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

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Refer to NMFS No: WCRO-2020-01767

October 20, 2020

William D. Abadie
Chief, Regulatory Branch
U.S. Army Corps of Engineers, Portland District
P.O. Box 2946
Portland, OR 97208-2946

Re: Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson–Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Columbia Improvement District Winter Pump Station Project, Lake Umatilla (HUC #170701010601), Columbia River, Morrow County, Oregon.

Dear Mr. Abadie:

Thank you for your letter of June 30, 2020 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 Columbia Improvement District (CID) Winter Pump Station Project. This consultation was conducted in accordance with the 2019 revised regulations that implement section 7 of the ESA (50 CFR 402, 84 FR 45016).

Thank you, also, for your request for consultation pursuant to the essential fish habitat (EFH) provisions in Section 305(b) of the Magnuson–Stevens Fishery Conservation and Management Act [16 U.S.C. 1855(b)] for this action.

NMFS also reviewed the likely effects of the proposed action on EFH, pursuant to section 305(b) of the Magnuson–Stevens Fishery Conservation and Management Act [16 U.S.C. 1855(b)], and concluded that the action would adversely affect the EFH of Pacific Coast salmon. Therefore, we have included the results of that review in Section 3 of this document.

After reviewing the current status of the species, the environmental baseline, the effects of the proposed action and the cumulative effects, NMFS concludes that the proposed action is not likely to jeopardize the continued existence of ESA-listed Upper Columbia River (UCR) spring-run Chinook salmon (*Oncorhynchus tshawytscha*), UCR steelhead (*O. mykiss*), Middle Columbia River (MCR) steelhead, Snake River Basin steelhead, Snake River (SR) spring/summer-run Chinook salmon, SR fall-run Chinook salmon, and SR sockeye salmon (*O. nerka*). NMFS also determined that the action will not destroy or adversely modify designated critical habitats for these species. Rationale for our conclusions is provided in the attached biological opinion

(opinion). The enclosed opinion is based on information provided in your biological assessment, email discussions, and other sources of information cited in the opinion.

In addition, NMFS concurs that the subject action is not likely to adversely affect the following ESA-listed species: Lower Columbia River (LCR) Chinook salmon, LCR coho salmon (*O. kisutch*), LCR steelhead, Upper Willamette River (UWR) Chinook salmon, UWR steelhead, Columbia River chum salmon (*O. keta*), Pacific eulachon (*Thaleichthys pacificus*), green sturgeon (*Acipenser medirostris*), or southern resident killer whale (*Orcinus orca*).

As required by section 7 of the ESA, NMFS is providing an incidental take statement (ITS) with the opinion. The ITS includes reasonable and prudent measures (RPMs) NMFS considers necessary or appropriate to minimize the impact of incidental take associated with this program. The ITS also sets forth nondiscretionary terms and conditions, including reporting requirements, that the U.S. Army Corps of Engineers must comply with to carry out the RPMs. Incidental take from actions that meet these terms and conditions will be exempt from the ESA's prohibition against the take of the listed species considered in this opinion.

Please contact Rebecca Viray, Columbia Basin Area Office, (541) 962-8524, Rebecca.Viray@noaa.gov, if you have any questions concerning this consultation, or if you require additional information.

Sincerely,

Michael Tehan
Assistant Regional Administrator
Interior Columbia Basin Office
NOAA Fisheries, West Coast Region

Enclosure

cc: Caila Heintz, Corps, Regulatory Office, Caila.M.Heintz@usace.army.mil
Dana Kurtz, Anderson Perry & Associates, dkurtz@andersonperry.com

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

Columbia Improvement District Winter Pump Station Project

NMFS Consultation Number: WCRO-2020-01767

Action Agency: U.S. Army Corps of Engineers

Affected Species and NMFS' Determinations:

ESA-Listed Species	Status	Is Action Likely to Adversely Affect Species	Is action Likely to Jeopardize the Species	Is Action Likely to Adversely Affect Critical Habitat	Is Action Likely to Destroy or Adversely Modify Critical Habitat
Upper Columbia River spring Chinook salmon (*Oncorhynchus tshawytscha*)	Endangered	Yes	No	Yes	No
Upper Columbia River steelhead (*O. mykiss*)	Threatened	Yes	No	Yes	No
Snake River spring/summer-run Chinook salmon (*O. tshawytscha*)	Threatened	Yes	No	Yes	No
Snake River fall-run Chinook salmon (*O. tshawytscha*)	Threatened	Yes	No	Yes	No
Snake River sockeye salmon (*O. nerka*)	Endangered	Yes	No	Yes	No
Snake River steelhead (*O. mykiss*)	Threatened	Yes	No	Yes	No
Middle Columbia River steelhead (*O. mykiss*)	Threatened	Yes	No	Yes	No
Columbia River chum salmon (*O. keta*)	Threatened	No	N/A	No	N/A
Lower Columbia River steelhead (*O. mykiss*)	Threatened	No	N/A	No	N/A
Lower Columbia River Chinook salmon (*O. tshawytscha*)	Threatened	No	N/A	No	N/A
Lower Columbia River coho salmon (*O. kisutch*)	Threatened	No	N/A	No	N/A

ESA-Listed Species	Status	Is Action Likely to Adversely Affect Species	Is action Likely to Jeopardize the Species	Is Action Likely to Adversely Affect Critical Habitat	Is Action Likely to Destroy or Adversely Modify Critical Habitat
Upper Willamette River steelhead (*O. mykiss*)	Threatened	No	N/A	No	N/A
Upper Willamette River Chinook salmon (*O. tshawytscha*)	Threatened	No	N/A	No	N/A
Pacific eulachon (*Thaleichthys pacificus*)	Threatened	No	N/A	No	N/A
Green sturgeon (*Acipenser medirostris*)	Threatened	No	N/A	No	N/A
Southern resident killer whale (*Orcinus orca*)	Endangered	No	N/A	No	N/A

Fishery Management Plan That Identifies EFH in the Project Area	Does Action Have an Adverse Effect on EFH?	Are EFH Conservation Recommendations Provided?
Pacific Coast Salmon	Yes	Yes

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

Issued By: Michael Tehan________

Michael Tehan
Assistant Regional Administrator for Interior Columbia Basin Office
West Coast Region
National Marine Fisheries Service

Date: October 20, 2020

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ACRONYM GLOSSARY

A&P	Abundance and Productivity
BA	Biological Assessment
BMP	Best Management Practice
cfs	Cubic Feet per Second
CH	Critical Habitat
CHART	Critical Habitat Analytical Review Team
CID	Columbia Improvement District
Corps	U.S. Corps of Engineers
CRS	Columbia River System
cu yd	Cubic Yard
DPS	Distinct Population Segment
DQA	Data Quality Act
EFH	Essential Fish Habitat
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FR	Federal Register
ft	Feet
ft^2	Square Feet
gpm	Gallons Per Minute
HUC	Hydrologic Unit Code
ICRD	Interior Columbia Recovery Domain
ICTRT	Interior Columbia Basin Technical Recovery Team
ITS	Incidental Take Statement
kcfs	Kilo Cubic Feet per Second
LCR	Lower Columbia River
MCR	Middle Columbia River
MPG	Major Population Group
MSA	Magnuson–Stevens Fishery Conservation and Management Act
NLAA	Not Likely to Adversely Affect
NMFS	National Marine Fisheries Service
ODEQ	Oregon Department of Environmental Quality
OHWM	Ordinary High Water Mark
opinion	Biological Opinion
PAH	Polycyclic Aromatic Hydrocarbon
PBF	Physical or Biological Features
PCE	Primary Constituent Element
PFMC	Pacific Fishery Management Council
POM	Port of Morrow
project	Columbia Improvement District Project
RPM	Reasonable and Prudent Measure
SR	Snake River
SRB	Snake River Basin
SS/D	Spatial Structure and Diversity
TSS	Total Suspended Solids

UCR	Upper Columbia River
UCSRB	Upper Columbia Salmon Recovery Board
DOC	U.S. Department of Commerce
UWR	Upper Willamette River
VSP	Viable Salmonid Population

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1. INTRODUCTION

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

1.1. Background

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

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

We completed pre-dissemination review of this document using standards for utility, integrity, and objectivity in compliance with applicable guidelines issued under the Data Quality Act (DQA) (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001, Public Law 106-554). The document will be available within 2 weeks at the NOAA Library Institutional Repository [https://repository.library.noaa.gov/welcome]. A complete record of this consultation is on file at Columbia Basin Area Office, Ellensburg, Washington.

1.2. Consultation History

NMFS received a draft biological assessment (BA) from the U.S. Army Corps of Engineers (Corps) on June 8, 2020. The draft BA was prepared by Anderson Perry & Associates, Inc., on behalf of the Columbia Improvement District (CID), who has applied for a Corps Section 10 of the Rivers and Harbors Act (33 U.S.C. 403) and Section 404 of the Clean Water Act (33 U.S.C. 1344).

The initial draft BA concluded that the proposed action is not likely to adversely affect (NLAA) Upper Columbia River (UCR) spring-run Chinook salmon (*Oncorhynchus tshawytscha*), Snake River (SR) spring/summer-run Chinook salmon, UCR steelhead (*O. mykiss*), Middle Columbia River (MCR) steelhead, Snake River Basin (SRB) steelhead, SR fall-run Chinook salmon (*O. tshawytscha*), SR sockeye salmon (*O. nerka*), and designated critical habitat for these seven species. The draft BA also concluded that EFH for Chinook salmon and coho salmon, as designated by Section 305 of the Magnuson–Stevens Fishery Conservation and Management Act, will not likely be adversely affected.

On June 12, 2020, NMFS provided comments on the draft BA to the Corps in early coordination. NMFS' initial comments included questions and requests for details regarding the proposed new water withdrawals of 29.9 cubic feet per second (cfs). Due to the new water withdrawals from the mainstem Columbia River, NMFS recommended the BA include a description of the effects of the proposed new water right withdrawal. NMFS recommended that the BA include these additional species: Lower Columbia River (LCR) Chinook salmon, LCR coho salmon (*O. kisutch*), LCR steelhead, Upper Willamette River (UWR) Chinook salmon, UWR steelhead, Columbia River chum salmon (*O. keta*), Pacific eulachon (*Thaleichthys pacificus*), green sturgeon (*Acipenser medirostris*), and southern resident killer whale (*Orcinus orca*). NMFS informed the Corps that our analysis would consider potential effects of new water withdrawals and all potential effects to all fifteen ESA-listed species in the Columbia River downstream to the Pacific Ocean, as well as any potential effects to southern resident killer whales.

On June 30, 2020, the Corps submitted to NMFS a final BA and a letter requesting formal consultation. Formal consultation was initiated on June 30, 2020.

1.3. Proposed Federal Action

Under the ESA, "action" means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by federal agencies (50 CFR 402.02). Under the MSA, federal action means any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken by a federal agency (50 CFR 600.910).

The Corps proposes to authorize a permit to the CID to construct a new pump station located on the Columbia River at river mile (RM) 271.5, near Boardman, Oregon. The new pump station will allow the CID to supply water for wintertime industrial and agricultural needs for the Port of Morrow (POM). The project would include construction and installation of a new upland pump station, concrete foundation, and two new in-water intake pipes placed into an excavated trench in the Columbia River, an upland pipeline, and upland infrastructure system. The existing intakes are screened in compliance with NMFS criteria. Intake and pump station construction may take up to 4 months. In-water construction is estimated to occur for up to 2 weeks during the Oregon Department of Fish and Wildlife (ODFW) recommended in-water work window of December 1 to March 31. As stated above, the Corps' authorities for permitting this action are derived from Section 10 of the Rivers and Harbors Act (33 U.S.C. 403) and Section 404 of the Clean Water Act (33 U.S.C. 1344).

The current facilities include an existing pump station, two booster pump stations, a transmission pipeline, and a canal system (Figure 1). The existing CID pump station, located on a platform in the Columbia River, is shared with Farmland Reserve, Inc. Columbia Improvement District has six pumps on the southwest side of the pump station, and Farmland Reserve, Inc., has six pumps on the northeast side. The conveyance system transfers water from the Columbia River to the first booster pump station on the shore located approximately 150 feet (ft) away. The water transfers through a 72-inch-diameter pipeline to the first booster pump station; it is then pumped 3.5 miles to the second booster pump station. From the second booster pump station the water is further pumped 3.5 miles to an irrigation canal. Farmers withdraw irrigation water out of the 7 mile-long canal. Two parallel pipelines are located between the two pump stations. One pipeline is a 72-inch-diameter cement mortar lined steel pipe, while the other pipeline is a combination of 72-inch and 75-inch-diameter fiberglass pressure pipe.

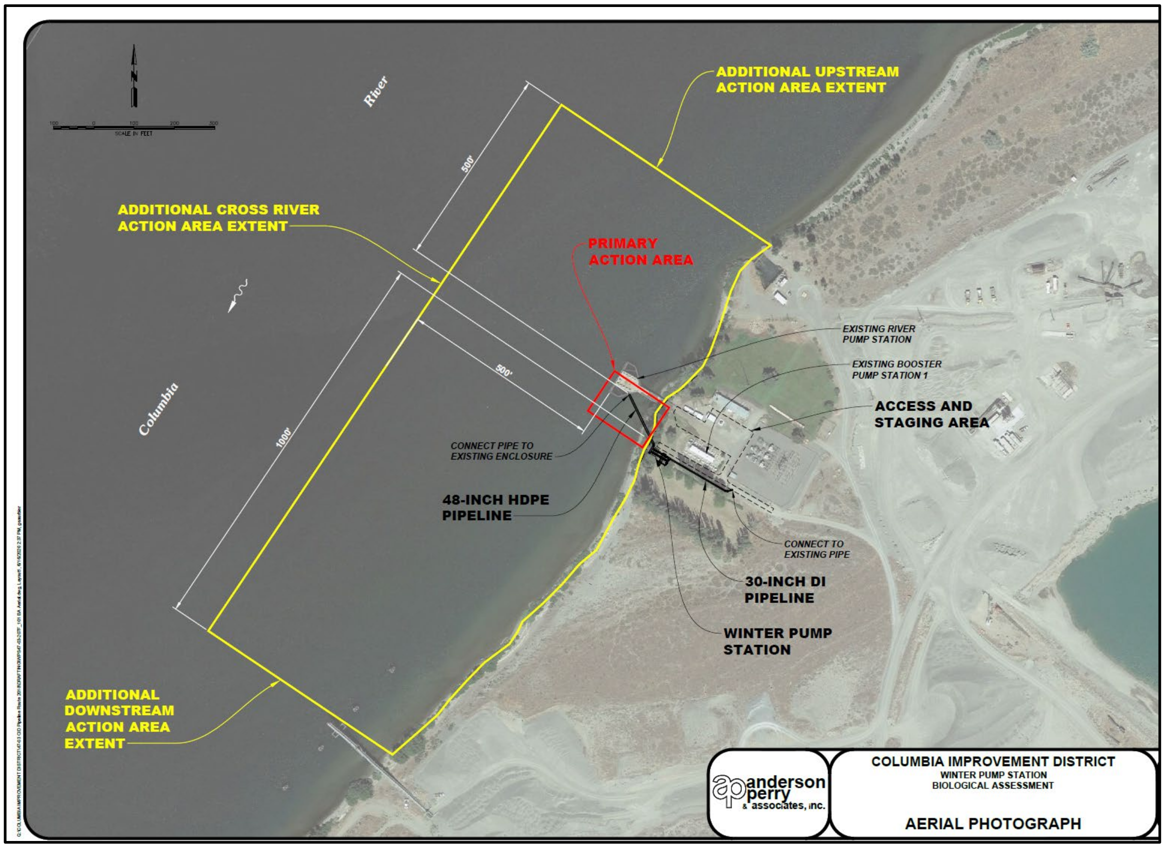

Figure 1. Project Location for Columbia Improvement District Pump Station. The depictions of the action area in this figure were drawn by the applicant, and are not indicative of the ESA action area.

The existing pump station is separated from the Columbia River by an enclosure wall. Six NMFS-approved tee screens keep debris and aquatic life out of the pump station. The six screens provide a total capacity of 439,800 gallons per minute (gpm), while the existing pump station has a pumping capacity of approximately 312,000 gpm (187,000 gpm for CID/125,000 gpm for Farmland Reserve, Inc.) The screens were designed with a 30% buffer to allow for loss of capacity between screen cleanings and to reduce the wet well drawdown.

1.3.1. New Intake Pipeline and In-water Construction

The proposed action includes the construction of the new upland winter pump station, and installation of two new approximately 100-ft-long, 36-inch-diameter high density polyethylene intake pipes.[1] The new intake pipes will be installed into a trench measuring approximately 25-ft-wide, 10-ft-deep, and 120-ft-long that will be excavated in the riverbed of the Columbia River. The contractor will use an excavator and crane, operated from the bank or a barge. The contractor completing the in-water installation will make the decision whether to use a barge.

[1] E-mail received October 2, 2020 from Dana Kurtz, Anderson and Perry) to Caila Heintz (U.S. Army Corps of Engineers) informing of a minor modification in the original proposed action as in the BA. The CID will install two 36-inch-diameter pipes instead of the one 48-inch-diameter pipe described in the submitted BA.

Approximate barge dimensions are 195-ft-long by 34-ft-wide. If the contractor uses a barge, the barge would cover approximately 6,630 ft^2 of shallow water habitat during the in-water work window for a 1-month duration as needed for the pipeline excavation and installation. Sediment curtains will be used to create a barrier to minimize the spread of turbidity. The pipe bedding material will be placed in the trench using a crane and the intake pipe will follow. Divers will secure the intake pipes to the existing river pump station wet well that is connected to the NMFS-approved fish screens. The pipes will be placed in the excavated trench and secured. There will be 926 cubic yards (cu yd) of the native substrate excavated, which will then be used to cover the installed pipe, and the riverbed contours will be restored. No new piles will be installed, and no impact or vibratory driving will be necessary for the project.

1.3.2 Upland New Winter Pump Station Construction

A concrete pump foundation (50-ft-long and 25-ft-wide) for the new pump station will be installed in the uplands next to the existing booster pump station, along with two pumps and a valve vault. A rubber-tracked excavator will create a trench for the new upland pipeline (180 ft long) to connect from the new winter pump station to the existing pipeline. Pipe bedding material will be placed and a 30-inch ductile iron pipe will be placed in the trench and connected to the existing pipeline.

The new pump station will be designed to upgrade the CID system to provide winter water withdrawals from the Columbia River for use by the POM.

1.3.3. Water Withdrawals.

Point of Diversion Transfer. The action includes a proposal to transfer the points of diversion (pending) of four established surface irrigation season water rights held by the POM. These existing water rights are limited to a maximum rate of 22.16 cfs and not to exceed 5,163.75 acre ft/year during the irrigation season (April 15 to September 30). The current water rights are withdrawn from the existing Frederickson Diversion located 400 ft upstream from the existing CID station. The point of diversion transfer proposes to convert the POM's water rights from the current irrigation only water right to a municipal and (or) industrial use water right. The water right change of use allows the POM the option for the water withdrawals to be used for irrigation, municipal or industrial needs. The conversion of the water right from irrigation to municipal water rights will require a volume limit and the rate limit during the irrigation season. If the POM uses the 5,164 acre feet maximum volume only from April 15–September 30, they cannot withdraw the full 22.16 cfs for the total 169 days of the irrigation season. During the irrigation season if daily water withdrawals occur with the transferred water right it could only be used at a rate of 15.4 cfs.

The point of diversion transfer would allow the POM to withdraw the existing water rights from either the current Frederickson Diversion or withdraw from the CID pump station located downstream 400 ft. The change of use from irrigation to municipal right would allow the water to convey through the POM non-potable water system for potential municipal needs. The applicants have described the POM future plans to transition some land from farming to industrial use. The change of use transfer will authorize the water right for future municipal/

industrial use. The applicant has not identified other specific new POM municipal or industrial development plans in the proposed action.

New Winter Water Right. The project also includes a proposed new water right for the POM, pending review by OWRD. This proposed new water right is for an additional withdrawal of 29.9 cfs (10,020 acre ft/year), outside of the irrigation season (October 1 to April 14). The new pump station would allow the water withdrawals for wintertime industrial and agricultural needs by the POM through this new 29.9 cfs winter water right. OWRD authorizes all water rights permits in Oregon. Following the approval of the transferred (converted) irrigation right and the new winter water right application the OWRD will require limited time of use for water withdrawn from the CID pump station or if withdrawn from the existing Frederickson Diversion as summarized in Table 1.[2]

Table 1. Summary of Port of Morrow Use of Water Rights for during Irrigation and Winter Season.

Time Period	Converted Irrigation Right Max Rate @ CID Diversion (cfs)	NEW Winter Water Right @ CID Diversion (cfs)
Mar 1 to Apr 14	0	29.9
Apr 15 to Sep 30	22.16*	0
Oct 1 to Feb 28	0	29.9

* = the more conservative maximum rate is 22.16 cfs during this part of the irrigation season, however based on the conversion of the volume to a municipal use rate, as described in this document, the rate is likely to be 15.4 cfs.

1.3.4. Conservation Measures

The following conservation measures and best management practices are identified in the submitted BA to minimize or avoid environmental impact to listed species or critical habitat.

- The project manager and project engineer will meet on site with the selected contractor, any state or federal agencies or interested parties prior to beginning work. They will ensure the locations of sensitive biological sites and measures to protect them are understood and will be followed.
- Equipment and vehicles will be parked and stored in the gravel staging areas. Preassembly of intake pipes and structures may occur at the staging area or on the existing pump station platform.
- Staging areas for non-work storage of equipment and vehicles, other than track-mounted vehicles will be located at least 150 ft away from the Columbia River.
- All equipment will be cleaned, maintained and refueled, prior to operating within 150 ft of the regulated work areas. Fuels and other hazardous materials will be placed greater than 150 ft from the Columbia River.
- All equipment will be inspected and cleaned in the vehicle staging area. All equipment will be checked for fluid leaks, and any leaks found will be fixed. External oil, grease,

[2] Email dated August 18, 2020 from Dana Kurtz (Anderson Perry & Associates) to Rebecca Viray (NMFS).This correspondence contained additional information summarizing the POM's allowed use of converted irrigation rights for municipal use during irrigation and winter season as prepared by Bruce Brody-Heine (Principal Hydrologist, GSI Water Solutions, Inc.)

dirt and mud will be removed from equipment. Temporary impoundments to catch water from equipment cleaning will be located at least 150 ft from the regulated work areas.

- No untreated wash and rinse water will be discharged directly into the Columbia River.
- Biodegradable lubricants will be used in equipment within 150 ft of the Columbia River. In-water construction and work will occur during the ODFW's in-water work window of December 1 to March 31 to minimize effects to fish.
- Erosion control measures will be installed prior to construction. Sediment curtains will be used to minimize turbidity released from in-water construction. Silt fencing will be used during ground disturbance activities on the riverbank to reduce sedimentation into the Columbia River.
- Spill prevention measures will be implemented, and fuel containment systems will be designed to completely contain a potential spill (e.g., using a 10-inch-deep pit lined with reinforced plastic sheeting and absorbent skimmer boom around bulk fuel tanks). Other pollution control devices and measures (such as diapering, parking on absorbance materials, etc.) adequate to provide containment of hazardous materials will also be used as necessary for equipment (track-mounted equipment, large cranes etc.) with limited mobility to minimize the risk of fuel reaching the Columbia River.
- Hazardous materials containment booms and spill containment booms will be maintained on site to facilitate the cleanup of hazardous materials spills. These containment booms will be installed where there is potential for release of pollutants or other toxicants.
- No waste material is anticipated to be generated from the project. However any waste or spoil materials will be disposed of at an upland site.
- Following excavation of the river channel and installation of new pipeline, native substrate will be replaced. The river channel and banks will be restored to pre-existing conditions.
- Minimal vegetation will be removed during the installation of the pipeline into the streambank.
- Turbidity will be monitored during construction.
- No impact or vibratory pile driving will be required.

We considered, under the ESA, whether or not the proposed action would cause any other activities and determined that it would result in an increase in water withdrawals outside of the irrigation season. The conversion of the irrigation water rights to municipal use may contribute towards additional development and uses for the new water withdrawals. However, based on discussions with the applicant, there are no current plans for the additional water, thus new development (either agricultural or industrial) is not reasonably certain to occur. Consequently, the effects of the water right conversion and diverting that water are considered in Effects of the Action, section 2.5, but the effects of any development as a consequence of the new water right are not considered in this opinion.

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

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

The Corps' consultation request included a submitted BA that determined the proposed action is NLAA LCR Chinook salmon, LCR coho salmon, LCR steelhead, UWR Chinook salmon, UWR steelhead, CR chum salmon, Pacific eulachon, green sturgeon, and southern resident killer whale, and their critical habitat. Our concurrence is documented in the "Not Likely to Adversely Affect" Determinations section (Section 2.13).

2.1. Analytical Approach

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

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

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

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

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

- Evaluate the rangewide status of the species and critical habitat expected to be adversely affected by the proposed action.
- Evaluate the environmental baseline of the species and critical habitat.

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

2.2. Rangewide Status of the Species and Critical Habitat

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

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

During the last century, average regional air temperatures in the Pacific Northwest increased by 1 to 1.4°F as an annual average, and up to 2°F in some seasons, based on average linear increase per decade (Abatzoglou et al. 2014; Kunkel et al. 2013). Warming is likely to continue during the next century as average temperatures are projected to increase another 3 to 10°F, with the largest increases predicted to occur in the summer (Mote et al. 2014).

Decreases in summer precipitation of as much as 30% by the end of the century are consistently predicted across climate models (Mote et al. 2014). Precipitation is more likely to occur during October through March, less during summer months, and more winter precipitation will be rain than snow (ISAB 2007; Mote et al. 2014). Earlier snowmelt will cause lower stream flows in late spring, summer, and fall, and water temperatures will be warmer (ISAB 2007; Mote et al. 2014). Models consistently predict increases in the frequency of severe winter precipitation events (i.e., 20-year and 50-year events), in the western United States (Dominguez et al. 2012). The largest increases in winter flood frequency and magnitude are predicted in mixed rain-snow watersheds (Mote et al. 2014).

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

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

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

Moreover, as atmospheric carbon emissions increase, increasing levels of carbon are absorbed by the oceans, changing the pH of the water. A 38 to 109% increase in acidity is projected by the end of this century in all but the most stringent CO^2 mitigation scenarios, and is essentially irreversible over a time scale of centuries (IPCC 2014). Regional factors appear to be amplifying acidification in Northwest ocean waters, which is occurring earlier and more acutely than in other regions and is already impacting important local marine species (Barton 2012; Feely et al. 2012). Acidification also affects sensitive estuary habitats, where organic matter and nutrient inputs further reduce pH and produce conditions more corrosive than those in offshore waters (Feely et al. 2012; Sunda and Cai. 2012).

Global sea levels are expected to continue rising throughout this century, reaching likely predicted increases of 10 to 32 inches by 2081–2100 (IPCC 2014). These changes will likely result in increased erosion and more frequent and severe coastal flooding and shifts in the composition of nearshore habitats (Tillmann and Siemann 2011). Estuarine-dependent salmonids such as chum and Chinook salmon are predicted to be impacted by significant reductions in rearing habitat in some Pacific Northwest coastal areas (Glick et al. 2007). Historically, warm periods in the coastal Pacific Ocean have coincided with relatively low abundances of salmon and steelhead, while cooler ocean periods have coincided with relatively high abundances, and therefore these species are predicted to fare poorly in warming ocean conditions (Scheuerell and Williams 2005; Zabel et al. 2006). This is supported by the recent observation that anomalously warm sea surface temperatures off the coast of Washington and Oregon in June 2015 resulted in poor coho and Chinook salmon body condition for juveniles caught in those waters (NWFSC 2015). Changes to estuarine and coastal conditions, as well as the timing of seasonal shifts in these habitats, have the potential to impact a wide range of listed aquatic species (Reeder et al. 2013).

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

2.2.1. Status of the Species

For Pacific salmon and steelhead, we commonly use the four "viable salmonid population" (VSP) criteria (McElhany et al. 2000) to assess the viability of the populations that, together, constitute the species. These four criteria (spatial structure, diversity, abundance, and productivity) 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.

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 on habitat quality and spatial configuration, and 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 in single genes to complex life history traits (McElhany et al. 2000).

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

Productivity, as applied to viability factors, refers to the entire life cycle (i.e., the number of naturally-spawning adults produced per parent). 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.

For species with multiple populations, once the biological status of a species' populations has been determined, we assess the status of the entire species using criteria for groups of populations, as described in recovery plans and guidance documents from technical recovery teams. 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 metapopulations (McElhany et al. 2000).

The summary that follows describes the status of seven ESA-listed species, and their designated critical habitats that occur within the geographic area of this proposed action and are considered in this opinion. More detailed information on the status and trends of these listed resources, and their biology and ecology, are in the listing regulations and critical habitat designations published in the Federal Register (Table 2), as well as applicable recovery plans and 5-year status reports. These additional documents are incorporated by reference (NMFS 2009; NMFS 2015; NMFS 2016a; NMFS 2016b; NMFS 2016c; NMFS 2017a; NMFS 2017b; UCSRB 2007). These documents are available on the NMFS West Coast Region website (http://www.westcoast.fisheries.noaa.gov/). The next 5-year status reviews will be completed in 2021.

Table 2. Listing status, status of critical habitat designations and protective regulations, and relevant Federal Register (FR) decision notices for ESA-listed species considered in this opinion. Listing status: 'T' means listed as threatened; 'E' means listed as endangered.

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
Sockeye salmon *(O. nerka)*			
Snake River	E 8/15/11; 70 FR 37160	12/28/93; 58 FR 68543	ESA section 9 applies
Steelhead (*O. mykiss*)			
Middle Columbia River	T 1/5/06; 71 FR 834	9/02/05; 70 FR 52630	6/28/05; 70 FR 37160
Upper Columbia River	T 1/5/06; 71 FR 834	9/02/05; 70 FR 52630	2/1/06; 71 FR 5178
Snake River Basin	T 1/5/06; 71 FR 834	9/02/05; 70 FR 52630	6/28/05; 70 FR 37160

Upper Columbia River Spring-run Chinook Salmon ESU

The UCR spring-run Chinook salmon ESU was originally listed as endangered under the ESA in 1998 (64 FR 14308), and the status was affirmed in 2005 and 2012. In 2016, the 5-year status review for UCR spring-run Chinook salmon concluded that the species should maintain its endangered listing classification (NMFS 2016c; NWFSC 2015).

A recovery plan is available for this species (UCSRB 2007). A 5-year status review was completed in 2016 (NMFS 2016c). Achieving recovery (i.e., delisting the species) of each ESU via sufficient improvement in the abundance, productivity, spatial structure, and diversity is the longer-term goal of the Upper Columbia Salmon Recovery Board (UCSRB) Plan. The recovery plan calls for meeting or exceeding the same basic spatial structure and diversity criteria adopted from the Interior Columbia Technical Recovery Team (ICTRT) viability report for recovery (NWFSC 2015). None of the three extant populations in this ESU are viable with respect to abundance and productivity (A&P), and they all have a greater than 25% chance of extinction in 100 years (UCSRB 2007).

Spatial structure and diversity. This species includes all naturally-spawned populations of spring-run Chinook salmon in all river reaches accessible to Chinook salmon in Columbia River tributaries upstream of the Rock Island Dam and downstream of Chief Joseph Dam (excluding the Okanogan River), the Columbia River upstream to Chief Joseph Dam, and progeny of six artificial propagation programs. Historically, UCR spring-run Chinook salmon likely included three major population groups (MPGs). Two of these MPGs were eliminated by the completion of Grand Coulee and Chief Joseph Dams (UCSRB 2007; NWFSC 2015). The remaining North Cascades MPG is comprised of three extant populations: the Wenatchee River, the Methow River, and the Entiat River populations.

The composite spatial structure and diversity (SS/D) risks for all three of the extant populations in this MPG are rated at high risk (Table 3). The natural processes component of the SS/D risk is low for the Wenatchee River and Methow River populations and moderate for the Entiat River population. All three populations are rated at high risk for diversity, driven primarily by chronically high proportions of hatchery-origin spawners (26 to 76%) in natural spawning areas and a lack of genetic diversity among the natural-origin spawners (ICTRT 2007; NWFSC 2015). This effect is particularly high in the Wenatchee and Methow populations with hatchery spawners composing 66% and 76%, respectively (NMFS 2014). The high proportion of hatchery spawners reflects the large increase in releases from the directed supplementation programs in those two drainages. The hatchery supplementation program in the Entiat was discontinued in 2007 and hatchery fish on the spawning grounds in the Entiat have declined in recent years.

Abundance and productivity. NMFS (2020) discussed updated adult abundance estimates for UCR spring-run Chinook salmon. These indicate a substantial downward trend in natural-origin spawners at the ESU level from 2015 to 2019. Returns through 2018, for each of the three extant populations remained considerably below the minimum abundance thresholds established by the ICTRT with substantial numbers of hatchery-origin fish on the spawning grounds. NMFS will evaluate the implications for viability risk of these more recent returns in the upcoming 5-year status review, expected in 2021. The status review will also consider new information on population productivity, diversity, and spatial structure.

Estimated productivity (returns-per-spawner) was on average about the same in 2009–2018 as in 1999 to 2008, and indicates that UCR spring-run Chinook salmon populations are not replacing themselves. Possible contributing factors include density dependent effects, differences in spawning distribution relative to habitat quality, and reduced fitness of hatchery-origin spawners. As of the last status review, the combinations of recent A&P for each population had resulted in a high risk rating for the ESU when compared to the ICTRT viability curves (NWFSC 2015). NMFS will evaluate the implications for viability risk of more recent adult returns in the upcoming 5-year status review, expected in 2021.

Table 3. Upper Columbia River Spring-run Chinook Salmon ESU population viability status summary.

Population	Abundance and productivity metrics*				Spatial Structure and Diversity (SS/D) metrics			Overall viability rating
	ICTRT Minimum Threshold	Natural Spawning Abundance	ICTRT Productivity	Integrated A&P Risk	Natural Processes Risk	Diversity Risk	Integrated SS/D Risk	
Wenatchee River 2005–2014	2,000	545 (311–1,030)	0.60 (0.27,15/20)	High	Low	High	High	High Risk
Entiat River 2005–2014	500	166 (78–354)	0.94 (0.18, 12/20)	High	Moderate	High	High	High Risk
Methow River 2005–2014	2,000	379 (189–929)	0.46 (0.31, 16/20)	High	Low	High	High	High Risk

*Current A&P estimates are geometric means. The range in annual abundance, standard error, and number of qualifying estimates for production are in parentheses. Upward arrows = current estimates increased from prior review. Oval = no change since prior review (NWFSC 2015). The Wenatchee, Entiat, and Methow River populations are considered a high risk for both A&P and composite spatial structure and diversity (SS/D), as they are noted in the above table.

There have been improvements in the viability ratings for some of the component populations, but overall several of the factors cited by the ICTRT (2007) remain as concerns or key uncertainties.

Limiting factors. Limiting factors include (NOAA 2011; UCSRB 2007):

- Effects related to the hydropower system in the mainstem Columbia River, including reduced upstream and downstream fish passage, altered ecosystem structure and function, altered flows, and degraded water quality
- Degradation of floodplain connectivity and function, channel structure and complexity, riparian areas and large woody debris recruitment, stream flow, and water quality
- Degraded estuarine and nearshore marine habitat
- Hatchery-related effects
- Persistence of non-native (exotic) fish species
- Harvest in Columbia River fisheries

Snake River Spring/Summer-run Chinook Salmon ESU

NMFS listed the SR spring/summer-run Chinook salmon ESU as a threatened species in 1992. The status was affirmed in 2005 and updated in 2014. NMFS released a final recovery plan for this species in October of 2017 (NMFS 2017a), and the most recent status review was completed in 2016 (NMFS 2016b). This species includes all naturally-spawned populations of spring/summer-run Chinook salmon originating from the mainstem Snake River and the

Tucannon River, Grande Ronde River, Imnaha River, and Salmon River subbasins, and from 10 artificial propagation programs (DOC 2014). The ICTRT recognized 28 extant and three extirpated populations of SR spring/summer-run Chinook salmon, and aggregated these into five MPGs that correspond to ecological subregions (Table 4) (ICTRT 2003; McClure and Cooney 2005). All but one extant population (Chamberlain Creek) are at “high” risk of extinction (Ford 2011, NWFSC 2015).

Spatial structure and diversity. Spatial structure ratings remain unchanged or stable with low or moderate risk levels for the majority of the populations in the ESU. Four populations from three MPGs (Catherine Creek and Upper Grande Ronde of the Grande Ronde/Imnaha River MPG, Lemhi River of the Upper Salmon River MPG, and Lower Middle Fork Salmon of the Middle Fork Salmon River MPG) remain at high risk for spatial structure loss. Three MPGs in this ESU have populations that are undergoing active supplementation with local broodstock hatchery programs. In most cases, those programs evolved from mitigation efforts and include some form of sliding-scale management guidelines that limit hatchery contribution to natural spawning based on the abundance of natural-origin fish returning to spawn—the more natural-origin fish that return, the fewer hatchery fish that are needed to spawn naturally. Sliding-scale management is designed to maximize hatchery benefits in low abundance years and reduce hatchery risks at higher spawning levels.

Table 4. Major population groups, populations, and scores for the key elements of abundance and productivity (A&P), diversity, and spatial structure and diversity (SS/D), used to determine current overall viability risk for Snake River spring/summer-run Chinook salmon (NWFSC 2015). Risk ratings included very low (VL), low (L), moderate (M), high (H), very high (VH), and extirpated (E). Maintained (MT) population status indicates that the population does not meet the criteria for a viable population but does support ecological functions and preserve options for recovery of the Distinct Population Segment (DPS).

Major Population Groups	Spawning Populations (Watershed)	A&P	Natural Processes Risk	Diversity	Integrated SS/D	Overall Viability Risk
Lower Snake River	Tucannon River	H	L	M	M	H
	Asotin River	N/A	N/A	N/A	N/A	E
Grande Ronde and Imnaha rivers	Wenaha River	H	L	M	M	H
	Lostine/Wallowa River	H	L	M	M	H
	Minam River	H	L	M	M	H
	Catherine Creek	H	M	M	M	H
	Upper Grande Ronde R.	H	H	M	H	H
	Imnaha River	H	L	M	M	H
	Lookingglass Creek	N/A	N/A	N/A	N/A	E
South Fork Salmon River	Little Salmon River	*	L	L	L	H
	South Fork mainstem	H	L	M	M	H
	Secesh River	H	L	L	L	H
	EF/Johnson Creek	H	L	L	L	H
Middle Fork Salmon River	Chamberlin Creek	M	L	L	L	MT
	Big Creek	H	VL	M	M	H
	Lower Mainstem MF	*	M	M	M	H
	Camas Creek	H	L	M	M	H

Major Population Groups	Spawning Populations (Watershed)	A&P	Natural Processes Risk	Diversity	Integrated SS/D	Overall Viability Risk
	Loon Creek	H	L	M	M	H
	Upper Mainstem MF	H	L	M	M	H
	Sulphur Creek	H	L	M	M	H
	Bear Valley Creek	H	VL	L	L	H
	Marsh Creek	H	L	L	L	H
Upper Salmon River	Salmon Lower Main	H	L	L	L	H
	Salmon Upper Main	H (M)	L	L	L	H
	Lemhi River	H	H	H	H	H
	Pahsimeroi River	H (M)	M	H	H	H
	Salmon East Fork	H	L	H	H	H
	Yankee Fork	H	M	H	H	H
	Valley Creek	H	L	M	M	H
	North Fork	*	L	L	L	H
	Panther Creek	N/A	N/A	N/A	N/A	E

*Insufficient data

Abundance and productivity. NMFS (2020) discussed updated adult abundance estimates for SR spring/summer Chinook salmon. These indicated a substantial downward trend in natural-origin spawners at the ESU level from 2014 to 2019. Returns during the last 3 years in the series, 2017 through 2019, were the lowest since 1999. These data also showed recent and substantial downward trends for most of the MPGs and populations, except those in the Lemhi River, Camas Creek, and Upper Grande Ronde Mainstem, when compared to the 2009 to 2013 period. All populations except Chamberlain Creek remained considerably below the minimum abundance thresholds established by the ICTRT. For many populations, the total spawner counts include substantial numbers of hatchery-origin adults. Exceptions were the entirety of the Middle Fork MPG and several populations in the Upper Salmon MPG. NMFS will evaluate the implications for viability risk of these more recent returns in the upcoming 5-year status review, expected in 2021. The status review will also consider new information on population productivity, diversity, and spatial structure.

Most populations will need to see increases in A&P in order for the ESU to recover. As of the last status review, NWFSC (2015) stated that the SR spring/summer-run Chinook salmon ESU remained at high overall risk, with the exception of the Chamberlain Creek population in the Middle Fork Salmon River MPG.

Limiting factors. Limiting factors for this species include:

- Degradation of floodplain connectivity and function, channel structure and complexity, riparian areas and large woody debris recruitment, stream flow, and water quality.
- Effects related to the hydropower system in the mainstem Columbia River, including reduced upstream and downstream fish passage, altered ecosystem structure and function, altered flows, and degraded water quality
- Harvest-related effects
- Predation

Snake River Fall-run Chinook Salmon ESU

Snake River fall-run Chinook salmon were originally listed as threatened in 1992 (57 FR 14653). The status was affirmed in 2005 and updated in 2014. NMFS released a final recovery plan for this species in November 2017 (NMFS 2017b). A 5-year status review was completed in 2016 (NMFS 2016b). This species includes all naturally-spawned populations of fall-run Chinook salmon originating from the mainstem Snake River below Hells Canyon Dam; from the Tucannon River, Grande Ronde River, Imnaha River, Salmon River, and Clearwater River subbasins; and from four artificial propagation programs (DOC 2014).

The ICTRT identified three populations of this species, although only the lower mainstem population exists at present, and it spawns in the lower mainstem of the Clearwater, Imnaha, Grande Ronde, Salmon and Tucannon rivers. The extant population of SR fall-run Chinook salmon is the only remaining population from a historical ESU that also included large mainstem populations upstream of the current location of the Hells Canyon Dam complex (ICTRT 2003; McClure and Cooney 2005). The extant population has a high proportion of hatchery-origin spawners.

NMFS (2020) discussed updated adult abundance estimates for SR fall Chinook salmon. These indicated a substantial downward trend in the abundance of natural-origin spawners at the ESU level during 2013 to 2019. However, overall abundance remained higher than before 2005. NMFS will evaluate the implications for viability risk of these more recent returns in the upcoming 5-year status review, expected in 2021. The status review will also consider new information on productivity, diversity, and spatial structure.

The SR fall Chinook salmon ESU is composed of a single demographically independent population. Five-year geometric means in the numbers of natural-origin and total (natural- plus hatchery-origin) spawners through 2018 indicated very small negative changes in abundance between the two most recent 5-year periods (NMFS 2020).

As of the last status review, the ESU was considered viable, but would need to see an increase in productivity combined with a reduction in diversity risk to recover (ICTRT 2010; NWFSC 2015). The single population delisting options provided in the draft Snake River Fall Chinook Recovery Plan would require the population to meet or exceed minimum requirements for Highly Viable with a high degree of certainty (NWFSC 2015).

Limiting factors. Limiting factors for this species include:

- Degradation of floodplain connectivity and function and channel structure and complexity
- Harvest-related effects
- Loss of access to historical habitat above Hells Canyon and other Snake River dams
- Impacts from mainstem Columbia River and Snake River hydropower systems
- Hatchery-related effects
- Degraded estuarine and nearshore habitat

Snake River Sockeye Salmon ESU

The SR sockeye salmon were ESA-listed in November 1991 (56 FR 58619) as endangered. We reaffirmed the listing in 2005 (70 FR 2853). Best available information indicates that the SR sockeye salmon ESU is at high risk and remains at endangered status. The NMFS released a final recovery plan for this species on June 8, 2015 (NMFS 2015). The most recent 5-year status review was completed in 2016 (NMFS 2016b). Overall, the recovery strategy aims to reintroduce and support adaptation of naturally self-sustaining sockeye salmon populations in the Sawtooth Valley lakes.

Spatial structure and diversity. This species includes all anadromous and residual sockeye salmon from the SR Basin, Idaho, and artificially-propagated sockeye salmon from the Redfish Lake Captive Broodstock Programs (DOC 2014). The ICTRT defined Sawtooth Valley sockeye salmon as the single MPG within the SR sockeye salmon ESU. The MPG contains one extant population (Redfish Lake) and two to four historical populations (Alturas, Petit, Stanley, and Yellowbelly lakes) (NMFS 2015). At the time of listing in 1991, the only confirmed extant population included in this ESU was the beach-spawning population of sockeye salmon from Redfish Lake, with about 10 fish returning per year (NMFS 2015). At this stage of the recovery efforts with limited distribution across the Sawtooth Valley lakes, the ESU remains rated at high risk for both spatial structure and diversity (NWFSC 2015).

Abundance and productivity. NMFS (2020) discussed updated adult abundance estimates for SR sockeye salmon. These indicate a substantial downward trend in the returns of hatchery-origin and natural-origin adults to the Sawtooth Valley since 2014. The 5-year geometric mean of total spawner counts declined 6% in 2014 to 2018 when compared to 2009 to 2013. NMFS will evaluate the implications for viability risk of these more recent returns in the upcoming 5-year status review, expected in 2021. The status review will also consider new information on productivity, diversity, and spatial structure.

Limiting factors. The key factor limiting recovery of the SR sockeye salmon ESU is survival. In the Sawtooth Valley natal lakes, limiting factors include blocked access; low zooplankton density (which can restrict sockeye salmon growth and fitness); current and legacy effects of land use and other human activities such as mining, grazing, recreational use, lakeshore development, and irrigation diversions; lake poisoning; and introduction and continued stocking of non-native species (such as brook trout, rainbow trout, lake trout, and kokanee).

Portions of the migration corridor in the Salmon River are impaired by reduced water quality and elevated temperatures (IDEQ 2011). The natural hydrological regime in the upper mainstem Salmon River Basin has been altered by water withdrawals. Survival rates from Lower Granite Dam to the spawning grounds are low in some years (e.g., average of 31%, range of 0–67% for 1991–1999) (Keefer et al. 2008b). Keefer et al. (2008b) conducted a radio tagging study on adult SR sockeye salmon passing upstream from Lower Granite Dam in 2000 and concluded that high in-river mortalities could be explained by "a combination of high migration corridor water temperatures and poor initial fish condition or parasite loads." Keefer et al. (2008b) also examined current run timing of SR sockeye salmon versus records from the early 1960s, and concluded that an apparent shift to earlier run timing recently may reflect increased mortalities for later migrating adults. In the Columbia and lower Snake River migration corridor, predation rates on juvenile sockeye salmon are unknown, but terns and cormorants consume 12% of all salmon smolts reaching the estuary, and piscivorous fish consume an estimated 8% of migrating juvenile salmon (NOAA 2011), a significant source of mortality.

Upper Columbia River Steelhead DPS

The UCR steelhead distinct population segment (DPS) was originally listed under the ESA in 1997 (62 FR 43937). The Upper Columbia Recovery Plan calls for "…restoring the distribution of naturally-produced spring-run Chinook salmon and steelhead to previously occupied areas where practical, and conserving their genetic and phenotypic diversity" (UCSRB 2007). In 2015, the 5-year review for the UCR steelhead concluded the species should maintain its threatened listing classification (NMFS 2016c).

Spatial structure and diversity. The UCR steelhead DPS is composed of a single MPG which includes four naturally-spawned anadromous steelhead populations below natural and artificial impassable barriers in streams within the Columbia River Basin, upstream from the Yakima River, Washington, to the United States–Canada border, as well as six artificial propagation programs. Historically, there were likely three MPGs. Two additional steelhead MPGs likely spawned above Grand Coulee and Chief Joseph Dams, but these MPGs are extirpated, and reintroduction is not required for ESA recovery (UCSRB 2007). NMFS has defined the UCR steelhead DPS to include only the anadromous members of this species (70 FR 67130).

All extant natural populations are considered to be at high risk of extinction for SS/D (NWFSC 2015). With the exception of the Okanogan population, the UCR steelhead populations were rated as low risk for spatial structure. Each population is at high risk for diversity, largely driven by chronic high levels of hatchery spawners within natural spawning areas and lack of genetic diversity among the populations. The proportions of hatchery-origin returns in natural spawning areas remain extremely high across the DPS, especially in the Methow and Okanogan River populations.

Abundance and productivity. NMFS (2020) discussed updated adult abundance estimates for UCR steelhead. These indicate a substantial downward trend in the number of natural-origin spawners at the DPS level from 2014 to 2019. Population level estimates of natural-origin and total (natural- and hatchery-origin) spawners through 2018 also showed recent and substantial downward trends for most of the populations. All populations remain considerably below the minimum abundance thresholds established by the ICTRT.

NMFS will evaluate the implications for viability risk of these more recent returns in the upcoming 5-year status review, expected in 2021. The status review will also consider new information on productivity, diversity, and spatial structure.

Limiting Factors. Limiting factors for this species include (NOAA 2011; UCSRB 2007):

- Adverse effects related to the mainstem Columbia River hydropower system
- Impaired tributary fish passage
- Degradation of floodplain connectivity and function, channel structure and complexity, riparian areas, large woody debris recruitment, stream flow, and water quality

- Hatchery-related effects
- Predation and competition
- Harvest-related effects

Snake River Basin Steelhead DPS

This ESU was first listed as endangered under the ESA in 1991 (62 FR 43937). In October of 2017, NMFS released the final SR Spring/Summer-run Chinook Salmon and Steelhead Recovery Plan (NMFS 2017a). The most recent 5-year status review was completed in 2016 (NMFS 2016b). The overall viability ratings for natural populations in the SRB steelhead DPS range from moderate to high risk. Four out of the six MPGs are not meeting the specific objectives in the recovery plan; the Grande Ronde MPG is tentatively rated as viable.

Spatial structure and diversity. The SRB steelhead DPS includes all naturally-spawned anadromous steelhead populations originating below natural and manmade impassable barriers in streams in the Snake River Basin of southeast Washington, northeast Oregon, and Idaho. Twenty-four historical populations (an additional three are extirpated) within six MPGs comprise the SRB steelhead DPS. Inside the geographic range of the DPS, 12 hatchery steelhead programs are currently operational. Five of these artificial programs are included in the DPS. With one exception, spatial structure ratings for all of the SRB steelhead populations were low or very low risk, given the evidence for distribution of natural production within populations. The exception was the Panther Creek population, which was given a high risk rating for spatial structure based on the lack of spawning in the upper sections. No new information was provided for the 201status technical review that would change those ratings (Table 5) (NWFSC 2015).

Table 5. Major population groups, populations, and scores for the key elements of A&P, diversity, and spatial structure and diversity (SS/D), used to determine current overall viability risk for Snake River Basin steelhead (Ford 2011; NMFS 2011b). Risk ratings included very low (VL), low (L), moderate (M), and high (H). Maintained (MT) population status indicates that the population does not meet the criteria for a viable population but does support ecological functions and preserve options for recovery of the Distinct Population Segment.

Major Population Group	Spawning Populations (Watershed)	ICTRT Minimum Threshold	A&P	Diversity	Integrated SS/D	Overall Viability Risk*
Lower Snake River	Tucannon River	1,000	H?	M	M	H?
	Asotin Creek	500	M?	M	M	MT
Grande Ronde River	Lower Grande Ronde	1,000	**	M	M	MT?
	Joseph Creek	500	VL	L	L	Highly viable
	Upper Grande Ronde	1,500	V	M	M	Viable
	Wallowa River	1,000	H?	L	L	M?

Major Population Group	Spawning Populations (Watershed)	ICTRT Minimum Threshold	A&P	Diversity	Integrated SS/D	Overall Viability Risk*
Clearwater River	Lower Clearwater	1,500	M?	L	L	MT?
	South Fork Clearwater	1,000	H	M	M	H?/MT
	Lolo Creek	500	H	M	M	H?/MT
	Selway River	1,000	M?	L	L	MT?
	Lochsa River	1,000	M?H	L	L	MT?
Salmon River	Little Salmon River	500	M?	M	M	MT?
	South Fork Salmon	1,000	M?	L	L	MT?
	Secesh River	500	M?	L	L	MT?
	Chamberlain Creek	500	M?	L	L	MT?
	Lower MF Salmon	1,000	M?	L	L	MT?
	Upper MF Salmon	1,000	M?	L	L	MT?
	Panther Creek	500	M?	M	H	H?
	North Fork Salmon	500	M	M	M	MT?
	Lemhi River		**	M	M	MT
	Pahsimeroi River	1,000	M	M	M	MT?
	East Fork Salmon	1,000	M	M	M	MT?
	Upper Main Salmon	1,000	M	M	M	MT?
Imnaha	Imnaha River	1,000	M	M	M	M

* There is uncertainty in these ratings due to a lack of population-specific data.
** Insufficient data.
? Ratings are based on limited or provisional data series.

Abundance and productivity. NMFS (2020) discussed updated adult abundance estimates for SRB steelhead. These indicate a substantial downward trend in the abundance of natural-origin spawners at the DPS level from 2014 to 2019. The number of natural-origin spawners in the Upper Grande Ronde Mainstem population appears to have been at or above the minimum abundance threshold established by the ICTRT, while the Tucannon River and Asotin Creek populations have remained below their respective thresholds). The 2019 abundance level for the Tucannon River population was lower than the most recent 5-year geomean. For many other SRB steelhead populations, spawning ground surveys are not feasible due to high spring flows that would wash out weirs and low visibility that precludes redd counts. The IDFG, Columbia River Inter-Tribal Fish Commission (CRITFC), and the NWFSC therefore collect tissue samples from adult steelhead trapped at Lower Granite Dam and assign these fish to genetic stocks by comparing them to samples taken inside the boundary of each spawning population (NMFS 2020). The genetic stock identification (GSI) groups are broader than spawning populations, but fit within the MPGs. The most recent 5-year geometric means indicate large decreases in natural-origin abundance for most of the genetic stocks/MPGs, with a smaller decrease for the Upper Clearwater genetic stock group.

NMFS will evaluate the implications for viability risk of these more recent returns in the upcoming 5-year status review, expected in 2021. The status review will also consider new information on population productivity, diversity, and spatial structure.

Limiting factors. Limiting factors for this species include (NMFS 2011a; NMFS 2011b):

- Adverse effects related to the mainstem Columbia River hydropower system
- Impaired tributary fish passage
- Degradation of floodplain connectivity and function, channel structure and complexity, riparian areas and large woody debris recruitment, stream flow, and water quality
- Increased water temperature
- Harvest-related effects, particularly for B-run steelhead
- Predation
- Genetic diversity effects from out-of-population hatchery releases
- Harvest-related effects
- Effects of predation, competition, and disease

Middle Columbia River Steelhead DPS

In 1999, NMFS listed MCR steelhead under the ESA as a threatened species (64 FR 14517). A recovery plan is available for this species (NMFS 2009), and this plan details much of the existing status information for the MCR steelhead. The most recent 5-year status review was completed in 2016 (NMFS 2016a).

Spatial structure and diversity. This species includes all naturally-spawned steelhead populations originating below natural and manmade impassable barriers from the Columbia River and its tributaries upstream of the Wind and Hood rivers (exclusive) to and including the Yakima River, excluding steelhead originating from the Snake River Basin. This DPS includes steelhead from seven artificial propagation programs (DOC 2014). The DPS does not currently include steelhead that are designated as part of an experimental population above the Pelton Round Butte Hydroelectric Project in the Deschutes River Basin, Oregon (DOC 2014). The ICTRT identified 17 extant populations in this DPS (ICTRT 2003; McClure and Cooney 2005). The populations fall into four MPGs: Cascade eastern slope tributaries (five extant and two extirpated populations), the John Day River (five extant populations), the Walla Walla and Umatilla rivers (three extant and one extirpated populations), and the Yakima River (four extant populations) (ICTRT 2003; McClure and Cooney 2005). Viability ratings for these populations range from extirpated to viable (Table 6) (NMFS 2009, NWFSC 2015).

Abundance and productivity. NMFS (2020) discussed updated adult abundance estimates for MCR steelhead. These indicate a substantial downward trend in the abundance of natural-origin spawners at the DPS level from 2014 to 2019. Population level estimates of natural-origin and total (natural- plus hatchery-origin) spawners through 2018 or 2019 also showed recent and substantial downward trends in abundance for most of the MPGs and populations (exceptions are the Klickitat and Yakima River populations) when compared to the 2009 to 2013 period. In many cases, the most recent 5-year geometric mean in natural-origin abundance is considerably below the minimum abundance thresholds established by the ICTRT. However, the Klickitat, Middle Fork John Day, and Umatilla River populations are well above these thresholds. A relatively limited number of hatchery fish is present on the spawning grounds within this DPS.

NMFS will evaluate the implications for viability risk of these more recent returns in the upcoming 5-year status review, expected in 2021. The status review will also consider new information on productivity, diversity, and spatial structure.

Table 6. Major population groups, populations, and scores for the key elements of A&P, diversity, and spatial structure and diversity (SS/D), used to determine current overall viability risk for Middle Columbia River steelhead). Risk ratings included very low (VL), low (L), moderate (M), high (H), and extirpated (E). Maintained (MT) population status indicates that the population does not meet the criteria for a viable population but does support ecological functions and preserve options for recovery of the Distinct Population Segment.

Major Population Group	Population (Watershed)	A&P	Natural Processes Risk	Diversity	Integrated SS/D	Overall Viability Risk
Cascade Eastern Slope Tributaries	Fifteenmile Creek	M	VL	L	L	MT
	Klickitat River	M	L	M	M	MT
	Deschutes Eastside	L	L	M	M	Viable
	Deschutes Westside	H	L	M	M	H
	Rock Creek	*	M	M	M	H
	White Salmon	N/A	N/A	N/A	N/A	E
	Crooked River	N/A	N/A	N/A	N/A	E
John Day River	Upper John Day	M	VL	M	M	MT
	North Fork John Day	VL	VL	L	L	Highly Viable
	Middle Fork John Day	L	L	M	M	Viable
	South Fork John Day	L	VL	M	M	Viable
	Lower John Day Tributaries	M	VL	M	M	MT
Walla Walla and Umatilla rivers	Umatilla River	M	M	M	M	MT
	Touchet River	H	L	M	M	H
	Walla Walla River	M	M	M	M	MT
Yakima River	Satus Creek	L	L	M	M	Viable
	Toppenish Creek	L	L	M	M	Viable
	Naches River	M	L	M	M	M
	Upper Yakima	M	M	H	H	H

* Re-introduction efforts underway (NMFS 2009)

Limiting factors. Limiting factors for this species include (NMFS 2009; NOAA Fisheries 2011):

- Degradation of floodplain connectivity and function, channel structure and complexity, riparian areas, fish passage, stream substrate, stream flow, and water quality
- Mainstem Columbia River hydropower-related impacts
- Degraded estuarine and nearshore marine habitat
- Hatchery-related effects
- Harvest-related effects
- Effects of predation, competition, and disease

2.2.2. Status of Critical Habitat

In this section, we examine the status of designated critical habitat by examining the condition and trends of the essential PBFs of that habitat throughout the designated areas (Tables 7 and 8). These features are essential to the conservation of the ESA-listed species because they support one or more of the species' life stages (e.g., sites with conditions that support spawning, rearing, migration and foraging). Rangewide, all habitat types are impaired to some degree, even though many of the watersheds comprising the fully designated area are ranked as providing high conservation value. The proposed action, however, affects only freshwater rearing and freshwater migration habitats.

Table 7. Physical and biological features of critical habitat designated for ESA-listed species considered in this opinion (except Snake River spring/summer-run Chinook salmon, Snake River fall-run Chinook salmon, and Snake River sockeye salmon), and corresponding species life history events.

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

Table 8. Physical and biological features of critical habitats designated for Snake River spring/summer-run Chinook salmon, Snake River fall-run Chinook salmon, and Snake River sockeye salmon and corresponding species life history events.

Physical or Biological Features		Species Life History Event
Site Type	**Site Attribute**	
Spawning and juvenile rearing areas	Access (sockeye) Cover/shelter Food (juvenile rearing) Riparian vegetation Space (Chinook) Spawning gravel Water quality Water temp (sockeye) Water quantity	Adult spawning Embryo incubation Alevin growth and development Fry emergence from gravel Fry/parr/smolt growth and development
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

For salmon and steelhead, NMFS' critical habitat analytical review teams (CHARTs) ranked watersheds within designated critical habitat at the scale of the fifth-field hydrologic unit code (HUC5) in terms of the conservation value they provide to each ESA-listed species that they support (NMFS 2005). The conservation rankings are high, medium, or low. To determine the conservation value of each watershed to species viability, the CHARTs evaluated the quantity and quality of habitat features (e.g., spawning gravels, wood and water condition, side channels), the relationship of the area compared to other areas within the species' range, and the significance of the population occupying that area to the species' viability criteria. Thus, even if a location had poor habitat quality, it could be ranked with a high conservation value, if it were essential due to factors such as limited availability (e.g., one of a very few spawning areas), a unique contribution of the population it served (e.g., a population at the extreme end of geographic distribution), or the fact that it serves another important role (e.g., obligate area for migration to upstream spawning areas).

Interior Columbia Recovery Domain

Critical habitat has been designated in the Interior Columbia recovery domain (ICRD), which includes the SR spring/summer-run Chinook salmon, SR fall-run Chinook salmon, UCR spring-run Chinook salmon, SR sockeye salmon, MCR steelhead, UCR steelhead, and SRB steelhead.

Habitat quality in tributary streams in the ICRD varies from excellent in wilderness and roadless areas to poor in areas subject to heavy agricultural and urban developments. 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 reduced habitat complexity are common problems for critical habitat in developed areas.

Migratory habitat quality in this area has been affected by the development and operation of the Columbia River System (CRS) 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 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 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. Also, operation and maintenance of large water reclamation systems such as the Umatilla Basin and Yakima Projects have significantly modified flow regimes and degraded water quality and physical habitat in this domain.

Many stream reaches designated as critical habitat in the ICRD are over-allocated, with more allocated water rights than existing streamflow. 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 streamflow has been identified as a major limiting factor for all listed salmon and steelhead species in this recovery domain except SR fall-run Chinook salmon and SR sockeye salmon (NMFS 2007; NMFS 2011a).

Many stream reaches designated as critical habitat are listed on the state of Oregon's Clean Water Act section 303(d) list for water temperature. Many areas that were historically suitable rearing and spawning habitat are now unsuitable due to high summer stream temperatures. Removal of riparian vegetation, alteration of natural stream morphology, and withdrawal of water all contribute to elevated stream temperatures. Contaminants such as insecticides and herbicides from agricultural runoff and heavy metals from mine waste are common in some areas of critical habitat.

The ICRD is a very large and diverse area. The CHART determined that few watersheds with PBFs for Chinook salmon or steelhead are in good to excellent condition with no potential for improvement. Overall, most ICRD watersheds are in fair-to-poor or fair-to-good condition. However, most of these watersheds have some potential for improvement.

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 Columbia River corridor is ranked as high conservation value. The CHARTs 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.

A summary of the status of critical habitats considered in this opinion is provided in Table 9.

Table 9. Critical habitat, designation date, Federal Register (FR) citation, and status summary for critical habitat considered in this opinion.

Species	Designation Date and Federal Register Citation	Critical Habitat Status Summary
Upper Columbia River spring-run Chinook salmon	9/02/05 70 FR 52630	Critical habitat encompasses four subbasins in Washington containing 15 occupied watersheds, as well as the Columbia River rearing/migration corridor. Most HUC5 watersheds with PBFs for salmon are in fair-to-poor or fair-to-good condition. However, most of these watersheds have some, or high, potential for improvement. We rated the conservation value of HUC5 watersheds as high for 10 watersheds, and medium for five watersheds. The conservation value of migration habitat in this area has been affected by the development and operation of the dams and reservoirs of the Columbia River Systems.
Snake River spring/summer-run Chinook salmon	10/25/99 64 FR 57399	Critical habitat consists of river reaches of the Columbia, Snake, and Salmon rivers, and all tributaries of the Snake and Salmon rivers (except the Clearwater River) presently or historically accessible to this ESU (except reaches above impassable natural falls and Hells Canyon Dam). Habitat quality in tributary streams varies from excellent in wilderness and roadless areas, to poor in areas subject to heavy agricultural and urban development (Wissmar et al. 1994). Reduced summer stream flows, impaired water quality, and reduced habitat complexity are common problems. Migratory habitat quality in this area has been severely affected by the development and operation of the dams and reservoirs of the Columbia River Systems.

Species	Designation Date and Federal Register Citation	Critical Habitat Status Summary
Snake River fall-run Chinook salmon	10/25/99 64 FR 57399	Critical habitat consists of river reaches of the Columbia, Snake, and Salmon rivers, and all tributaries of the Snake and Salmon rivers presently or historically accessible to this ESU (except reaches above impassable natural falls, and Dworshak and Hells Canyon dams). Habitat quality in tributary streams varies from excellent in wilderness and roadless areas, to poor in areas subject to heavy agricultural and urban development (Wissmar et al. 1994). Reduced summer stream flows, impaired water quality, and reduced habitat complexity are common problems. Migratory habitat quality in this area has been severely affected by the development and operation of the dams and reservoirs of the Columbia River Systems.
Snake River sockeye salmon	10/25/99 64 FR 57399	Critical habitat consists of river reaches of the Columbia, Snake, and Salmon rivers; Alturas Lake Creek; Valley Creek; and Stanley, Redfish, Yellow Belly, Pettit and Alturas lakes (including their inlet and outlet creeks). Water quality in all five lakes generally is adequate for juvenile sockeye salmon, although zooplankton numbers vary considerably. Some reaches of the Salmon River and tributaries exhibit temporary elevated water temperatures and sediment loads that could restrict sockeye salmon production and survival. Migratory habitat quality in this area has been severely affected by the development and operation of the dams and reservoirs of the Columbia River Systems.
Upper Columbia River steelhead	9/02/05 70 FR 52630	Critical habitat encompasses 10 subbasins in Washington containing 31 occupied watersheds, as well as the Columbia River rearing/migration corridor. Most HUC5 watersheds with PCEs for salmon are in fair-to-poor or fair-to-good condition (NMFS 2005). However, most of these watersheds have some or a high potential for improvement. We rated the conservation value of HUC5 watersheds as high for 20 watersheds, medium for eight watersheds, and low for three watersheds.
Snake River Basin steelhead	9/02/05 70 FR 52630	Critical habitat encompasses 25 subbasins in Oregon, Washington, and Idaho. Habitat quality in tributary streams varies from excellent in wilderness and roadless areas, to poor in areas subject to heavy agricultural and urban development (Wissmar et al. 1994). Reduced summer stream flows, impaired water quality, and reduced habitat complexity are common problems. Migratory habitat quality in this area has been severely affected by the development and operation of the dams and reservoirs of the Columbia River Systems.

Species	Designation Date and Federal Register Citation	Critical Habitat Status Summary
Middle Columbia River steelhead	9/02/05 70 FR 52630	Critical habitat encompasses 15 subbasins in Oregon and Washington containing 111 occupied watersheds, as well as the Columbia River rearing/migration corridor. Most HUC5 watersheds with PBFs for salmon are in fair-to-poor or fair-to-good condition (NMFS 2005). However, most of these watersheds have some or a high potential for improvement. We rated the conservation value of occupied HUC5 watersheds as high for 80 watersheds, medium for 24 watersheds, and low for 9 watersheds.

HUC5=Fifth-field Hydrologic Code; ESU=Evolutionarily Significant unit; PBF= Physical or Biological Feature; PCE=Primary Constituent Element.

2.3. Action Area

"Action area" means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). The action area for the proposed action includes the area 500 ft upstream of the in-water activity at the CID intake station at Columbia River RM 271 based on anticipated turbidity plumes from construction-related activities. The action extends downstream to the confluence with the Pacific Ocean based on reductions in flow from new water withdrawals. We anticipate any reduction of in-stream flow due to the proposed new water withdrawals will be indistinguishable beyond the confluence of the Columbia River with the Pacific Ocean.

2.4. Environmental Baseline

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

The project site is within the John Day Reservoir of the Columbia River near Boardman, Oregon. The location is in a rural area dominated by irrigated agricultural and industrial use. Multiple other pump stations exist on the shoreline of Columbia River. The current facilities contain the existing CID pumping station and intakes that reside on a docking station shared with the Farmlands Reserve. The new pump station site is 1.2 miles upstream from the POM. The existing water withdrawals are drawn from the Frederickson Diversion located 400 ft upstream from the existing CID pump station. The Umatilla Wildlife Refuge is approximately 700 ft upstream from the site location, and thus outside of the action area.

The action area includes the footprint of in-water construction along the shoreline, and within shallow waters and upland areas of the mainstem Columbia River. The project site has been heavily impacted by anthropogenic alterations along the shoreline and upland areas. The Columbia River shoreline is composed of sand, large gravels, cobble substrate and depositional materials. There is no suitable spawning habitat and it is low quality for benthic prey production. There is minimal riparian vegetation and few trees along the shoreline and banks of the Columbia River. The site does not contain large woody material, pools or off-channel habitat or refugia. The upland portion of the project site for the new winter pumphouse contains existing facility structures, gravel areas and spaces previously altered over the years for agricultural and industrial uses.

Current conditions within much of the mainstem Columbia River are degraded relative to historical conditions, a reflection of a multitude of actions whose effects frame the environmental baseline in the action area. The hydropower system has greatly modified natural flow and altered the hydrograph of the Columbia River, water impoundments have altered water quality resulting in higher water temperatures and elevated sediments, changes in fish community structure leading to increased rates of piscivorous and avian predation on juvenile salmon and steelhead, altering fish passage and delayed migration for both adults and juveniles. Shoreline development has reduced natural vegetation, disconnected floodplains, and reduced available off-channel refugia.

The mainstem dams and reservoirs, such as John Day Reservoir (where the project is located), continue to substantially alter the mainstem migration corridor habitat. The reservoirs have increased the cross-sectional area of the river, reducing water velocity, altering the food web, and creating habitat for native and non-native species that are predators, competitors, or food sources for migrating juvenile salmon and steelhead. Travel times of migrating smolts increase as they pass through the reservoirs (compared to a free-flowing river), increasing exposure to both native and nonnative predators, and some juveniles are injured or killed as they pass through the dams (turbines, bypass systems, spillbays, or surface passage routes) (NMFS 2019). However, overall passage conditions and resulting juvenile survival rates in this part of the migration corridor have improved substantially since the 1990s, when these species were listed. This is most likely the result of improved structures and operations and predator-management programs at the John Day project and other dams (24-hour volitional spill, surface passage routes, improved juvenile bypass systems, predator-management measures, etc.)

In addition, numerous anthropogenic features or activities near the project site and throughout the action area (e.g., dams, pump stations, 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., litterfall, 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 historical 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.

The Columbia River shoreline, shallow water habitat, and natural vegetation is altered with in-water structures, rock, and riprap. 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. The Columbia River within the project area likely serves as juvenile rearing habitat and as a migration corridor for all ESUs/DPSs of spring- and fall-run Chinook salmon and steelhead and potentially sockeye salmon. Project activities will occur during winter, the recommended in-water work period, when adults do not typically occupy the project area. An occasional adult steelhead could be present year round in the mainstem Columbia River.

John Day Dam has created reservoir conditions in the project vicinity, with daily fluctuations in water level. John Day Reservoir is considered water quality limited by the Oregon Department of Environmental Quality (ODEQ) and it is on the Clean Water Act section 303(d) list for water temperature and pH (ODEQ 2006). Water temperatures in the action area are often elevated in the summer and early fall. Chemical contamination, nutrients and dissolved oxygen are also issues of water quality concern in the area. Turbidity in the reservoir is often elevated.

On the mainstem Columbia River, hydropower projects, water storage projects and the withdrawal of water for irrigation and urban uses have significantly degraded salmon and steelhead habitats (NMFS 2013). The volume of water discharged by the Columbia River varies seasonally according to runoff, snowmelt, and hydrosystem demands. Mean annual discharge is estimated to be 265 kilo cubic feet per second (kcfs), but may range from lows of 71 to 106 kcfs to highs of 539 kcfs. Water management activities have reduced flows in the Columbia River, measured at Bonneville Dam, from April through July. Flow management for hydropower has increased flows measured at Bonneville Dam during winter months. Naturally occurring maximum flows on the Columbia River occur in May, June, and July as a result of snowmelt in headwater regions. Minimum flows occur from September to March, with periodic peaks due to winter rains. Interannual variability in stream flow is strongly correlated with two recurrent climate phenomena, the El Nino/Southern Oscillation and the Pacific Decadal Oscillation.

2.5. Effects of the Action

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

The effects of the action includes effects caused by in-water excavation, installation of the intake pipes, and replacing substrate material over the pipes. Effects to habitat in the action area will likely occur as a consequence of construction of the upland pump station. These effects will occur at the project site located along the shoreline of the Columbia River and within the John Day Reservoir. Additional long-term effects will likely occur downstream from the project site due to the additional new water withdrawals from the Columbia River outside of the irrigation season. The species affected will include ESA-listed species that migrate through and occupy the John Day Reservoir during the in-water construction period, as well as additional effects to those salmon and steelhead anticipated to use the action area downstream of the project site for migration and rearing.

2.5.1. Fish Presence 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 Columbia River. 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. Some juvenile steelhead and salmon of all ESUs and DPS in this opinion may migrate and overwinter in the John Day Reservoir (Figure 2). A few adult steelhead of each DPS could be present year-round in the mainstem Columbia River. However, based on habitat quality and the number of adults in the John Day Reservoir, we anticipate that the adult steelhead of any DPS to be holding or migrating along the project site during the in-water construction work window will be small (a few fish). We anticipate a few individual adult Chinook salmon may migrate through the John Day Reservoir towards the end of the in-water work window. However, it is highly unlikely adult Chinook will be present within the in-water construction area because they prefer deeper habitat. Adult sockeye salmon are not typically present during the winter months when in-water construction is planned. However, in a rare occurrence an individual adult sockeye salmon may be present and could be affected by in-water work.

TIMING OF FISH PRESENCE IN THE PRIMARY ACTION AREA (RM 271.5)

<table>
<tr><th>Species</th><th colspan="2">ESU/DPS</th><th>Jan</th><th>Feb</th><th>Mar</th><th>Apr</th><th>May</th><th>Jun</th><th>Jul</th><th>Aug</th><th>Sep</th><th>Oct</th><th>Nov</th><th>Dec</th></tr>
<tr><td colspan="3">ODFW In-water Work Window</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="6">Steelhead</td><td rowspan="2">Upper Columbia River</td><td>Adult</td><td colspan="12">Migration</td></tr>
<tr><td>Juvenile</td><td colspan="12">Migration and Limited Rearing</td></tr>
<tr><td rowspan="2">Middle Columbia River</td><td>Adult</td><td colspan="12">Migration</td></tr>
<tr><td>Juvenile</td><td colspan="12">Migration and Limited Rearing</td></tr>
<tr><td rowspan="2">Snake River Basin</td><td>Adult</td><td colspan="12">Migration</td></tr>
<tr><td>Juvenile</td><td colspan="12">Migration and Limited Rearing</td></tr>
<tr><td rowspan="6">Chinook</td><td rowspan="2">Upper Columbia River spring-run</td><td>Adult</td><td></td><td></td><td colspan="4">Migration</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Juvenile</td><td colspan="12">Migration and Limited Rearing</td></tr>
<tr><td rowspan="2">Snake River fall-run</td><td>Adult</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td colspan="3">Migration</td><td></td><td></td></tr>
<tr><td>Juvenile</td><td colspan="12">Migration and Limited Rearing</td></tr>
<tr><td rowspan="2">Snake River spring-/summer-run</td><td>Adult</td><td></td><td></td><td colspan="8">Migration</td><td></td><td></td></tr>
<tr><td>Juvenile</td><td colspan="12">Migration and Limited Rearing</td></tr>
<tr><td rowspan="2">Sockeye</td><td rowspan="2">Snake River</td><td>Adult</td><td></td><td></td><td></td><td></td><td colspan="7">Migration</td><td></td></tr>
<tr><td>Juvenile</td><td colspan="12">Migration and Limited Rearing</td></tr>
</table>

Figure 2. Fish Presence at the Project Site located in the John Day Reservoir (Anderson Perry & Associates 2020).

The proposed action includes in-water excavation from the shoreline banks of the Columbia River extending into the shallow waters up to 15 ft deep below the ordinary high water mark (OHWM). 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 ft in mainstem reservoirs, and frequently altered their depth in the water column. In another study, Hughes (2004) noted that smaller fish swim closer to the stream bank than larger fish, and very few adult fish swim in the thalweg of the channel during upstream migration.

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). A small number of adult Chinook migrate at depths greater than 15 ft through John Day Reservoir towards the end of the in-water work window. Therefore, it is highly unlikely individual adult Chinook salmon may be present in the shallow waters of the project site during in-water work.

Adult steelhead migrate throughout the year and some overwinter in the John Day Reservoir in low numbers (Keefer 2008a). Project in-water construction activities will occur from December 1 to March 31, a period typically occupied by very few individual adults. The majority of adults migrate between June and October. Keefer et al. (2008a) found overwintering behaviors and distribution of adult steelhead in the Columbia River to be highly variable but found an estimated 12.4% of fish reaching spawning areas overwintered in the Columbia River. Daily counts at the Bonneville Dam have found few individual adult steelhead migrate during the winter months, with small increases in numbers of individual adults passing the dams in late February and March (Columbia River DART 2020). In addition to the steelhead being counted at the dams during the winter, some steelhead will hold in the reservoirs. Thus, we expect a few adult steelhead to be exposed to potential effects from construction activities.

During construction of this project, we do not expect adult SR fall-run Chinook or adult SR sockeye salmon to be present during the in-water work window as their migration timing and use of Columbia River habitat does not overlap with construction timing. We do not expect adult SR fall-run Chinook and SR sockeye salmon will be exposed to adverse effects of the proposed action. During late winter a few adult UCR spring-run Chinook salmon, SR spring/summer run Chinook salmon may be present in the project vicinity. Although adult UCR steelhead, MCR steelhead, and SRB steelhead are predicted to be most exposed to construction activities only a very small number of adults of any individual population of each DPS are expected to be rearing in the project site in the winter when construction activities occur.

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. Subyearlings from the SR fall Chinook salmon ESU express two peak movements downriver, between April and June, and then from mid-June through August. Some juvenile salmonids remain in freshwater for extended periods until reaching a larger size (more than 75 millimeters) (Levings et al. 1986; Levy and Northcote 1982; MacDonald et al. 1988; consequently, juvenile salmon and steelhead may be in the action area near construction activities during the in-water winder. In addition, salmonids from all ESUs/DPSs will be exposed to the long-term effects of flow changes in the Columbia River that will be a consequence of the proposed action.

Subyearling Chinook salmon generally remain close to the water surface, favoring habitat less than 6-ft-deep and where currents do not exceed 0.1ft/sec. 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) found that spring-run Chinook salmon smolts were often abundant just after sunset in shallow nearshore areas (<30 cm deep) of low current velocity. 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 ft and Chinook salmon migrating at a mean depth of 10 ft. A study by Timko et al. (2011) recorded juvenile steelhead migrating in the top 5 to 15 ft of the water column in the Priest Rapids Project (which is located upstream of the project area). 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. Thus, we expect spring-run subyearling Chinook salmon and steelhead to be present at the project site during the in-water construction.

Ocean-type juvenile Chinook salmon from upriver populations (UCR spring-run Chinook, SR spring/summer-run Chinook salmon and SR fall-run Chinook salmon) and rearing or migrating juvenile steelhead of all DPS are the most likely ESUs/DPSs to be exposed during in-water construction at the project site.

2.5.2. Effects to Species

We anticipate short-term effects to exposed species and life stages during project construction, and long-term effects to flows in the Columbia River as a consequence of the water withdrawals and potential impingement on intake screens. The short-term effects include the potential for injury and death, as well as injury and harm from reduced habitat quality. These effects are described below.

Harm, Mechanical Injury or Death during In-water Construction

The proposed action includes 2,500 ft^2 of in-water excavation in depths up to 10 ft; it is likely that some individual fish will flee or avoid the in-water activities. Adults and older juveniles are generally better at avoiding this kind of disturbance. Some fish are less likely to successfully flee and they may be injured or killed. In-water activities will take up to 2 weeks, and will occur between December 1 and March 31. Based on this timing and the shallow site characteristics, only adult steelhead (SRB, MCR and UCR) and juveniles from any of the ESUs/DPSs are likely to be present. Since adults and larger juveniles are better able to avoid disturbance, juvenile steelhead and subyearling Chinook salmon are the most vulnerable to exposure to in-water equipment.

Adult fish fleeing the work site are unlikely to be harmed. Generally, they are migrating upstream and avoidance of the work activities is not likely to impair their ability to migrate or hold. Juvenile fish fleeing the work site are also unlikely to be harmed because the site provides low quality feeding opportunities and this quality of feeding is present nearby.

Any juvenile fish present within the excavation footprint, or trapped within the sediment curtain, will likely be injured or killed from interactions with equipment. It is unlikely that more than a few fish would be killed or injured because few fish are present during the work window and the footprint is small. Any fish injured or killed will likely be distributed among any of the populations that could be present.

Water Quality
The proposed project includes in-water construction below the OHWM involving excavation, installation of the new intake pipes (2,500 ft^2, approximately 0.06 acres within the larger disturbance area), and replacing the bottom sediment over the new pipes. Heavy machinery and equipment working from banks or a barge during in-water work will suspend sediment and create a turbidity plume downstream of the work site.

Effects to salmonids are reasonably likely to occur from substrate disturbance though in-water excavation activities. These activities will temporarily increase delivery of fine sediments, increase turbidity in the water column and degrade water quality. The greater the flow of water over the disturbed area and the larger the disturbed area, the greater the movement of sediments.

In-water excavation and pipeline installation is anticipated to occur for up to 2 weeks. The proposed action will increase turbidity each day excavation occurs. Because the contractor will use a sediment curtain, we expect most of the elevated turbidity for those 2 weeks will remain within the sediment curtain. Turbidity levels will be high within the curtain each day (approximately 2,500 ft^2) and will likely settle out overnight, but rise again in the morning when in-water work resumes. Outside of the sediment curtain, we expect the turbidity levels to be near or slightly above background (see below for discussion of background levels in the reservoir in winter). Removal of the sediment curtain will increase turbidity and suspended sediment concentrations downstream of the in-water work area. Because background levels are naturally high and rapid mixing in the large river, turbidity plumes following sediment curtain removal are not expected to exceed 10% above background levels at 500 ft downstream from the construction area. This pulse of suspended sediment will last minutes to a few hours.

The John Day Reservoir tends to be relatively homogenous with regard to physical, chemical, and biological attributes, largely a result of low water-retention times within the reservoir (Gilbreath et al. 2000). Background turbidity in the winter in John Day River is relatively high with Secchi disc readings generally less than 1 meter. Phytoplankton concentrations contribute to elevated turbidity, and can be high in the winter as well. However, most of the elevated turbidity is a consequence of high suspended sediment loads.

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 has also been reported to cause physiological stress, reduce feeding and growth, and adversely affect survival. Although fish that remain in turbid waters may 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). Salmonid gill-flaring and behavioral modifications including feeding changes have been observed in response to pulses of suspended sediment (Berg and Northcote 1985) and turbidity plume avoidance has been observed in salmonids and other fish (Sigler et al. 1984, Lloyd et al. 1987, Servizi and Martens 1991).

During in-water work, any juvenile salmonid or steelhead present within the sediment curtains are most likely to experience one or more of these physical or behavioral effects from the reduction in water quality. They are likely to exhibit reduced feeding and reduced fitness. Outside the sediment curtain during in-water construction, turbidity levels will be close to background, and we do not expect juvenile or adult fish to respond to the small water quality changes. During sediment curtain removal and the short-term elevated suspended sediment downstream, adults will move out of the area with higher turbidity. Smaller juveniles that are less likely to flee may exhibit reduced feeding for a few hours. This is not expected to reduce their fitness over the long-term. We anticipate excess fine sedimentation will dissipate and settle into the channel substrate relatively quickly or be carried downstream.

Chemical contamination. As with all construction activities involving the use of mechanized equipment, accidental release of fuel, oil, and other contaminants may occur. If enough of the fuel or contaminant is spilled, it could injure or kill aquatic organisms. The project will include the use of heavy equipment (an excavator and a crane) deployed on either the river bank or a floating barge in the Columbia River. There is the potential for accidental spills of petroleum products or other hazardous materials into the river from this equipment. Petroleum-based contaminants, such as fuel, oil, and some hydraulic fluids, contain polycyclic aromatic hydrocarbons (PAHs), which can kill salmon at high concentrations, and can cause sublethal, adverse effects at lower concentrations (Meador et al. 2006).

Spills that make their way into the Columbia River could harm fish. However, NMFS anticipates PAH releases of only very small quantities (ounces) are likely with each accidental release or spill. Conservation measures (staging areas, biodegradable lubricants, fuel containment system and spill containment booms) will be implemented to minimize the use of toxic substances and prevent or contain any spill that may occur.

The project will include ODEQ water quality requirements, daily inspection of equipment for work below OHWM, and multiple conservation measures. The project will include all in-water work during the winter season. During this season the fewest number of listed fish are likely to be present, to minimize exposure of 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 of chemical contamination from the proposed action will injure or harm any juvenile or adult fish nearby.

Substrate Quality. The CID will excavate approximately 2,500 ft^2 of benthic habitat, place the new pipes, and then return the native substrate over the new pipes. Excavation will occur within the sediment curtain, where feeding will already be reduced (adults are expected to swim away from the disturbance and smaller juveniles will have reduced ability to feed because of elevated turbidity). Once the sediment curtain is removed, the substrate is expected to recolonize within a few days, although reestablishment of a more stable benthic community is likely to take up to several months after the work is completed. 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 recolonized. The prey base will be reduced for up to a few months and spring migrating juvenile of any DPS or ESU salmon and steelhead considered in this opinion that would occupy the action area would experience the temporary effects of this loss. However, during this recovery period, juvenile salmonids can feed nearby in similar habitats, and thus the effects to feeding will be small to negligible.

New Upland Pump Station Construction. The new upland pump station, upland pipeline and additional infrastructure will be built in the dry areas above the OHWM. The existing uplands at the CID location is highly altered from its natural riverbank characteristics at the project site. The site contains minimal riparian vegetation or trees along the riverbank and the uplands areas contain existing structural facilities and gravel areas. The new winter pump station will be an additional permanent structure at the project site and will likely continue and extend the existence of the facilities and structures for the foreseeable future. The site contains low quality riparian habitat features and these new structures will not further reduce the low quality of the habitat. Minimal vegetation will be removed and after project implementation all disturbed uplands areas will be restored to pre-site conditions. Silt fencing along the riverbank, spill prevention and hazardous containment measures will be used to limit erosion and contamination discharge into the Columbia River. The upland pump station and pipeline will not be in waters containing ESA-listed salmonids or critical habitat. NMFS does not anticipate the construction of the upland pump station and pipeline to have effects on listed salmonids.

Ambient Light/Shading. The reduction of ambient light (e.g., light attenuation and shading) is one of the primary mechanisms by which overwater and in-water structures (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. Studies have documented use, and sometimes selection, of in- and overwater structures by predators such as smallmouth bass and northern pikeminnow (Pribyl et al. 2004; Celedonia et al. 2008).

CID may use a barge in the Columbia River to excavate the trench and place the new pipes. To accomplish this, the barge would be in the water for up to 1 month, and would likely move along the pipe length to best access the work area. A stationary barge moored in shallow water can act much like a dock in blocking light and providing a haven for predatory fish such as 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). The shaded area can increase a predator's capture efficiency of prey. In general, predation on juvenile salmonids increases as light intensity decreases (Petersen and Gadomski 1994; Tabor et al. 1998). The shade will only occur during construction up to 1 month, at a time when juvenile fish of any DPS/ ESU may be present, and at a time when predators are less active. Further, because the barge will not be stationary the entire time, we expect the effectiveness of the predators to be reduced. Thus, we expect a few individual juvenile salmon or steelhead will experience behavior modifications (reduced feeding success, altered migration, avoidance) that may reduce fitness and cause injury or death from predation. The duration of this effect is up to 1 month.

Intake Entrainment/ Impingement during project operation. The project includes installing two new 36-inch-diameter intake pipes into an excavated trench approximately 150 ft. from shore. The new intake pipes will attach to the existing wet well enclosure, screened intake and pumphouse structure. The existing screens, which meet NMFS criteria, were upgraded and installed in 2017, and thus much of the potential for injury to fish during the irrigation season is part of the environmental baseline that will continue into the future. The additional exposure caused by extending the period of pumping from October until April is a potential effect of this action. The new intake pipe and pump station designs have been reviewed by a NMFS fish passage engineer[3] and meet NMFS design criteria.

Adult salmonids and most juvenile salmonids in the vicinity of the intakes and screens will likely volitionally swim away from the area and avoid injury or death from entrainment and impingement at the intake screens and pumps. Subyearling Chinook salmon and juvenile steelhead are the most likely to be exposed to effects during rearing or migrating in the shallow waters near the project site. Smaller size juvenile fish, smolts or if fry were present at the immediate front of the intake and screen are more vulnerable to the effects of potential entrainment or impingement at the fish screen and may be injured or killed. We anticipate a few individual juvenile salmon and steelhead of any of the ESU/ DPS may encounter injury or be killed if they are unable to flee from in front of the intake structures. We do not expect the number of fish killed to be a significant amount to affect the abundance of any population of ESA-listed salmon or steelhead considered in this opinion.

Water Withdrawals. The Corps' permit will allow the additional reduction of Columbia River flow by 29.9 cfs (total maximum of 10,020 acre ft/yr) from October 1 to April 14. Water depths and flows fluctuate considerably throughout the day below large hydroelectric dams, including the John Day Dam. Hydropower operations significantly influence water elevation, depth and flow in shallow areas in the John Day Reservoir and downstream reaches; tidal fluctuations below Bonneville Dam also influence elevation and flow. We reviewed daily average discharge of Columbia River flows at Bonneville Dam from 2000 through 2019, for the period October 1 to April 14 when the new winter withdrawals are proposed to occur. The lowest daily average during this period occurred in 2007 on October 1 and was 71,972 kcfs[4]. We reviewed potential effects of the new water right compared to the daily average flow around the Ives Island complex (RM 114) below Bonneville Dam. An additional withdrawal of 29.9 cfs would reduce the flow less than 0.001%. Additionally, the 10-year (2010–2019) average discharge from Bonneville Dam for the first 15 days in October is about 98,388 kcfs and the new withdrawal would reduce this average by less than 0.001%.

In that context, it is unlikely that flows in John Day Reservoir and below John Day Dam will be meaningfully affected by a relatively small withdrawal of 29.9 cfs. We believe that this small

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[3] Email on June 16, 2020 from J. Brown (NMFS hydraulic Engineer) to R. Viray (NMFS fish biologist) concerning the new intake designs comply with NMFS Anadromous Fish Passage Criteria 2011.

[4] Columbia Basin data access in real time (DART), Columbia Basin Research: http://www.cbr.washington.edu/dart/query/river_graph_text

change in flow will not be meaningfully detected by the juvenile and adult salmonids migrating through this reach of the Columbia River. Thus we do not expect any reduction in population-level VSP parameters as a consequence of the permanent flow reduction for any of the salmonids in this consultation.

Point of Diversion Transfer and Change in Use. The proposed action includes the point of diversion transfer and water use change for the POM's existing 22.1 cfs water right. The Corps authorization to permit the CID to build the Winter Pump station would allow the withdrawal of the current 22.1 cfs to be withdrawn 400 ft downstream from the current Frederickson Diversion. This will allow the flows to remain in the Columbia River for a very small increase of time and duration prior to withdrawal. We anticipate the point of diversion transfer for the existing water right of 22.1 cfs, which is currently withdrawn from March 1 to October 31, will not affect Columbia River flows.

The change in use for the current irrigation season water right from irrigation only to a municipal and industrial water right will allow the discretion to alter future plans of water use by POM. Currently, with the irrigation only use, some water will seep into the soil and drain back to the Columbia River. In other words, this type of use is not 100% consumptive. In the future, the water may be used for industrial and/or municipal uses which are generally closer to 100% consumptive. Thus in the future, there is a chance that there will be less return flows to the Columbia River.

However, the POM has not provided information of new industrial or municipal developments in the future. Thus, we are not reasonably certain if/or how this change of use will be implemented. This opinion does not address any unknown new future additional developments or upgrades. Therefore, based on the reasons described above we are not reasonably certain that the change of use will cause changes in flow or water quality that will influence the quality or availability of habitat for ESA-listed salmonids.

Relevance of Effects on Individual Fish to Salmonid Population Viability

To determine whether the effects to individual fish are meaningful, we analyze the effect to VSP at the scale of the population: 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 life history diversity within a population can decline.

Abundance. Due to the small footprint of the excavation and the use of the in-water work period when few individuals are present, very small numbers of juveniles of salmon and steelhead of any of the DPS/ ESUs in this opinion will be injured or killed during excavation or backfilling of the trench. Juvenile steelhead and subyearling Chinook salmon are the most likely to be present during this season. The action will result in a short-term small, localized reduction in prey availability. We expect these organisms to recolonize quickly so that there will be little effect on prey by the time juveniles are present and little effect on fish condition or survival. Other effects of the action (short-term increases in fine sediments and turbidity) will modify the behavior of individuals in the action area, but are not likely to affect survival. The loss of a few juvenile fish in any population will not meaningfully change its abundance.

Productivity. A few adult steelhead may be displaced during in-water construction, but no adults are expected to be killed or harmed. A few individual fish from spring-migrating populations of Chinook and steelhead may be injured or killed during in-water work. No more than a few juveniles of any population is expected to be injured or killed. These effects will not alter the productivity of any of the populations.

Spatial structure. NMFS does not expect the proposed project to affect the spatial structure of any of the affected populations because the proposed action will not affect the distribution of any populations nor block access to habitat.

Diversity. The project's related activities are not likely to affect more than a few individuals of any population or DPS/ ESU due to the use of the in-water work window when very few individuals of any population will be present in the action area. Any individual juveniles in the vicinity that encounter effects would be a very small proportion of each of the species' populations that will be exposed to project-related activities or long-term operations.

2.5.3. Effects on Critical Habitat

The critical habitat PBFs most likely to be affected are substrate, water quality, forage, and safe passage.

Substrate
Approximately 2,500 ft^2 of near-shore, shallow-water benthic habitat will be disrupted by trench excavation (up to 12 ft. deep) and intake pipe installation during in-water construction. Approximately 926 cu yd of native substrate and material will be removed and used as fill to cover the installed intake pipes, returning the natural contours of the streambed of the Columbia River. Increased turbidity from project activities will result in sediment deposition downstream of the in-water work area, which has the potential to adversely affect primary and secondary productivity (Spence et al. 1996) for a short time period during and immediately following in-water work. Excess fine sediment in the action area is expected to occur over a small area and is likely to be transient, as daily and seasonal increases in water velocity associated with dam operations remobilize and redeposit these sediments in slower moving portions of the reservoir. The scale of impact will be minimal relative to the rearing habitat in the action area, and will not meaningfully change the conservation value of substrate within the John Day Reservoir.

Water Quality
The proposed action will have a short-term (up to 1 month) negative effect on water quality by increasing suspended sediment and turbidity during construction; this will occur within the sediment curtain. Additionally, an area up to 500 ft downstream of the in-water work area will have increased suspended sediment for minutes to hours after the sediment curtain is removed. The size and velocity and naturally high turbidity of the river in the John Day Reservoir results in relatively homogenous physical, chemical and biological characteristics. Thus, the turbidity pulse following sediment curtain removal will quickly become mixed with the river and be indistinguishable from background levels. In addition to the sediment curtains, CID proposes to

use erosion and sediment measures to reduce excess turbidity and suspended fine sediments. NMFS anticipates any excess turbidity will dilute and disperse with the river current and not be distinguishable from background levels 500 ft downstream of the proposed action. The use of heavy equipment may result in very small amounts of pollutants entering waterways as discussed above. However, the project will use conservation measures (storage and fueling or lubricants, fuels in designated areas, hazardous and spill containment booms) to limit effects of chemical contamination reducing water quality. Through the use of these measures it is unlikely chemical contamination will have more than a minimal effect to water quality. Given the proposed best management practices, erosion control methods, a Spill Prevention, Containment, and Control plan, and the use of the in-water work window NMFS believes that the effects to water quality will not meaningfully decrease the function of this PBF 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 excavation and installation of the intake pipes in an area approximately 2,500 ft^2 (0.06 acres). We expect nearby benthic macroinvertebrates will begin to recolonize within several days to weeks, and will fully recolonize the area within a few months after project completion. The alteration of this amount of habitat could have some localized effects to forage for out-migrating and rearing juvenile salmonids and steelhead that use this nearshore area during construction, and for up to several months after project completion. However, we do not anticipate the localized reduction in available forage will have long-term impact to the quality of habitat. Given the size of the reservoir, the amount of available local nearshore habitat, and the short-term nature of the effect, NMFS does not anticipate that this project will change the conservation value of forage in the John Day Reservoir.

Safe Passage
The proposed action will not alter PBFs for passage, except during the 2-week period to excavate and install the pipeline trench. This construction will occur at a time when very few fish of any species will be migrating either upstream or downstream and will occupy only a small footprint, around which migration in either direction will be unimpeded. The action will not alter safe passage PBFs after construction.

Relevance of Effects on Physical or Biological Features to Conservation Value
As described above, the proposed action will have effects on substrate, water quality, forage, and safe passage during construction and for perhaps as long as several months after construction is complete. The function of these PBFs will return following construction. Therefore, the proposed action will not affect the conservation value of critical habitat in the action area.

2.6. Cumulative Effects

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

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

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. The POM's water right change of use from irrigation to municipal may influence the use of the water withdrawals from applications on agricultural uses to municipal uses and contribute to additional municipal or development growth at the POM. However, we are not aware of site-specific plans for such activities in the future. 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 in-stream 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. The population of Morrow County, Oregon, grew 3.8%[5] from 2010 to 2019. NMFS assumes the population for Morrow County will continue to grow for the foreseeable future. As the human population in the action area grows, demand for agricultural, commercial and residential development, and recreation is likely to increase as well. Industrial and commercial development often contribute to increases in shoreline riprap, altered landscapes and increases in impermeable surfaces. The effects of new development are likely to reduce the conservation value of the habitat within the action area. However, the magnitude of the effect is difficult to predict and is dependent on many social and economic factors. NMFS is not aware of any specific future non-federal activities within the action area that would cause greater effects to a listed species or designated critical habitat than presently occur.

Although these are ongoing and likely to continue in the future, the future rate of development will depend on whether there are economic, administrative, and legal factors that can either support or restrict development (or in the case of contaminants, safeguards). Therefore, although NMFS finds it likely that the cumulative effects of these activities will have adverse effects commensurate to those of similar past activities, it is not possible to quantify these effects. Some of these future activities will require a federal permit, and thus will undergo ESA consultation. Many 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.

Based on the analysis above, the cumulative effects of future state and private activities will have a continued negative effect on ESA-listed fish and their habitats.

[5] U.S. Census Bureau. Available at: https://www.census.gov/quickfacts/morrowcountyoregon

2.7. Integration and Synthesis

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

2.7.1. Species

The environmental baseline is characterized by degraded floodplain and channel structure, altered sediment routing, altered hydrology, and altered water quality. Within the action area the major sources of impacts to salmon and steelhead, are hydropower dam systems as well as the continued development and maintenance of the shoreline including marinas, docks, roads, railroads, and riprap. Dams and reservoirs within the migratory corridor have altered the river environment and affected fish passage. The operation of water storage projects has altered the natural hydrograph of the Columbia River. 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 provides inadequate protection of habitats and refugia for sensitive aquatic species. The cumulative effects of state and private actions within the action area are anticipated to continue to have negative effects on ESA-listed salmonids.

Climate change is likely to affect the abundance and distribution of the ESA-listed species considered in the Opinion. The exact effects of climate change are both uncertain, and unlikely to be spatially homogeneous and the ability of listed-species to adapt is uncertain. Most of the effects of the action are short term, and thus will not exacerbate the effects on species and habitat caused by climate change. The long-term effects of impingement at the new screen is likely to be small as long as the screen is maintained, and this effect will not be altered by climate change. The long-term change in flows for the new withdrawal is small, and flows in the Columbia River will continue to be controlled by hydropower operations into the future.

The action area is used by UCR spring-run Chinook salmon, UCR steelhead, MCR steelhead, SRB steelhead, SR spring/summer-run Chinook salmon, SR fall-run Chinook salmon, and SR sockeye salmon. Upper Columbia River spring-run Chinook salmon and SR sockeye are listed as endangered. All three UCR spring-run Chinook salmon populations, and SR sockeye salmon, have an overall viability rating of high risk. The other five species are listed as threatened, and while some populations are viable, most populations within these ESU/DPSs remain at moderate or high risk.

NMFS anticipates the proposed action will affect juveniles of all species within the active in-water work area. Smaller juvenile fish that are less likely to flee will be trapped within the sediment curtain and are likely to die or be injured by equipment or high levels of turbidity. The work area is a small area and will affect only a few individuals of any population. Only adult steelhead are likely to be in the John Day Reservoir in the winter work window and they are highly likely to avoid the disturbance caused by the construction. Adult steelhead are migrating or holding in the reservoir in the winter, and the avoidance behaviors are not expected to reduce their fitness because there is other similar habitat in the vicinity.

In addition to direct injury or death, juvenile salmonids may be harmed during and in the few months following construction because of the following:

- by temporarily reducing available forage from disrupting established macroinvertebrate communities;
- the barge may provide cover for predatory fish which may kill or injure juveniles;
- increased turbidity may disrupt normal feeding activities of juveniles and displace them to other areas of the reservoir;
- increased risk of spill of oils or greases from equipment working adjacent or in the water. The implementation of Best Management Practices (BMPs) will minimize the risk of a spill occurring and minimize the consequence of a spill (through appropriate spill response) so that the risk of injury or death of salmonids is very low.

These effects will be minor, temporary (days to a few months), and will affect all populations of juvenile salmonids that are present in the John Day Reservoir during the winter work window.

In addition to these short-term effects, there are likely to be long-term consequences of the proposed action. The screens on the new intake pipe will comply with NMFS's screening criteria to prevent entrainment of juveniles into the pipe. However, even with proper maintenance a small number of juveniles may become impinged or scrape along the screen, which could result in injury or death. The other long-term effect will be reduced flow in the Columbia River from John Day Reservoir downstream to the Pacific Ocean from October through March. The 29.9 cfs of new water withdrawal is very small compared to flows in the Columbia River and we do not expect adult or juvenile salmon and steelhead to be able to meaningfully detect the change in flow.

Considering the effects of the action in conjunction with the existing condition of the environmental baseline and the small level of potential cumulative effects, NMFS has determined that the loss of a very small number of juvenile salmon and steelhead that may be caused by the proposed action will not be substantial enough to negatively influence VSP criteria at the population scale and will not appreciably reduce the likelihood of any population maintaining its current status. Because the effects will not be substantial enough to negatively influence VSP criteria at the population scale, the viability of MPGs, ESUs, and DPSs are also not expected to be reduced. The effects of the proposed action are not likely to appreciably reduce survival of any of the seven species considered in this opinion at the species level, or is the action likely to reduce the likelihood of recovery of these species.

2.7.2. Critical Habitat

The proposed action has the potential to affect numerous PBFs within the action area. Those PBFs include water quality (sediment, turbidity, and chemical contamination), substrate, safe passage, and forage. The primary effects of the action will be short-term construction-related effects, although new water withdrawals outside of the irrigation season will affect flows in the Columbia River into the future. NMFS expects adverse effects to the above PBFs from the reduced water quality, temporary disturbance of the substrate and shallow-water benthic habitat which will cause a temporary change to prey availability in the disturbed area. Increases in TSS and turbidity during project construction are expected to be high within the turbidity curtain. Once the sediment curtain is removed, water quality will be impaired by a turbidity plume that may extend as far as 500 ft downstream of the excavation area, and last for up to a few hours. Background levels of turbidity in the John Day Reservoir are quite high, and this temporary increase in turbidity in a small area of the river will not change water quality at the scale of the critical habitat designation.

Benthic disturbance in the excavation area will reduce prey availability. The prey invertebrates will start to recolonize as soon as construction is done. Recolonization will occur over a couple of months. The disturbed area is a small fraction of similar quality, shallow habitat area available for use in the John Day Reservoir.

The new water withdrawals will slightly change flow conditions from near the intake extending downstream in the Columbia River to the Pacific Ocean. Flows in the Columbia River above Bonneville Dam are controlled by the operation of the hydropower system. Below Bonneville Dam, flows and river elevation are controlled by hydropower operations and the dams. This small change in flow in the John Day reach will not meaningfully change the quality of the safe passage PBF.

Based on our analysis that considers the current status of PBFs, adverse effects from the proposed action will cause a small and localized decline in the quality and function of PBFs in the action area. However, because of the scale and extent of the effects to PBFs, we do not expect a reduction in the conservation value of critical habitat in the action area. As we scale up from the action area to the designation of critical for each species, the proposed action is not expected to appreciably reduce the conservation value of the designated critical habitat.

2.8. Conclusion

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

2.9. Incidental Take Statement

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

2.9.1. Amount or Extent of Take

In the biological opinion, NMFS determined that incidental take is reasonably certain to occur as follows: (1) behavioral changes due to increased turbidity; (2) increased injury or death from predation; (3) mechanical injury or death from in-water work equipment; and (4) injury or death from entrainment or impingement at intakes or screens. NMFS is reasonably certain the incidental take described here will occur because: (1) recent and historical surveys indicate ESA-listed species are known to occur in the action area; and (2) the proposed action includes in-water activities that are reasonably certain to harm or kill juvenile steelhead and salmon.

Incidental Take from Increased Turbidity
NMFS expects salmon and steelhead to be temporarily displaced and may have reduced feeding (harm) due to elevated turbidity levels resulting from in-water work associated with the excavation and installation of the intake pipe, and removal of the sediment curtain. Because it is not feasible to observe fish harmed, NMFS will use the extent and duration of the turbidity plume as a surrogate for take resulting from degraded water quality. These indicators are causally linked to incidental take from channel excavation and intake screen assembly installation in waters containing the seven species covered in this opinion, because the amount of take increases as turbidity associated with the in-water work increases in extent and duration. Therefore, NMFS will consider the extent of take exceeded if a turbidity plume exceeds 10% of background measurements during project construction (as measured 500 ft downstream from in-water work) or extends further than 500 ft downstream of the in-water work area for more than for more than two consecutive monitoring intervals.

Incidental Take from Increased Predation
NMFS expects the proposed action will result in harm, harassment, injury or death to salmon and steelhead by increases in exposure to piscine predators. Salmon and steelhead experience behavior modifications (harm) through reduced feeding success, altered migration from avoiding predators (harassment). The modifications may result in reduced fitness and survival to any juvenile steelhead or salmon present. We expect injury or death of juvenile salmon and steelhead from increased predators due to the temporary reduction in ambient light and shade from the presence of the temporary barge.

Estimating the specific number of animals injured or killed by increased predation is not possible because of the range of responses that individual fish will have, and because the numbers of fish present is highly variable. While this uncertainty makes it impossible to quantify take in terms of numbers of animals injured or killed, the duration of the temporary habitat change to which fish will be exposed is readily discernible and presents a reliable measure of the extent of take that can be monitored and tracked. Therefore, the duration of the temporary habitat modified by the presence of the barge during in-water work represents the extent of take exempted from increased predation in this ITS. The proposed surrogate is linked to anticipated take because it described the duration of changes in habitat conditions will cause take due to increases in predator habitat. Also, this clearly quantifiable measure can easily be measured to determine if take might be exceeded. Specifically, NMFS will consider the extent of take exceeded if the presence of the temporary barge at the project in-water work site exceeds 30 days.

Incidental Take from Mechanical Injury or Death
NMFS anticipates the proposed action will result in injury or death as a result of in-water excavation and fill. Estimating the specific number of animals injured or killed by interactions with heavy equipment is not possible because of the range of responses that individual fish will have, and because the numbers of fish present at any 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 altered by excavation and installation of the in-water pipeline is readily discernible and presents a reliable measure of the extent of take that can be monitored and tracked. Therefore, the estimated extent of habitat encompassed by trench excavation and filling represents the extent of take associated with mechanical injury and death. The proposed surrogate is causally linked to anticipated take because it describes conditions that will cause take due to in-water work. Specifically, NMFS will consider the extent of take exceeded if the limits of excavation and filling exceed 2,520 ft^2.

Incidental Take from Entrainment or Impingement
NMFS anticipates the proposed action will result in injury or death as a result of entrainment or impingement at screens at the intake pump station. Estimating the specific number of animals injured or killed at intake screens is not possible because of the range of responses that individual fish will have, and because the numbers of fish present at any time is highly variable. While this uncertainty makes it impossible to quantify take in terms of numbers of animals injured or killed, the rate of water withdrawal at the intake screens is readily discernible and presents a reliable measure of the extent of take that can be monitored and tracked. Therefore, the estimated rate of the water withdrawal while pumping at the intakes represents the extent of take associated with entrainment or impingement. The proposed surrogate is linked to anticipated take because it described conditions that will cause take due to fish experiencing entrainment or impingement at the intake pump and screen. Specifically, NMFS will consider the extent of take exceeded if the pumping rate exceeds 29.9 cfs (10,020 acre ft/year).

The surrogates described above are measurable, and thus can be monitored and reported. For this reason, the surrogates function as effective reinitiation triggers.

2.9.2. Effect of the Take

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

2.9.3. Reasonable and Prudent Measures

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

1. Avoid or minimize take from habitat disturbance and mechanical injury.
2. Avoid or minimize take from reduced water quality.
3. Avoid or minimize take from increased predation.
4. Avoid or minimize take from injury or death from entrainment or impingement.
5. Conduct sufficient monitoring to ensure that the project is implemented as proposed, and the amount and extent of take is not exceeded.

NMFS believes that full application of conservation measures included as part of the proposed action, together with use of the 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.

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

1. The following terms and conditions implement RPM 1:

   a. Conduct all work below the OHWM within as short a period as possible between December 1 and March 31.
   b. Confine excavation to the minimum area necessary to achieve project goals, no larger than 2,520 ft^2.
   c. Implement all proposed impact minimization measures and BMPs as described in the Proposed Action section of this opinion and in the BA dated June 2020.

2. The following terms and conditions implement RPM 2:

   a. Conduct turbidity monitoring as follows:
      i. All in-water construction shall be conducted following the proposed sediment control measures and follow state and federal water quality

requirements to minimize sedimentation and turbidity in the Columbia River.

ii. Monitoring will be conducted daily, every 4 hours during daylight hours, when in-water work is conducted.

iii. Observations shall occur daily before, during, and after commencement of construction activities and compared to observable baseline turbidity measurements upstream of the action area.

iv. Background measurements will be measured or observed at an undisturbed site within the flow channel approximately 100 ft upstream of the project area.

v. Compliance measures will be measured or observed in the flowing channel approximately 500 ft downstream from the project area. If visible plume is observed at 500 ft. downstream, measurements should not exceed above 10% of the background measurements. If turbidity is exceeded, best management practices will be modified and additional sediment control measures will be installed to minimize downstream increase of turbidity and fine sediments. Properly sized curtains will be used to ensure that the curtains remain in constant contact with the substrate, and span the entire water column. Monitoring will be continued every 4 hours. If plume is observed to exceed 10% of background measurements (after 8 hours) work shall be stopped until the turbidity level returns to baseline conditions.

b. Vehicles must be fueled, operated, maintained, and stored as follows:

i. Vehicle staging, cleaning, maintenance, refueling, and fuel storage must take place in a vehicle staging area 150 ft. or more from any stream, waterbody or wetland, or on an adjacent, established road area.

ii. All vehicles operated within 150 ft. of any stream, waterbody or wetland must be inspected daily for fluid leaks before leaving the vehicle staging area. Any leaks detected must be repaired in the vehicle staging area before the vehicle resumes operation. Inspections must be documented in a record that is available for review on request by NMFS.

iii. All equipment operated must be cleaned before beginning operations to remove all external oil, grease, dirt, and mud.

c. A chemical and pollution control plan will be prepared and carried out, commensurate with the scope of the project, which includes:

i. The name, phone number, and address of the person responsible for accomplishing the plan.

ii. Best management practices to confine, remove, and dispose of construction waste, including every type of debris, discharge water, concrete, petroleum product, or other hazardous materials generated, used, or stored on-site including notification of proper authorities.

iii. Procedures to contain and control a spill of any hazardous material generated, used or stored onsite, including notification of proper authorities.

iv. Steps to cease work under high flow conditions, except for efforts to avoid or minimize resource damage.

3. The following terms and conditions implement RPM 3.

   a. The Corps (or applicant) shall remove the barge from the action area as soon as in-water construction is complete.

4. The following terms and conditions implement RPM 4.

   a. All intakes pumps and diversions shall have fish screens to avoid juvenile fish entrainment and impingement and will be operated in accordance with NMFS' current fish screen criteria (NMFS 2011c).

5. The following terms and conditions implement RPM 5.
   a. Track and monitor construction activities to ensure that the conservation measures are meeting the objective of minimizing take.
   b. Submit a completion of project report to NMFS 2 months after project completion. The completion report shall include, at a minimum, the following:
      i. Starting and ending dates for work completed, with in-water work period specified.
      ii. Details of total footprint of disturbed area during in-water excavation and installation of pipeline to ensure meeting the extent of take requirements.
      iii. Summary and details of turbidity monitoring including:
         a. Any daily observed turbidity plume from the in-channel work area to 500 ft downstream during the in-water construction period. Observations shall occur daily before, during and after commencement of construction activities and compared to observable turbidity.
         b. Description of the visually monitored downstream extent of turbidity plumes resulting from in-water construction and excavation activities, including removal of the sediment curtain.
         c. A summary of pollution and erosion control inspection results, including results of implementing required BMPs, and including a description of any erosion control failure, contaminant release, and efforts to correct such incidence.
      iv. Photos of habitat conditions (open water including sediment control measures, shoreline, banks, vegetation, etc.) at the in-water work site before, during, and after project completion. General views and close-ups showing details of the project and project area, including pre- and post-construction. Label each photo with date, time, project name, photographer's name, and the subject.
      v. Number and species of any observed injured or dead listed salmon or steelhead found at the in-water work site.

c. All reports will be sent to:

National Marine Fisheries Service
Columbia Basin Branch
304 South Water Street, Suite 201
Ellensburg, Washington 98926

i. Reference to NMFS consultation number WCRO-2020-01767.

d. If the amount or extent of take is exceeded, stop project activities and notify NMFS immediately.

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 recommendations are discretionary measures that NMFS believes are consistent with this obligation and therefore should be carried out by the federal action agency:

1. Work with CID and other water users in the Columbia River Basin including landowners on long-term plans and designs to improve water use and efficiency, and to upgrade and modify other existing pump stations and intakes to prevent injury to fish and aquatic resources.

2.11. Not Likely to Adversely Affect Determinations

NMFS received the Corps' for written concurrence that the proposed action is not likely to adversely affect six salmon and steelhead species, plus the southern DPS of Pacific eulachon, the southern DPS of North American green sturgeon and the southern resident killer whale, and their designated critical habitat. NMFS prepared this response to the Corps' request pursuant to section 7(a)(2) of the ESA, implementing regulations at 50 CFR 402, and agency guidance for the preparation of letters of concurrence.

2.11.1. Lower Columbia River Salmon and Steelhead

The upstream limit of these species is the Hood River in Oregon and the White Salmon River in Washington. Lower Columbia River Chinook salmon, LCR steelhead and LCR coho salmon spawn in tributary streams and no spawning occurs in the mainstem Columbia River. They will not be exposed to any of the short-term effects of construction; hence these effects are discountable. The water withdrawals will extend down the Columbia River to reaches that provides habitat for these LCR species. However, the change in flow will not elicit a response by these three species. Similarly, there will be no change in the value of the migration PBF of or their critical habitats.

All the effects of the action are expected to be so minor that it will not rise to the level of take (insignificant) or highly unlikely to occur because of the lack of exposure (discountable). Therefore, NMFS concurs that the proposed action is NLAA LCR Chinook salmon, steelhead, and coho or their designated critical habitat.

2.11.2. Columbia River Chum Salmon

The CR chum salmon ESU includes all naturally spawned populations in the Columbia River and its tributaries in Oregon and Washington. While the CR chum salmon ESU includes three MPGs (Coast, Cascade and Gorge), we focus our analysis on the Lower Gorge population within the Gorge MPG. Adults from the Lower Gorge population spawn below Bonneville Dam. Fry emerge from March through May and promptly migrate downstream to the Columbia River estuary.

Adult chum salmon enter the Columbia River concurrent with the proposed water withdrawal. They will not be exposed to any of the short-term effects of construction and thus effects associated with construction activities are discountable for CR chum salmon. The water withdrawals will extend down the Columbia River to reaches that provide habitat for this species. However, the change in flow will be so minor that it will not elicit a response by CR chum salmon. Similarly, there will be no change in the value of the migration PBF of their critical habitat.

Therefore, we do not anticipate that CR chum will be exposed to any construction-related effects, thus these effects of the action are discountable. We expect the flow changes will be insignificant. Thus, we concur with the Corps that the proposed action is NLAA CR chum salmon.

2.11.3. Upper Willamette River Salmon and Steelhead

Upper Willamette River adult Chinook salmon enter the Willamette River departing the Columbia River mainstem beginning in January. Adults ascend Willamette Falls after April and spawn from August to October. Spawning occurs from March until June (ODFW and NMFS 2011c).

These two species will not be exposed to any of the effects of construction nor the effects of water withdrawals. All the effects of the action are expected to be discountable. Therefore, NMFS concurs that the proposed action is NLAA UWR Chinook salmon, UWR steelhead and designated critical habitat.

2.11.4. Southern DPS Eulachon

Southern DPS eulachon enter the Columbia River from late fall through winter and spawn in lower Columbia River tributaries downstream of Bonneville Dam. The Columbia River serves as a migration corridor for this species. They will not be exposed to any of the short-term effects of construction (discountable) and the changes in flow caused by water withdrawals will be so minor that we do not expect it to elicit a response by individuals of this species (insignificant). Thus the effects of the action will be discountable or insignificant for this species and its critical habitat. NMFS concurs that the proposed action is NLAA southern DPS eulachon and designated critical habitat.

2.11.5. Southern DPS of Green Sturgeon

The southern DPS of green sturgeon are broadly distributed in nearshore marine areas from Mexico to the Bering Sea. Green sturgeon are commonly observed in bays, estuaries, and sometimes the deep riverine mainstem in lower elevation reaches of non-natal rivers along the west coast of North America, including the lower Columbia River estuary (NMFS 2015). Green sturgeon spawn in the Sacramento River. Larvae and juveniles rear in the Sacramento and San Francisco Bay estuary before entering the Pacific Ocean. Subadults and adults may occur in the Columbia River estuary during the summer and fall months and then congregate off northern Vancouver Island, B.C., Canada, during the winter and spring months (NMFS 2019). This species will not be exposed to any of the short-term effects of construction because they have not access to habitat near the project site. The water withdrawals occur upstream beyond two hydroelectric dams and reservoirs. The changes to flow that will be experienced by the green sturgeon will be so minor that we do not expect a response from these fish nor a change in the value of their critical habitat. Thus all the effects of the action are discountable (construction-related effects) or insignificant (flow effects) for green sturgeon.

NMFS concurs that the proposed action is NLAA the southern DPS of green sturgeon and its designated critical habitat.

2.11.6. Southern Resident Killer Whale

Southern resident killer whales consist of three pods (J, K, and L) that inhabit coastal waters off Washington, Oregon, and Vancouver Island and are known to travel as far south as central California and as far north as Southeast Alaska (NMFS 2008). From spring through fall, the whales spend a substantial amount of time in the inland waterways of the Strait of Georgia, Strait of Juan de Fuca, and Puget Sound. All three pods generally remain in the Georgia Basin through October and make frequent trips to the outer coasts of Washington and southern Vancouver Island (Ford et al. 2000).

By late fall, all three pods are seen less frequently in inland waters. Several sightings and acoustic detections of Southern residents have been obtained off the Washington and Oregon coasts in the winter and spring (NMFS 2018). Satellite-linked tag deployments have also provided more data on the Southern resident killer whale movements in the winter, indicating that the K and L pods use the coastal waters along Washington, Oregon, and California during non-summer months.

Southern resident killer whales consume a variety of fish species (22 species) but salmon are identified as their primary prey (Ford 1998; Ford 2000). Scale and tissue sampling from May to September indicate that their diet consists of a high percentage of Chinook salmon. Coho salmon and steelhead are also found in the diet in spring and fall months when Chinook salmon are less abundant. The occurrence of K and L pods off the Columbia River in March suggests the importance of Columbia River spring-run stocks of Chinook salmon in their diet (Hanson 2013) at that time of year. Chinook salmon genetic stock identification from samples collected in winter and spring in coastal waters included 12 United States West Coast stocks, and over half of the Chinook salmon consumed originated in the Columbia River for the K and L pods (primarily fall-run stocks). Based on genetic analysis of feces and scale samples, Chinook salmon from Fraser River stocks dominate the diet of southern resident killer whales in the summer (Hanson 2011).

NMFS has determined that the proposed action would have insignificant effects on eight salmon and steelhead species that migrate through the lower Columbia River, southern DPS of Pacific eulachon, and southern DPS of North American green sturgeon. But is likely to have negative effects on seven species of salmon and steelhead that migrate through or adjacent to the project site. However, the loss of a few upriver salmon and steelhead is not expected to alter the availability of food for southern resident killer whales, and thus the effects of the proposed action are insignificant. Therefore, NMFS concurs that the proposed action is NLAA southern resident killer whales.

2.12. Reinitiation of Consultation

This concludes formal consultation for the CID Winter Pump Station Project.

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

3. MAGNUSON–STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT ESSENTIAL FISH HABITAT RESPONSE

Section 305(b) of the MSA directs federal agencies to consult with NMFS on all actions or proposed actions that may adversely affect EFH. Under the MSA, this consultation is intended to promote the conservation of EFH as necessary to support sustainable fisheries and the managed species' contribution to a healthy ecosystem. For the purposes of the MSA, EFH means "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity", and includes the physical, biological, and chemical properties that are used by fish (50 CFR 600.10). 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) of the MSA also requires NMFS to recommend measures that can be taken by the action agency to conserve EFH. Such recommendations may include measures to avoid, minimize, mitigate, or otherwise offset the adverse effects of the action on EFH [CFR 600.905(b)]

This analysis is based, in part, on the EFH assessment provided by the Corps and descriptions of EFH for Pacific Coast salmon (PFMC 2014); contained in the fishery management plans developed by the Pacific Fishery Management Council (PFMC) and approved by the Secretary of Commerce.

3.1. Essential Fish Habitat Affected by the Project

The proposed project action area includes EFH for various life-history stages of Chinook salmon (*O. tshawytscha*) and coho salmon (*O. kitsutch*) (PFMC 2014).

3.2. Adverse Effects on Essential Fish Habitat

Based on information provided in the BA and the analysis of effects presented in Section 2 of this document, NMFS concludes that the proposed action will adversely affect EFH designated for Chinook and coho salmon because it will have effects on water quality, benthic communities, and channel substrate.

The proposed project includes adding temporary barge, excavation of channel substrate, installation of the new intake pipe beneath the substrate of the Columbia River, and then covering the new pipe with substrate material removed during excavation. This will alter approximately 2,500 ft^2 (0.06 acres) of river bottom, altering benthic habitat and macroinvertebrate production. This action will result in short-term effects to water quality and feeding habitat, and long-term effects to flow in the Columbia River outside of the irrigation season.

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

1. The temporary alteration of the near-shore environment by placement of beneath the channel substrate which will temporarily (during construction) affect juvenile rearing and the quality of habitat in the migration corridor.
2. Temporary reduction in prey availability from removal and disturbance of the macroinvertebrate community and as a result of increased fine sediment in stream substrates due to in-water work.
3. Short-term elevation of turbidity and sedimentation within and immediately downstream from the construction area from construction activities.

3.3. Essential Fish Habitat Conservation Recommendations

NMFS determined that the following conservation recommendations are necessary to avoid, minimize, mitigate, or otherwise offset the impact of the proposed action on EFH:

1. Implement RPM 1 and RPM 3, and their terms and conditions described in the ITS in the ESA portion of this document, to minimize adverse effects to EFH due operation of heavy equipment, in-water construction, and sediment disturbance.

2. Implement RPM 5, and its terms and conditions described in the ITS in the ESA portion of this document, to ensure completion of monitoring and reporting to confirm that these terms and conditions are effective for avoiding and minimizing adverse effects to EFH.

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

3.4. Statutory Response Requirement

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

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

3.5. Supplemental Consultation

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

4. DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW

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

4.1. Utility

Utility principally refers to ensuring that the information contained in this consultation is helpful, serviceable, and beneficial to the intended users. The intended users of this opinion are the Corps. Other interested users could include Columbia Improvements District, the POM, Anderson Perry & Associates, Inc., and the citizens of Morrow County. Individual copies of this opinion were provided to the Corps. The document will be available within 2 weeks at the NOAA Library Institutional Repository [https://repository.library.noaa.gov/welcome]. The format and naming adheres to conventional standards for style.

4.2. Integrity

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

4.3. Objectivity

Information Product Category: Natural Resource Plan

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

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

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

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

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