging and rearing, a behavior far more typical of fall-run Chinook salmon. Bradford and Taylor (1997) reported similar results with subyearlings dispersing downstream from natal tributaries to mainstem habitats. This mostly occurred during the night with fish moving to the stream margins and nearshore areas during the day.

During construction of this project, UCR spring-run Chinook salmon and UCR steelhead will be least vulnerable to adverse effects of the proposed actions, as their migration timing and use of Columbia River habitat does not overlap with construction timing. Although, MCR steelhead, Snake River Basin steelhead, and ocean-type juvenile Chinook salmon from upriver populations (Snake River spring/summer-run Chinook salmon and Snake River fall-run Chinook salmon) are predicted to be most vulnerable to construction activities, they are not expected to be rearing in the shallow-water nearshore area in the winter, when construction activities occur.

Based on the above described life history behaviors of the listed species, NMFS anticipates the proposed action will affect all species and life stages by, new overwater structures, new permanent in-water structures and increases in piscivorous predators. The Project will affect juveniles from all six NMFS-listed species in the action area by causing physical and biological changes to the environmental baseline, including direct effects during in-water construction. Detailed description of effects at the scale of individual fish appears below.

2.5.2 Effects on Species

Project Construction and Water Quality

The proposed project includes in-water work below the OHWM due to the expansion of the existing pump station and construction of the new intake station. These types of activities can lead to construction-related effects to listed fish from heavy machinery working in-water, pile installation, and changes in water quality, including turbidity.

Initial project activities include in-water excavation, infrastructure installation and pile driving. These activities will occur between December 1 and February 28. Activities such as excavation result in the resuspension of sediment. The proposed action will increase turbidity for several minutes to hours. The effects of suspended sediment and turbidity on fish range from beneficial to detrimental. Elevated total suspended solids (TSS) have been reported to enhance cover conditions, reduce piscivorous fish/bird predation rates, and improve survival, but elevated TSS have also been reported to cause physiological stress, reduce feeding and growth, and adversely affect survival. Although fish that remain in turbid waters experience a reduction in predation from piscivorous fish and birds (Gregory and Levings 1998) chronic exposure can cause physiological stress responses that can increase maintenance energy and reduce feeding and growth ((Lloyd et. al 1987); (Redding et. al. 1987); (Servizi and Martens 1991)).

Based on previous projects in the area, suspended sediments will likely be elevated for a few days following project completion and are not expected to exceed 10 percent above background levels at 500 feet downstream from the construction area. The excavation and increased sediments will occur up to several hours each day. This small amount will only occur in a small area of the river for a short period each day for the duration of in-water construction.

Chemical Contamination. As with all construction activities involving the use of mechanized equipment, accidental release of fuel, oil, and other contaminants may occur. We expect that the use of machinery will result in a small amount (not more than a few ounces) of oil and hydraulic fluid being leaked during project activities. Any leak will likely be contained within the immediate area where it would have short-term adverse effects on water quality and macroinvertebrates. Operation of machinery in close proximity to a river increases the chance a large fuel spill or hydraulic line rupture will contaminate the water. The conservation measures and spill containment plan will minimize the risk of a spill and, if a spill does occur, will minimize its dispersal and exposure to fish.

The project will include ODEQ water quality conditions, daily inspection of equipment for work below OHWM, and multiple conservation measures. The project also will include a reduced in-water work period when the fewest fish are least likely to be present, to minimize the effects of construction to listed fish. There is ample habitat in the immediate vicinity of the action area for fish to move to, if needed. For these reasons, it is unlikely that effects on water quality from the proposed action will harm or harass ESA-listed anadromous species.

Upland Pipeline Construction. The upland pipeline will be trenched a half mile on the McNary Wildlife Refuge and continue onto private lands. The upland portion of the pipeline will not be in waters containing ESA-listed salmonids or DCH. NMFS does not anticipate the construction of the upland pipeline to have effects to listed salmonids.

Sound Pressure Levels and Noise. Pile driving will create hydroacoustic disturbance to any listed fish present in the action area. The proposed action will increase sound pressure levels and noise during construction via pile driving activity. The project entails the placement of 16 H-piles at the St. Hilaire pump station and 18 steel pilings, 64 H-Piles, and 54 sheet piles for the new EID intake and pump station. All piles will be installed using only a vibratory hammer. As described in the proposed action, the cumulative daily duration of peak underwater noise from pile-driving is anticipated to be up to 76 hours and work is expected to take 9.5 days. Operation will include a slow "soft start" to allow fish to move volitionally from the project area. Pile driving operations will only be completed during the day and will cease overnight.

Fishes with swimbladders (including salmonids) are sensitive to underwater impulsive sounds (*i.e.,* sounds with a sharp sound pressure peak occurring in a short interval of time). As the pressure wave passes through a fish, the swimbladder is rapidly compressed due to the high pressure, and then rapidly expanded as the under pressure component of the wave passes through the fish. Fish respond differently to sounds produced by impact hammers than to sounds produced by vibratory hammers. Vibratory hammers produce a more rounded sound pressure wave with a slower rise time in comparison to impact hammers. Because the more rounded sound pressure wave produced by vibratory hammers produces a slower increase in pressure, the potential for injury and mortality is reduced.

A multi-agency work group determined that to protect listed species, sound pressure waves should be below the threshold of 206 decibels (dB), and for cumulative strikes either 187 dB sound exposure level (SEL) where fish are larger than 2 grams or 183 dB SEL where fish are smaller than 2 grams. In addition, a "harassment" threshold below sound pressure levels of 150 dB) is applied for behavioral effects to individual listed fish (NMFS 2008). Any salmon or steelhead within a certain distance of the source (*i.e.* the radius where the root mean square (rms) sound pressure level (SPL) will exceed 150 dB re: 1 μPa2) will be exposed to levels that cause changed behavior. For this project, estimated sound pressure levels for a 12-inch steel pipe and H-type piles can be as much as 171 dB, 155 RMS and 150 SEL (California Department of Transportation 2009). Based on estimates using the NMFS hydroacoustic calculator, we anticipate that behavioral effects (150 dB rms) will occur out to 22 meters (72 ft).

The effects of this exposure are expected to occur in a semi-circle out to 72 ft, around each pile installation by a vibratory driver. Some rearing juvenile salmon and steelhead may experience the effects of these sound pressure levels. However, there are a multitude of possible behavioral responses that may occur—from no change, to a mild awareness, a startle response, small temporary movements, or larger movements—that displace the fish from their normal location. The result of exposure could be a temporary threshold shift in hearing due to a temporary fatiguing of the auditory system that can reduce the survival, growth, and reproduction of the affected fish by increasing the risk of predation and reducing foraging or spawning success

(Stadler and Woodbury 2009). It is difficult for NMFS to determine the type of response an individual juvenile fish will make or what type of effect that response has to a population. In general, it is reasonable to assume some fish will exhibit a behavioral response over the duration of pile driving activity and will likely flee the immediate area.

The proposed action is reasonably certain to alter salmon and steelhead rearing and migration behavior from both pile driving use. A few salmon are likely to be injured from pile driving activities but the majority of fish will respond by merely adjusting their behavior. Also, the noise and disturbance of driving pile is ephemeral, and timing restrictions will minimize the amount of fish that will be exposed. However, NMFS does not believe that this response will alter the fitness of juvenile salmon or steelhead to a point where any fish will be killed.

Changes to Physical Features of Habitat. The Columbia River provides foraging, rearing, and migratory habitat for all listed species covered in this opinion. The nearshore shallow water component provides overwintering habitat, as well as important spring and summer foraging habitat for salmon and steelhead during their outmigration.

The addition of in- and overwater structures and changes in riparian and benthic habitat can alter a variety of physical processes controlling the development and distribution of nearshore habitats, which in turn affect fish behavior and fish condition. Changes to the ambient light regime and riparian and benthic habitat caused by project actions will affect fish behaviors. The proposed action will remove, replace, and add new in- and overwater structures in the McNary Reservoir.

Ambient Light/Shading. The reduction of ambient light (*e.g.,* light attenuation and shading) is one of the primary mechanisms by which docks, floats, pilings, and moored vessels adversely affect salmon and steelhead. Light levels are a determining factor that can impair fitness and survival in juvenile salmonids by altering certain behaviors, such as migration, feeding success, and predator avoidance ((Nightingale and Simenstad 2001); (Rondorf et al. 2010)). Overwater structures, can substantially reduce light levels necessary for these behaviors.

The proposed action will increase the amount of overwater structure in the Columbia River by 538 ft^2. However, from a shading standpoint, the proposed project incorporate open grating structures (404 ft^2) design criteria to minimize the amount of new shading. These structures may attract smallmouth bass and northern pikeminnow, which prey on juvenile salmonids in the Columbia River system ((Vigg et al. 1991); (Tabor et al. 2004); (Zimmerman and Ward 1999); (Fritts and Pearsons 2004)). We are unaware of studies directly linking juvenile salmonid predation by predators associated with over- and in-water structures. However, studies have documented use, and sometimes selection, of in- and overwater structures by smallmouth bass and northern pikeminnow ((Pribyl et al. 2004); (Celedonia et al. 2008)). Increased predation may change fish behavior include delayed migration, alteration of schooling behavior, and even injury or death of juvenile salmon.

In addition, the proposed project will expand the existing pump station and install new permanent pump station structures, substantially prolonging the persistence of these overwater

structures in the Columbia River. Changed behavior could include delayed migration, alteration of schooling behavior, and death of juvenile salmon from increased predation. However, the extent of these effects on fish is difficult to quantify in terms of the number of affected fish without elaborate and expensive studies. Overall, however, the effects are expected to not significantly increase predation of any single species of salmonids above current levels to an extent to affect the population level.

Riparian and Benthic Habitat. The expansion of the existing pump station and the construction of the new intake and pump station structures will harden and degrade approximately 0.66 acres of benthic habitat during pile installation. The new pump station structures will discourage the use of the area as rearing in shallow water habitat. The new intake pump station will further degrade the function and quality of the shoreline and riparian habitat.

The Columbia River both upstream and downstream of the project area provides foraging, rearing, and migration habitat for all listed species. These shallow shoreline habitats with low velocities and slopes offer juvenile salmon refugia from predatory fish that may be too large to enter shallow water (Rondorf et al. 2010). In addition to refuge, shallow water habitat provides a high abundance of terrestrial insects (Rondorf et al. 1990). Developed shorelines limit the available suitable habitat for juvenile salmonids, while at the same time providing better habitat conditions for predators of juvenile salmonids (Rondorf et al. 2010). Riparian degradation, and water quality are currently limiting factors for most Columbia River salmon and steelhead species (NMFS 2005). The proposed action will have both beneficial and detrimental habitat effects that will be experienced by juveniles of all populations of each species that rely on the action area.

Alteration of the riverbed and substrate can result in the removal of benthic organisms, resulting in an immediate, localized reduction of food in the affected area. Aside from the initial physically disruptive effects, there is a concern for the speed of the recovery (repopulation) of bottom areas that are disturbed. Some of disturbed area caused by the new steel pilings located below the OHWM will recover due to the presence of the long-term permanent in-water structures. Recolonization in other areas may include the same organisms or opportunistic species that have environmental requirements that are flexible enough to allow them to reoccupy a disturbed site. Recolonization of the site can begin quickly, although reestablishment of a more stable benthic community may take several months or years after the work is completed (Barton and Dwyer 1997, Fowler 2004, Korsu 2004).

The project also includes 0.069 acres of riparian and shoreline restoration where old concrete structures and debris are removed from below OHWM along the shorelines. This area is 33 miles downstream of the project area. The removal of these materials will likely have small, short-term effects similar to those just described. Long-term, however, the removal of the concrete debris will improve and increase the available benthic and shallow water habitat available for benthic organisms.

NMFS expects the new pump station structures to alter the availability of macroinvertebrates to salmonids and steelhead during construction and 2 to 3 months post-construction. Drifting

invertebrates from upstream are expected to recolonize the affected areas once the proposed project is completed. These changes are expected to increase the diversity of invertebrates over time, as the area is re-colonized. The prey base will be reduced for a few months and spring migrating juveniles that would temporarily occupy the action area would experience the effects of this loss. However, due to the small area that would be affected, the effects on fish would be minimal.

Overall, the project will likely maintain habitat conditions for listed fish, with the addition of a slight increase in available benthic habitat and improved nearshore conditions.

Instream Water Withdrawals. The purpose of the St. Hilaire Pump station expansion and installation of the new EID pump station is to allow the consolidation and transfer of existing and new "mitigated" water rights to a central point of diversion for irrigation needs. As detailed in the proposed action section, the project is associated with the transfer of existing surface irrigation water rights totaling 200 cfs. In addition, the OWRD will require the issuance of 94.11 cfs of new mitigated in-stream water rights. Per the OWRD requirements, the water withdrawal mitigations will result in a "zero" net reduction of instream surface flows from the Columbia River, and thus no effects. If at any time the mitigated flows are not met, irrigation withdrawals will cease[6].

Based on the requirements and conditions of the water rights with OWRD, NMFS does not anticipate the transfer and new issuance of water withdrawal permits will result in any reduction in instream surface flow, or result in effects to listed salmonids in the action area.

Intake Entrainment/ Impingement. The potential for injury or mortality to juvenile salmonids from impingement or entrainment at the fish screens associated with the Project water intake structures depends on multiple factors. These include: the species and life stages of fish present during the irrigation season; the number of fish present in the intake vicinity; the location and depth of the intake and screen structures within the river; water velocities approaching and sweeping over the screens; the design and orientation of the screens; and maintenance features to keep the screen openings clear of debris. As described in the description of the Proposed Action, the new Project intakes include self-cleaning fish screens, sited to meet appropriate approach velocities. The screen designs have been reviewed by a NMFS fish passage engineer and meet current NMFS design criteria to protect the species and life stages of salmonids expected in the action area.

Juvenile salmon and steelhead prefer migrating and rearing along shallow water habitats and shorelines of the Columbia River. The pump station upgrades and new intake are located in deeper, off-shore waters of the Columbia River, where migrating juvenile salmonids are less likely to occur.

[6] Phone conversation between Rebecca Viray (NMFS) and Kim Ogren (OWRD) on February 7, 2018, regarding the status of the water right permits, transfers, and mitigation requirements.

Given the protective design features and new locations of the intake structures, NMFS does not anticipate injury or mortality to juvenile steelhead or salmon to occur from entrainment or impingement.

Relevance of Effects on Individual Fish to Salmonid Population Viability

NMFS assesses the importance of habitat effects in the action area (on individual fish) to their ESUs or DPSs by examining the relevance of those effects to the characteristics of VSPs. The characteristics of VSPs are abundance, population growth rate (productivity), spatial structure, and diversity. While these characteristics are described as unique components of population dynamics, each characteristic exerts significant influence on the others. For example, declining abundance can reduce spatial structure of a population; and when habitats are less varied, then diversity among the population declines.

Abundance. Small populations are at a greater risk of extinction than larger populations because of several processes that affect population dynamics. For this reason, it is important to look at what parts of this project will affect salmonid abundance. The action will result in a short-term loss of benthic prey items, but at a time when few fish will be present. In-water excavation and construction may have short-term effects due to vibratory sounds, increases in turbidity, fine sediments, and chemical contamination modifying the behavior of individual salmonids in the action area. In addition, the shallow water restoration improvements included in the Project should increase forage availability relative to baseline conditions. Abundance is not expected to change as a result of construction activities. The Project will add structures that predators may exploit to more effectively ambush juveniles of all of the subject species. The extent of this predation cannot be precisely estimated but it can be assumed to be small because the action area is small and not occupied by large numbers of the subject species. Therefore, we do not anticipate increased predation will affect the abundance of adult returns of any of the subject species. We also do not anticipate that the action will cause increases in turbidity and construction-related effects to alter abundance because the Project will occur at a time when it is unlikely adults will be in the action area.

Productivity. The proposed action will create and maintain conditions that favor predators of salmon and steelhead. Predation will continue to exert a sustained detrimental effect on listed species, each of which already experience low population growth rates. The extent of this predation cannot be precisely estimated but it can be assumed to be small because the amount of additional structure is a small proportion compared to the size of the McNary Reservoir; which limits the number of the subject species that might be exposed to increased predation. We do not anticipate that the action will reduce the productivity of any of the subject species to more than a minimal degree. Additionally, the beneficial restorations parts of the project will improve riparian function, increasing prey availability and providing escape cover for juvenile salmon and steelhead.

Spatial Structure. NMFS does not expect the proposed project to affect the spatial structure of any of the affected species more than a minimal amount because the action area does not include

spawning areas or tributary habitat. In addition, the project will not prevent adult salmon or steelhead from returning to their natal streams.

Diversity. The project is not likely to differentially affect one life history strategy over another to more than a minimal degree. For this reason, projects effects on diversity will not be more than minimal, at most.

Summary. Because effects on the abundance, productivity, spatial structure, and diversity are not expected to be more than minimal, only minimal effects would occur at the population scale for any of the affected species.

2.5.3 Effects on Critical Habitat

Implementation of the proposed project is likely to affect freshwater rearing and freshwater migration sites for the subject species. The specific attributes of designated critical habitat affected by the proposed action are substrate, water quality, forage, and safe passage.

Substrate

The proposed action will affect the substrate in several ways. The expansion of the St. Hilaire pump station and installation of the new EID pump station intake and pipes will disrupt 0.066 acre of substrate with the new hardened water structures. There will be the permanent removal of 398 cubic yards (yd^3) and 1,028 yd^3 of new fill deposited at the pump station site. The project will result in an overall net increase of 630 yd^3 fill material during the project construction. Increased turbidity will lead to sediment deposition which will be washed away by the next high flow event. Overall, the project will harden and alter substrate in the McNary Reservoir, but will not change the conservation value of substrate at the fifth-field watershed scale.

Water Quality

The proposed action will have a short-term (2 to 3 months) negative effect on water quality by increasing suspended sediment and turbidity during construction and for a short period after construction activities. NMFS anticipates any excess turbidity will dilute and disperse with the river current and not be distinguishable from background levels downstream 500 ft of the proposed action. The use of heavy equipment may result in small amounts of pollutants entering waterways as discussed above; it is unlikely chemical contamination will have more than a minimal effect. However, given the proposed best management practices, and the timing of the elevated turbidity NMFS believes that the effects to water quality will not meaningfully decrease the function of the PBFs in the action area.

Forage

The proposed action will have a short-term negative effect on benthic macroinvertebrates by crushing, covering, or displacing them during construction of the excavation and installation of new pump cans and pilings at the pump stations in an area approximately 0.066 acres. The habitat restoration will remove concrete debris covering an area of 0.069 acres. The substrate

under the removed debris will be left in place. The exposed substrate will improve benthic habitat. The alteration of this amount of habitat could have some very localized effects to forage for out-migrating juvenile salmonids and steelhead that use this nearshore area during construction and for the first year after project completion. However, forage prey will re-colonize the area within a few months after project completion. Given the size of the reservoir, the amount of available local nearshore habitat, and the short-term nature of the action, NMFS does not anticipate that this project will change the conservation value of forage at the fifth-field watershed scale.

Safe Passage

Salmon and steelhead migrate through the area as adults and juveniles. The work window coincides with adult steelhead migration, but their migrations should proceed normally because project activities, and thus disturbance, will not occur round-the-clock and because Project's construction is scheduled at the time of year the fewest fish are anticipated to migrate through the river corridor. We also do not anticipate adult steelhead will migrate along the shallow water habitat in the action area. The new and existing structures will alter the quality of the migratory habitat in the nearshore for a portion of the juvenile salmon and steelhead that use this area for rearing or foraging. Bass are predators on juvenile salmonids. To the extent that the overwater structure increases bass spawning success, the proposed action could maintain or increase the number of bass and reduce passage success.

Relevance of Effects on Physical or Biological Features to Conservation Value

As described above, the proposed action will have some short-term and long-term effects on substrate, water quality, forage, and safe passage. The persistence of in- and overwater structures will burden the function of the rearing and migration PBFs in the action area. The extent of the burden is partially ameliorated by the light penetrating and grated design of the overwater structure, and the removal of the relict concrete and cement structure to restore habitat and provide riparian and benthic enhancements. Overall, the proposed action is expected to maintain habitat conditions, but will still allow certain small and degrading actions to continue and persist into the future. These negative effects, however, are minimal in the action area and even less consequential at the HUC5 watershed scale. Therefore, the proposed action will not affect the conservation value of critical habitat in the Cold Springs Wash–Lake Wallula HUC more than a minor amount.

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 Act. Cumulative effects, when combined with baseline effects and effects of the action, may increase the likelihood that the proposed action will result in jeopardy to a listed species, or in destruction or adverse modification of designated critical habitat.

During this consultation, NMFS searched for information on future state, tribal, local, or private actions that were reasonably certain to occur in the action area. Resource-based activities such as timber harvest, agriculture (including substantial irrigation withdrawals affecting both tributary and mainstem Columbia River flows), mining, shipping, and energy development are likely to continue to exert an influence on the quality of freshwater habitat in the action area. Irrigation of farmlands contributes to large amounts of instream water withdrawals throughout the basin. Applications of pesticides and chemicals for agricultural production contribute to pollutant inputs and accumulate to degrade water quality. Additional effects to the Middle Columbia River are anticipated with population growth, urban development, and increases in recreational use of the Columbia River. Industrial and commercial developments contribute to increases in shoreline riprap, altered landscapes and increases in impermeable surfaces. The intensity of this influence is difficult to predict and is dependent on many social and economic factors. However, the adoption of industry-wide standards to reduce environmental impacts and the shift away from resource extraction to a mixed manufacturing and technology-based economy should result in a gradual decrease in influence over time.

When these influences are considered collectively, we expect trends in habitat quality to remain flat or improve gradually over time. This will positively influence population abundance and productivity for the species affected by proposed action. In a worst-case scenario, cumulative effects, when balanced with expected federally-sponsored recovery actions, will not have an aggregate effect on population abundance trends. Similarly, we expect the quality and function of critical habitat PBFs to express a slightly positive to neutral trend over time as a result of the cumulative effects and anticipated federally-mandated recovery actions. However, as most activities waterward of the OHWM, whether for recovery or other uses, require a Corps permit, NMFS anticipates that most actions will require some future ESA consultation. In addition, most future state or tribal actions would likely have some form of federal funding or authorization and therefore would also be reviewed by NMFS. This limits the scope of cumulative effects that can be factored in this analysis.

2.7 Integration and Synthesis

The Integration and Synthesis section is the final step of NMFS' 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) to formulate the agency's biological opinion as to whether the proposed action is likely to: (1) result in appreciable reductions in the likelihood of both survival and recovery of the species in the wild by reducing its numbers, reproduction, or distribution; or (2) reduce the value of designated or proposed critical habitat for the conservation of the species. These assessments are made in full consideration of the status of the species and critical habitat (section 2.2).

Within the action area and the HUC5 watershed as a whole, the major sources of impact to salmon, steelhead, and their critical habitat are hydropower dams as well as the continued development and maintenance of the shoreline including marinas, docks, roads, railroads, and riprap. Dams and reservoirs, within the currently accessible migratory corridor, have altered the river environment and affected fish passage. The operation of water storage projects has altered

the natural hydrograph of many rivers. Water impoundment and dam operations affect downstream water quality characteristics. Salmon and steelhead are exposed to high rates of natural predation during all life stages from fish, birds, and marine mammals. Avian and introduced fish predation on salmonids has been exacerbated by environmental changes associated with river developments. Shoreline development has reduced the quality of nearshore salmon and steelhead habitat by eliminating native riparian vegetation, displacing shallow water habitat with fill materials and by further disconnecting the Columbia River from historic floodplain areas. Further, riparian species that evolved under the environmental gradients of riverine ecosystems are not well suited to the present hydraulic setting of the action area (*i.e.,* static, slackwater pools), and are thus often replaced by non-native species. The riparian system is fragmented, poorly connected, and provides inadequate protection of habitats and refugia for sensitive aquatic species.

The project will cause minor, short-term negative effects as a result of project construction (pile driving, excavation, and water quality), with some long-term effects of resulting from the new overwater structure, pilings, increased predation, and altered benthic habitat. The conservation measures and design criteria proposed by the St. Hilaire Farms and EID will ensure that these effects remain minor. The proposed action will not have more than minimal effects on the abundance, productivity, spatial structure, or diversity of the affected populations.

Adverse effects to PBFs will occur from changes in water quality (turbidity, chemical contamination), changes in noise levels (pile driving), and physical habitat (overwater structures, shading, riparian, and benthic habitat). The action's negative effects consist of both short-term and long-term effects that will have a sustained and additive detrimental effect on habitat condition in the mainstem Columbia River. However, the project will also have some positive effects to listed fish including removal of abandoned cement debris and structures in the shallow water nearshore habitat. Because the short-term negative effects will not appreciably impair the function of critical habitat, and because of the ameliorating elements included in the proposed action, NMFS anticipates that the project as a whole will maintain the overall carrying capacity for juvenile rearing fish, conservation value of the designated critical habitat in the action area in a functional state.

Any water withdrawal or other alteration of streamflow when it significantly impairs spawning, migration, feeding, or other essential behavioral patterns, are habitat-modifying activities that may harm ESA-listed species and therefore may be considered a "take" under the ESA. The irrigation water rights transferred in association with the proposed action would continue to withdraw instream flow regardless of the expansion and installation of the new intake and pump station. The new water rights issued by the OWRD for the point of diversion transfer requires "bucket for bucket" surface flow mitigation and will have a zero net withdrawal of instream flows. NMFS does not consider any take that may be associated with such withdrawals to be incidental to the proposed action and, therefore, compliance with these terms and conditions will not remove the prohibition against take due to the continuation of those water withdrawals.

Therefore, when effects of the action are added to the baseline, and anticipated cumulative effects are also considered, NMFS does not find an appreciable change in the population's

viability parameters. Similarly, the habitat-related effects of the proposed action are anticipated to be insufficient to meaningfully decrease the function of the PBFs in the action area.

2.8 Conclusion

After reviewing the current status of the listed species, the environmental baseline within the action area, the effects of the proposed action, and cumulative effects, it is NMFS' biological opinion that the proposed action is not likely to jeopardize the continued existence of the following six species considered in this opinion, or result in the destruction or adverse modification of their designated or proposed critical habitats:

- Upper Columbia River spring-run Chinook salmon
- Snake River spring/summer-run Chinook salmon
- Snake River fall-run Chinook salmon
- Middle Columbia River steelhead
- Upper Columbia River steelhead
- Snake River Basin steelhead

2.9 Incidental Take Statement

Section 9 of the ESA and Federal Regulation 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 results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering (50 CFR 222.102). Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. For the purposes of this consultation, we interpret "harass" to mean an intentional or negligent action that has the potential to injure an animal or disrupt its normal behaviors to a point where such behaviors are abandoned or substantially altered[7]. Section 7(b)(4) and section 7(o)(2) provide that taking that is incidental to an otherwise lawful agency action is not prohibited under the ESA, if that action is performed in compliance with the terms and conditions of the ITS.

2.9.1 Amount or Extent of Take

Effects of the action will coincide with the presence of all salmon and steelhead covered in this opinion such that incidental take in the form of harm is reasonably certain to occur. Harm includes those circumstances where habitat is so altered that individuals of the species modify their breeding, feeding, or sheltering behavior to the degree that it results in actually injury or death. All six species use portions of the action area for juvenile rearing, and adult and juvenile migrations, meaning that individuals of differing levels of sensitivity and response will encounter

[7] Memorandum dated October 21, 2016 from Donna S. Wieting (NMFS Office of Protected Resources) on Interim Guidance on the Endangered Species Act Term "Harass".

project effects. NMFS expects juvenile steelhead and juvenile Chinook salmon to be present in the project vicinity during the work window exposing them to construction effects, and all species considered in this document, will be exposed to the long-term post-construction nearshore habitat changes. A few adult steelhead maybe present in the mainstem Columbia River during the winter in-water construction, however, we anticipate it will be highly unlikely that adult steelhead will migrate along the shallow water habitat in the action area. In addition, the persistence of the in- and overwater structures ensures that at least a portion of the outmigrating smolts and adults from each species will experience habitat effects for as long as the structures remain. Because the water diversions (and flow effects) associated with pre-existing water rights would continue to occur with or without the proposed action, and water diversions associated with new water rights will be fully offset, we do not consider that any flow-related incidental take results from the proposed action. Accordingly, this incidental take statement does not exempt any diversion-related incidental take from the ESA's take prohibitions.

As described in section 2.4.2, the proposed action will occur over period of up to two months between December 1 and February 28. Because of project timing, NMFS expects few juvenile salmon and steelhead will occupy the action area. These fish tend to overwhelmingly rear and overwinter in tributary habitats and tend to occupy deeper water while in the Columbia River. Estimating the specific number of animals injured or killed by habitat-modifying activities is not impossible, despite the use of the best available scientific and commercial data, because of the range of responses that individual fish will have to changed habitat, and because the numbers of fish present at any time, and over time, is highly variable. While this uncertainty makes it impossible to quantify take in terms of numbers of animals injured or killed, the extent of habitat change to which present and future generations of fish will be exposed is readily discernible and presents a reliable measure of the extent of take that can be monitored and tracked. Therefore, when the specific number of individuals "harmed" cannot be predicted, NMFS may quantify take based on the extent of habitat modified.

The estimated extent of habitat affected by the addition of permanent structures in the aquatic environment represents the extent of take exempted in this ITS. The proposed surrogates are causally linked to anticipated take because they describe conditions that will cause take due to increases in predator habitat, changes in benthic structure, and sound effects. These also clearly quantifiable measures can easily be measured to determine if take might be exceeded.

Specifically, the extent of modified habitat is equivalent to the area of shadow cast on aquatic habitat covered by new or replaced overwater structure (538 ft^2 new), the amount of benthic habitat altered (0.066 acres), and the total placement of 34 new steel piles, 64 H-piles and 54 sheet piles which provide predator habitat and cause sound-related harm. Although these surrogates could be considered coextensive with the proposed action, monitoring and reporting requirements will provide opportunities to check throughout the course of the proposed action whether the surrogates are exceeded. For this reason, the surrogates function as effective reinitiation triggers.

2.9.2 Effect of Take

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

2.9.3 Reasonable and Prudent Measures and Terms and Conditions

"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 NMFS believes that full application of conservation measures included as part of the proposed action, together with use of the reasonable and prudent measures (RPMs) and terms and conditions described below, are necessary and appropriate to minimize the likelihood of incidental take of listed species due to completion of the proposed action.

The Corps shall:

1. Minimize take from construction activities.
2. Minimize take from new in- and overwater structure.
3. Minimize take from reduced water quality.
4. Track and monitor the project to ensure the applicant meets the requirements of this incidental take statement and that the extent of take is not exceeded.

2.9.4 Terms and Conditions

The terms and conditions described below are non-discretionary, and the Corps or any applicant must comply with them in order to implement the Reasonable and Prudent Measures (50 CFR 402.14). The Corps or any applicant has a continuing duty to monitor the impacts of incidental take and must report the progress of the action and its impact on the species as specified in this ITS (50 CFR 402.14). If the entity to whom a term and condition is directed does not comply with the following terms and conditions, protective coverage for the proposed action would likely lapse.

1. To implement RPM number 1 (construction activities), the Corps shall ensure that:
    a. The applicant conducts all work below the OHWM within as short a period as possible between December 1 and February 28.
    b. All installation of piles will be completed using a vibratory hammer.
    c. All state and federal permits are followed to during the project implementation and after project is completed.

2. To implement RPM number 2 (in-water and over-water structures), the Corps shall ensure that the Section 10 permit requires the overwater are 60 percent light penetrating and waterproof lightening equipment under portions of the new concrete deck.

3. To implement RPM number 3 (water quality), the Corps shall ensure that:
    a. A sediment turbidity curtain is installed to minimize downstream increase turbidity and fine sediments.
    b. A PCP is developed prior to the commencement of the project.

4. To implement RPM number 4 (monitoring activities), the Corps shall ensure that:

    a. The applicant tracks and monitors construction activities to ensure that the conservation measures are meeting the objective of minimizing take. Monitoring shall be conducted by the permittee and include daily visual survey for fish in the nearshore area inside the in-water work area.

    b. The applicant submits a completion of project report to NMFS two months after project completion. The applicant shall report all monitoring items to include, at a minimum, the following:

        i. Size and maximum surface area that is covered by structures.

        ii. Piling: number, size and type of piles installed.
            a. Piling installation: Provide a log of the dates, start and stop time, and total duration of all vibratory pile installations.

    c. All reports will be sent to:
    National Marine Fisheries Service,
    Columbia Basin Area Office
    Attention: WCR-2018-8908
    304 South Water Street, Suite 201
    Ellensburg, Washington 98926

NOTICE: If a sick, injured or dead specimen of a threatened or endangered species is found in the action area, the finder must notify NMFS Law Enforcement at (206) 526-6133 or (800) 853-1964, through the contact person identified in the transmittal letter for this opinion, or through the NMFS Washington State Habitat Office. The finder must take care in handling sick or injured specimens to ensure effective treatment, and in handling dead specimens to preserve biological material in the best possible condition for later analysis of cause of death. The finder should carry out instructions provided by Law Enforcement to ensure evidence intrinsic to the specimen is not disturbed unnecessarily.

2.10 Conservation Recommendations

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

following conservation recommendation is a discretionary measure that NMFS believes is consistent with this obligation and therefore should be carried out by the federal action agency:

1. To mitigate the effects of climate change on ESA-listed salmonids, follow recommendations by the ISAB (2007) to plan now for future climate conditions by implementing protective tributary, mainstem, and estuarine habitat measures, as well as protective hydropower mitigation measures. In particular, implement measures to protect or restore riparian buffers, wetlands, and floodplains; remove stream barriers; and to ensure late summer and fall tributary streamflows.
2. To improve habitat and near shore conditions along the Columbia River mainstem, continue to coordinate and work with applicants, property owners, stakeholders and other entities to improve and restore shoreline conditions to near natural riverbanks to increase shallow water habitat.

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

2.11 Reinitiation of Consultation

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

2.12 Species not Adversely Affected by the Proposed Action

Snake River Sockeye Salmon

This ESU includes all anadromous and residual sockeye salmon from the Snake River Basin, Idaho, and artificially propagated sockeye salmon from the Redfish Lake captive propagation program. The ICTRT identified historical sockeye salmon production in at least five Stanley Basin and Sawtooth Valley lakes and in lake systems associated with Snake River tributaries currently cut off to anadromous access (*e.g.,* Wallowa and Payette Lakes), although current returns of Snake River sockeye salmon are extremely low and limited to Redfish Lake (ICTRT 2007).

This species is still at extremely high risk across all four basic risk measures (abundance, productivity, spatial structure and diversity. Although the captive brood program has been successful in providing substantial numbers of hatchery produced *O. nerka* for use in

supplementation efforts, substantial increases in survival rates across life history stages must occur in order to re-establish sustainable natural production (Hebdon, Kline *et al.* 2004, Keefer, Peery *et al.* 2008). Although the status of the Snake River sockeye salmon ESU appears to be improving, this ESU remains at a high risk of extinction (NWFSC 2015). Recent returns are still a fraction of historic abundance and substantial increases in survival rates across all life-history stages must occur in order to re-establish sustainable natural production.

The primary risks to Snake River sockeye salmon from the proposed action include project construction, pile driving, and increased turbidity. However, NMFS does not expect Snake River sockeye salmon to be present in this off-channel area during project construction or use this area for rearing during their outmigration. Because sockeye salmon will not likely be present in the action area during project implementation, the risk of adverse effects to sockeye or their critical habitat is discountable.

3.0 MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT ESSENTIAL FISH HABITAT RESPONSE

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

This analysis is based, in part, on the EFH assessment provided by the Corps and descriptions of EFH for Pacific coast salmon (PFMC 1999) 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 project will affect EFH for Pacific Coast salmon including Chinook salmon (*O. tshawytscha*), and coho salmon (*O. kisutch*) (PFMC 2014). Freshwater EFH for Chinook and coho salmon consists of four major components: (1) spawning and incubation, (2) juvenile rearing, (3) juvenile migration corridors, and (4) adult migration corridors and holding habitat. Freshwater EFH depends on lateral (*e.g.,* floodplain, riparian), vertical (*e.g.,* hyporheic) and longitudinal connectivity to create habitat conditions for spawning, rearing, and migration including: (1) water quality (*e.g.,* dissolved oxygen, nutrients, temperature); (2) water quantity, depth, and velocity; (3) riparian-stream-marine energy exchanges; (4) channel gradient and stability; (5) prey availability; (6) cover and habitat complexity (*e.g.,* large wood, pools, aquatic and terrestrial vegetation); (7) space; (8) habitat connectivity from headwaters to the ocean (*e.g.,* dispersal corridors); (9) groundwater-stream interactions; and (10) substrate composition.

The implementing regulations for the EFH provisions of the MSA (50 CFR part 600) recommend that the Fishery Management Plans include specific types or areas of habitat within EFH as "habitat areas of particular concern" based on one or more of the following considerations: (1) the importance of the ecological function provided by the habitat; (2) the extent to which the habitat is sensitive to human-induced environmental degradation; (3) whether, and to what extent, development activities are, or will be, stressing the habitat type; and (4) the rarity of the habitat type. Based on these considerations, the Council designated five Habitat Areas of Particular Concern: 1) complex channels and floodplain habitats: 2) thermal refugia, 3) spawning habitat, 4) estuaries, and 5) marine and estuarine submerged aquatic vegetation.

Specific elements of Chinook and coho salmon EFH that will be affected include water quality, prey availability, habitat connectivity and substrate composition.

3.2 Adverse Effects to Essential Fish Habitat

Based on information provided in the BA and the analysis of effects presented in the ESA portion of this document, NMFS concludes that proposed action will adversely affect EFH designated for Chinook salmon and coho salmon because it will have effects on turbidity and benthic communities. The proposed project will add 538 ft^2 of new overwater structure, install 34 new steel piles, 64 H-piles and 54 sheet piles, and alter approximately 0.066 acres of river bottom, altering benthic habitat and macroinvertebrate production. The action will result in permanent new in-water and overwater structures in the Columbia River, which will impair the quality of habitat. These changes to EFH are long-lasting effects. To offset some of these effects the applicant is installing open grating to all new structures, and will remove 0.069 acres of concrete debris below OHWM in the Columbia River to increase benthic habitat.

Specifically, NMFS has determined that the action will adversely affect EFH as follows:

1. The permanent alteration of the near-shore environment by placement of in- and overwater structures adversely affects habitat connectivity.

2. Temporary reduction in prey availability from removal and disturbance of macroinvertebrate community.

3. Permanent shading of benthic habitat and creating functional migration obstacles to migrating Chinook salmon and coho salmon.

4. Reduction in established substrate composition from removal and disturbance of native substrates.

5. Episodic degradation of water quality (turbidity, sedimentation) from construction activities, and construction materials.

3.3 Essential Fish Habitat Conservation Recommendations

NMFS believes that the following conservation measures are necessary to avoid, mitigate, or offset the impact of the proposed action on EFH.

The following two conservation measures are necessary to avoid, mitigate, or offset the impact of the proposed action on EFH. These conservation recommendations are a subset of the ESA terms and conditions.

1. Construction. Follow the term and condition #1 (water quality) and term and condition #2 (pile installation). Water quality will be maintained during construction activities through the use of erosion control measures, proper mechanical staging and the development and implementation of a chemical/pollution contamination plan.
2. Monitoring and Reporting. Follow term and condition #4 (monitoring.)

Fully implementing these EFH conservation recommendations would protect, by avoiding or minimizing the adverse effects described in section 3.2, above, less than 1 acre of designated EFH for Pacific Coast salmon.

3.4 Statutory Response Requirement

As required by section 305(b)(4)(B) of the MSA, the federal agency must provide a detailed response in writing to NMFS within 30 days after receiving an EFH Conservation Recommendation from NMFS. 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 NMFS Conservation Recommendations, the federal agency must explain its reasons for not following the recommendations, including the scientific justification for any disagreements with NMFS over the anticipated effects of the action and the measures needed to avoid, minimize, mitigate, or offset such effects (50 CFR 600.920(k)(1)).

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

3.5 Supplemental Consultation

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

4.0 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 Corps and the Port of Benton. Other interested users could include the citizens of Benton County in Washington and users of the Crow Butte Park. Individual copies of this opinion were provided to the Corps. This opinion will be posted on the Public Consultation Tracking System website (https://pcts.nmfs.noaa.gov/pcts-web/homepage.pcts). 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, if applicable*] 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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