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

Refer to NMFS No: WCR-2017-7167

July 11, 2017

Roland Springer
Bureau of Reclamation
Snake River Area Office
230 Collins Avenue
Boise, Idaho 83702-4520

Re: Endangered Species Act Section 7(a)(2) Concurrence Letter and Magnuson-Stevens Fishery and Conservation Management Act Essential Fish Habitat Response for the Lewiston Orchards Project Water Exchange and Title Transfer, Nez Perce and Lewis Counties, Idaho, Hydrologic Units # 1706010702, 1706010303, 1706030612, 1706030613

Dear Mr. Springer:

Thank you for your letter of October 3, 2016, 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 Lewiston Orchards Project Water Exchange and Title Transfer. NMFS also reviewed the likely effects of the proposed action on essential fish habitat (EFH), pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) (16 U.S.C. 1855(b)), and concluded that the action would adversely affect the EFH of Pacific Salmon. Therefore, we have included the results of that review in Section 3 of this document.

In this biological opinion (Opinion), NMFS concludes that the action, as proposed, is not likely to jeopardize the continued existence of Snake River Basin steelhead, Snake River spring/summer Chinook salmon, Snake River fall Chinook salmon, and Snake River sockeye salmon. NMFS also determined the action will not destroy or adversely modify designated critical habitat for these species. Rationale for our conclusions is provided in the attached Opinion.

As required by section 7 of the ESA, NMFS provides an incidental take statement (ITS) with the Opinion. The ITS describes reasonable and prudent measures (RPM) NMFS considers necessary or appropriate to minimize the impact of incidental take associated with this action. The take statement sets forth nondiscretionary terms and conditions, including reporting requirements, that the Bureau of Reclamation (BOR) and any permittee who performs any portion of the action must comply with to carry out the RPM. Incidental take from actions that meet these terms and conditions will be exempt from the ESA take prohibition.

This document also includes the results of our analysis of the action's effects on essential fish habitat (EFH) pursuant to section 305(b) of the MSA, and includes two Conservation Recommendations to avoid, minimize, or otherwise offset potential adverse effects on EFH. These Conservation Recommendations are a subset of the ESA Terms and Conditions. Section 305(b)(4)(B) of the MSA requires federal agencies provide a detailed written response to NMFS within 30 days after receiving these recommendations.

If the response is inconsistent with the EFH Conservation Recommendations, the BOR must explain why the recommendations will not be followed, including the justification for any disagreements over the effects of the action and the recommendations. In response to increased oversight of overall EFH program effectiveness by the Office of Management and Budget, NMFS established a quarterly reporting requirement to determine how many Conservation Recommendations are provided as part of each EFH consultation and how many are adopted by the action agency. Therefore, in your statutory reply to the EFH portion of this consultation, NMFS asks that you clearly identify the number of Conservation Recommendations accepted.

Please contact Mr. Bob Ries at bob.ries@noaa.gov or (208-882-6148) if you have any questions concerning this consultation, or if you require additional information.

Sincerely,

Michael Tehan
for Barry A. Thom
Regional Administrator

Enclosure

cc: D. Johnson – NPT
A. Rogerson – NPT
B. Hills – NPT
H. McRoberts – NPT
R. Armstrong – NPT
B. Metz – LOID
R. Hennekey – IDFG

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

Lewiston Orchards Project Water Exchange and Title Transfer,
NMFS Consultation Number: WCR-2017-7167

Action Agency: U.S. Bureau of Reclamation

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?
Snake River steelhead (*Oncorhynchus mykiss*)	Threatened	Yes	No	Yes	No
Snake River spring/summer Chinook salmon (*O. tshawytscha*)	Threatened	Yes	No	Yes	No
Snake River spring/fall Chinook salmon (*O. tshawytscha*)	Threatened	Yes	No	Yes	No
Snake River Sockeye salmon (*O. nerka*)	Endangered	Yes	No	Yes	No

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

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

Issued By:

Michael Tehan
for Barry A. Thom
Regional Administrator

Date: July 11, 2017

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ACRONYMS

ac-ft	acre feet
afy	acre feet per year
BA	Biological Assessment
BIA	Bureau of Indian Affairs
BOR	Bureau of Reclamation
cfs	cubic feet per second

DPS	Distinct Population Segment
DQA	Data Quality Act
EA	Environmental Assessment
EFH	Essential Fish Habitat
ESA	Endangered Species Act
ESU	Evolutionarily Significant Units
ICTRT	Interior Columbia Technical Recovery Team
IDL	Idaho Department of Lands
IDWR	Idaho Department of Water Resources
ITD	Idaho Transportation Department
ITS	Incidental Take Statement
LOID	Lewiston Orchards Irrigation District
LOP	Lewiston Orchards Project
MPG	Major Population Group
MSA	Magnuson-Stevens Fishery Conservation and Management Act
NLAA	Not Likely to Adversely Affect
NMFS	National Marine Fisheries Service
Opinion	Biological Opinion
PBF	Physical and Biological Features
PCE	Primary Constituent Elements
Tribe	Nez Perce Tribe
VSP	Viable Salmonid Population

1. INTRODUCTION

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

1.1 Background

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

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

We completed pre-dissemination review of this document using standards for utility, integrity, and objectivity in compliance with applicable guidelines issued under the Data Quality Act (DQA) (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001, Public Law 106-554). The document will be available through NMFS' Public Consultation Tracking System WCR-2017-7167. A complete record of this consultation is on file at NMFS office in Boise, Idaho.

1.2 Consultation History

The NMFS completed consultation with the U.S. Bureau of Reclamation (BOR) on their operation and maintenance of the Lewiston Orchards Project (LOP) on April 15, 2010 (consultation number: NWR-2009-6062). The LOP collects and stores from Sweetwater and Webb Creeks, and diverts the water out of the basin for irrigation. The Opinion for the LOP consultation concluded that the water diversions cause adverse effects to Snake River Basin steelhead and their critical habitat by removing a relatively large volume of surface water from the Sweetwater and Webb Creeks; however, the Opinion determined that the LOP did not jeopardize the continued existence of steelhead, or destroy or adversely modify their designated critical habitat.

The Nez Perce Tribe (Tribe) initiated a legal challenge to the 2010 Opinion on the LOP, which includes structures on the Tribe's reservation. In January 2011, the Tribe, BOR, and NMFS entered into a Term Sheet Agreement under which parties proposed to pursue an alternative water project that could ultimately replace the LOP. Specifically, they sought to pursue a project that would exchange the existing LOP surface water diversions with a groundwater source drawing from multiple wells. NMFS met with BOR and other stakeholders at a variety of open meetings as the proposed action was developed. In 2013, pursuant to the 2011 agreement, BOR consulted with NMFS on the installation of a pilot well in the Tammany Creek drainage (consultation number: NWR-2013-10422). The pilot well was tested in 2015 and brought online in 2016. The pilot well is fully operational and it is now in use for the entirety of the 2017 irrigation season. Surface flows in Sweetwater and Webb Creeks have been increased for the 2017 irrigation season by an amount equal to the present well production. Much of the effects analysis in this Opinion is based on information gained from the pilot well test.

The Agreement provides that during the development and implementation of the well exchange project, BOR and Lewiston Orchards Irrigation District (LOID) would operate and maintain the LOP consistent with the 2010 Opinion, with minor modifications to the action made in the interest of improving operational efficiency or to benefit Snake River Basin steelhead or their critical habitat. It further provides that as groundwater wells come on line, water diversions through the LOP will be reduced by an agreed amount and left instream through the Idaho State Water Bank for instream flows. The amount of water diverted from Sweetwater and Webb Creeks in from 2017 forward has been reduced by an amount equal to the production from the pilot well. Once existing diversions from the LOP are completely replaced by well withdrawals, the agreement contemplates that title for the BOR-owned LOP facilities would be transferred to the Bureau of Indian Affairs (BIA) to hold in trust for the Tribe. The proposed action initiates the water exchange and title transfer process described in the agreement.

On August 15, 2016, NMFS received a draft Environmental Assessment (EA) for the LOP water exchange from BOR. The BOR also requested concurrence with a “not likely to adversely affect” (NLAA) determination for effects of the proposed action on listed species and their critical habitat. On October 6, 2016, NMFS sent an email to BOR requesting additional information needed to complete ESA consultation. The BOR provided NMFS additional information on Captain John Creek on October 14, 2016, and on November 17, 2016, provided an updated section of the draft EA that described ESA effects. In a phone call on or about December 6, 2016, NMFS informed BOR that we did not concur with a NLAA determination due to adverse effects of water withdrawals on critical habitat and listed steelhead and uncertainty over future operations of the diversion dams and storage facilities that will be transferred to the BIA. Formal consultation was initiated on November 17, 2016. NMFS sent a draft Opinion to the Nez Perce Tribe for review on July 5, 2017. The tribe provided comments on July 6, 2017.

1.3 Proposed Federal Action

For purposes of ESA consultation, “action” means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by federal agencies (50 CFR 402.02). The proposed action consists of the following activities: (1) Installation of deep wells in the Lewiston Orchards area; (2) a 1:1 exchange of well water for surface water presently diverted by the LOP; (3) title transfer of the LOP canals, diversion dams, and reservoirs in the Sweetwater Creek drainage to the BIA; and (4) a framework for future management or disposition of the facilities transferred to the BIA. The LOP facilities, reservoirs, and proposed well site are shown in Figure 1.

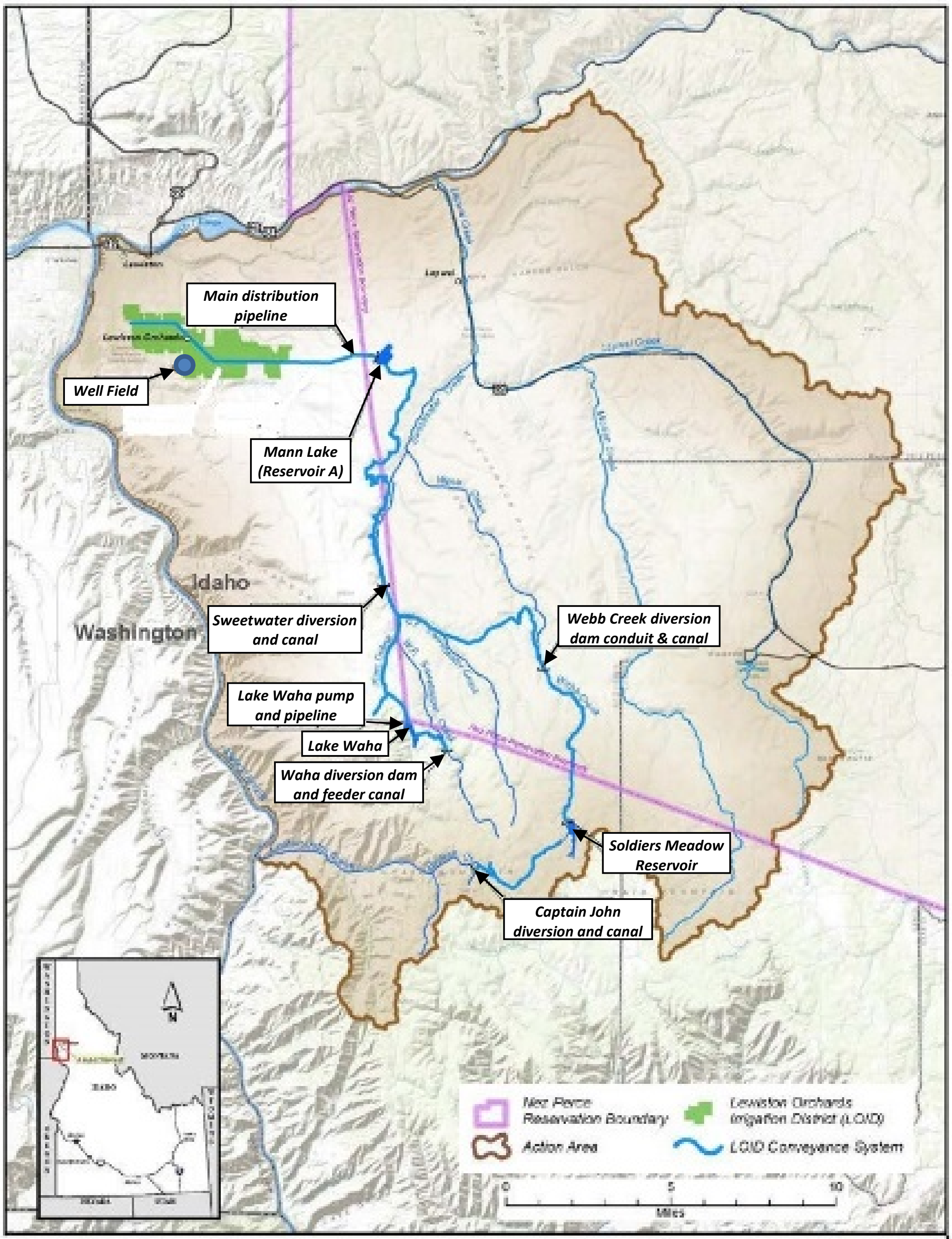

Figure 1. Map of Lewiston Orchards Project facilities and well location.

In this consultation, an incidental take statement will be issued for well installation and title transfer, and no further section 7 consultation is required for these actions. The biological assessment (BA) for this project also mentions a general framework for future operations or modifications to the LOP facilities after the title is transferred to the BIA, as may be necessary to maximize benefits to listed Snake River Basin steelhead and their critical habitat. This is further discussed in the Interrelated or Interdependent Actions section, below. Future actions undertaken by the BIA to meet the objectives of the water exchange and title transfer will not occur until those actions have been subjected to further section 7 consultation, if it is determined they "may affect" listed species and/or critical habitat.

For purposes of EFH consultation a 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).]"

1.3.1 Introduction

The purpose of the proposed action is to change the source of the water supply currently withdrawn from the LOP to the proposed wells in order to improve surface flows in the Webb Creek, Sweetwater Creek, and lower Lapwai Creek drainages. Surface flows are diminished by diversion of water into the LOP irrigation system. The streams affected by the water diversions support relatively high densities of juvenile steelhead in some stream reaches, but fish are absent in many reaches due to low flows in summer. In much of the area affected by LOP diversions, juvenile steelhead production, growth, and survival are likely to be diminished by low flow conditions that are caused in part by LOP water diversions.

The proposed action will install up to five additional wells, as needed to provide up to 8,500 acre-feet (ac-ft) of water annually for irrigation. The number of wells needed to meet the demand will depend on the production capacity of each well, which will not be known until the wells are drilled and tested. The well water will be exchanged for an equal volume of surface water that is presently withdrawn by the LOP. The water exchange will occur incrementally as new wells are developed. Once the irrigation demand is met entirely by well production, title to all of the LOP facilities upstream of Mann Lake would be transferred from the BOR to the BIA and held in trust for the Tribe. Once the title is transferred, the Tribe will manage the surface water facilities to benefit steelhead and their critical habitat in the Sweetwater Creek, Webb Creek, and lower Lapwai Creek drainages. The facilities will be operated to accumulate and store water in winter and spring, and to release the water in summer when low flows can be a major impediment to steelhead survival and production in the affected streams.

Well installation will occur incrementally as funding becomes available. Funding for the proposed action is authorized by the Fish and Wildlife Coordination Act authority. The timeframe for completing the well installation and title transfer is uncertain since funding is contingent on future budget allocations. The proposed action does not have a certain date for completing the exchange and title transfer due to uncertainty of future funds.

Present operation and maintenance of the LOP evaluated in the 2010 Opinion includes a rule set that prescribes minimum flows for times when water is diverted out of the basin and also includes a variety of provisions for monitoring, maintenance, and operation of facilities. The proposed action will not modify the minimum flows or any other provisions described in the

2010 Opinion. The proposed action will make additional water available for instream flows in Sweetwater and Webb creeks, but the 2010 rule set for minimum flows and all other provisions of the 2010 action would remain in effect until surface water diversions are replaced entirely by well water or until 2020, whichever comes first. Reinitiation of the consultation on the operation and maintenance of the LOP and continued reliance on surface water diversions in some form may occur during the transition period while the wells are being drilled and before this exchange and title transfer is completed.

1.3.2 Deep Well Installation and Operation

The proposed action includes installation of up to five additional wells, with each successive well added incrementally as funding becomes available. The wells will be located in or near the abandoned gravel quarry in the Tammany Creek drainage where the pilot well was installed in 2015 (Figure 1). Wells will be drilled to depths from 1,400 to 2,000 feet below ground, with the goal of hitting the Grande Ronde aquifer that feeds into the Snake River downstream. The Grande Ronde aquifer is a deep regional aquifer that conveys a tremendous amount of water. Withdrawing water from the Grande Ronde aquifer would not affect surface flows in Tammany Creek or other tributary streams. The production from each well is targeted to yield 2,000 gallons per minute. Actual depth and yield may vary due to unknown circumstances that may be encountered during the drilling process.

At the well sites, a variety of measures will be followed to avoid impacts to streams. Erosion control measures would be implemented to prevent stormwater discharges to nearby streams. The well sites are upland locations where mechanized equipment would not operate in-stream and all re-fueling of equipment would occur in uplands away from surface water. All construction equipment would be maintained in proper working order and maintained according to manufacturer's instructions. All fluid leaks would be repaired immediately. The drill rigs will recirculate water in a closed system that will not discharge wastewater. All well cuttings (materials removed from the well holes) will be removed from the site and placed in a location where they would not contribute fine sediment to Tammany Creek or other streams.

1.3.3 Water Rights Exchange

Currently, BOR holds title to the water rights associated with the LOP (Table 1), which are presently used by LOID. In conjunction with the federal action, LOID has applied for a new water right to withdrawal groundwater (Table 2) The groundwater right is conditioned on using it to replace the use of the existing LOP surface water rights described in Table 1. Concurrent with this replacement effort, the existing surface water rights may be changed to other purposes of use or places of use, subject to approval by the Idaho Department of Water Resources (IDWR). The IDWR issued a permit for the exchange project on July 18, 2014 with a priority date of May 8, 2014. The permit includes 8,500 ac-ft for municipal use annually within the LOID service area. The application includes an additional storage right in Mann Lake (Reservoir A) in a quantity of 3,043 ac-ft, based on reservoir size plus seepage and evaporation. The 3,043 ac-ft storage right would have an alternative permitted use for fire protection. The total diversion rate in the LOID water permit is 18 cubic feet per second (cfs). Meanwhile, for use within LOID, the groundwater right when combined with the existing surface water rights shall not exceed a total diversion rate of 110.3 cfs or a total storage volume of 19,306.0 ac-ft. Wells constructed after February 12, 2015, as points of diversion for this right shall be designed to appropriate water exclusively from the regional aquifer found in the Grande Ronde formation. The proof of beneficial use date for the groundwater right is August 1, 2019. The new right would provide LOID the water required to replace the LOP system. The LOID has additional water rights that are not associated with the exchange project.

Table 1. Summary of Bureau of Reclamation water rights to be transferred to Bureau of Indian Affairs.

SRBA Water Right No.	Water Source	Water Right and Beneficial Use - Area	Water Right and Type of Beneficial Use
85-02146	Webb Creek for storage in Soldiers Meadow Lake	2000 ac-ft per year (afy) storage	Irrigation and municipal
85-02147	Capt. John Creek for storage Soldiers Meadow Lake	6.3 cfs 2,000 afy	Irrigation and municipal
85-02049	Lake Waha	10 cfs (combined with No. 84-2063 may not exceed 10 cfs)	Irrigation and municipal
85-02063	Lake Waha	10 cfs	Irrigation and municipal
85-15424	Lake Waha	3,497.5 afy storage	Irrigation and municipal
85-11087	Lake Waha from West Fork Sweetwater Creek	20 cfs	Irrigation and municipal
85-00016	Sweetwater Creek	55 cfs natural flow diversion to storage	Irrigation and municipal
85-04483	Sweetwater Creek to be diverted into Sweetwater Canal for storage in Mann Lake	10,500 ac-ft storage	8,000 irrigation storage 1,000 stockwater storage 1,500 municipal storage
85-2065	Webb Creek	19 cfs	Irrigation and municipal

Table 2. New Lewiston Orchards Irrigation District groundwater right.

Idaho Water Right No.	Owner	Source	Priority Date	Use	Diversion Rate	Place of Use
85-15755	LOID	Groundwater	May 8, 2014	Municipal	18 cfs	LOID Service area

As ground water wells come online, diversion of surface water from the LOP would be reduced in an amount equal to an agreed upon in-lieu water exchange quantity, to be left instream through the Idaho State Water Bank for instream flows. How water in excess of minimum flows will be managed within the system will largely be dependent upon the water year, respective water availability among the wells and storage reservoirs. In all years, instream flows would meet or exceed the minimum flows specified in the 2010 Opinion.

1.3.4 Title Transfer and Management of Certain Lewiston Orchard Project Facilities

Federal reclamation projects such as the LOP are expressly authorized by Congress. Section 106 of the Reclamation Act of 1902 stipulates that BOR projects are owned by the U.S., and as such, an Act of Congress is required to transfer title out of federal ownership. Likewise, the transfer of lands in trust to the BIA for the Tribe will require federal legislation. The BOR will request these Congressional actions after the water exchange is completed. The transfer of water rights and title to LOP assets would coincide with conversion from the current surface water diversion system to the pumping plant. The LOP infrastructure features and assets located above and including Mann Lake (also called Reservoir A), would be conveyed to BIA to be held in trust for the Tribe. LOP features and assets located below Mann Lake would be transferred to LOID. The disposition of LOP assets and features is described in Table 3. Once this transaction is completed, BOR is released from all administrative authority, regulatory obligations, and liability associated with the LOP.

Table 3. Future ownership and disposition of Lewiston Orchard Project properties through the exchange.

Facility Name	Title holder after transfer	Future Management or Disposition
Captain John Diversion	BIA in trust for Tribe	The diversion and conveyance facilities may be retained to augment storage in Soldiers Meadow Reservoir. Periods of use will typically be from March through early May.
Soldiers Meadow Dam	BIA in trust for Tribe	Soldiers Meadow Reservoir water levels would be maintained for restore flows to designated critical habitat. Water may be released from Soldiers Meadow Reservoir to augment flows in either Webb or Sweetwater Creek, using the existing Webb Creek diversion infrastructure.
Webb Creek Diversion Dam and Pipeline	BIA in trust for Tribe	The dam will remain in place, which will enable the water stored in Soldiers Meadow Reservoir to be released downstream to Webb Creek and/or Sweetwater Creek. The facilities would be operated in a manner that maximizes benefits to critical habitat in Sweetwater and Webb creeks.
West Fork Sweetwater Diversion Dam, Feeder Canal, and Flume	BIA in trust for Tribe	The existing facilities will remain in place, which will enable water to be diverted from the West Fork Sweetwater Creek and conveyed to Lake Waha via the feeder canal.
Lake Waha Pump and Pipeline	BIA in trust for Tribe	Lake Waha will be managed to maintain variable water elevations closer to pre-LOP conditions. The intent is to maximize Sweetwater Springs' discharge, which is directly influenced by the elevation of the water surface in Lake Waha. Water also may be pumped from the lake into Sweetwater Creek using the existing pump and pipe to maximize benefits to critical habitat or to maintain water surface elevation in Lake Waha during period of high runoff.

Facility Name	Title holder after transfer	Future Management or Disposition
Sweetwater Diversion Dam and Canal	BIA in trust for Tribe	The Sweetwater Diversion Dam will remain in place for potential future needs. The BIA intends to evaluate the Sweetwater Creek diversion and habitat within Sweetwater Creek above the diversion to determine alternatives for restoring fish passage at the dam, while maintaining potential diversion capabilities.
Reservoir A Dam and Mann Lake	BIA in trust for Tribe	Reservoir A Dam and Mann Lake will remain in place and be managed as a storage reservoir for water pumped from the wells. The outlet gates of Reservoir A Dam would be kept open year round. Reservoir releases would be commensurate with water-user demands. Outside of irrigation season, the well field would supply water to Mann Lake to fill the reservoir. Water would be discharged from Mann Lake when demand exceeds well production capacity.
Filter Plant Property	LOID	The filter plant will be operated as a conduit for water moving downstream from Mann Lake or upstream from the well field to refill Mann Lake.

Following completion of the well field, the associated water exchange, and the subsequent title transfer to LOID and BIA, LOID and BIA will execute an operations agreement for Reservoir A Dam and Mann Lake. After the transfer and exchange, the source of the water in Mann Lake will consist almost entirely of water pumped from the wells fields, along with a small amount of water captured from 0.56 square miles of the uppermost portion of the Lindsay Creek drainage. Lindsay Creek at its mouth passes through a tunnel through a levee and into the Snake River. The tunnel makes Lindsay Creek inaccessible to anadromous fish.

1.3.5 Interrelated or Interdependent Actions

"Interrelated actions" are those that are part of a larger action and depend on the larger action for their justification. "Interdependent actions" are those that have no independent utility apart from the action under consideration (50 CFR 402.02). There are two interrelated or interdependent actions associated with the water exchange project and title transfer: (1) The LOID's new water right to pump groundwater from the Grande Ronde aquifer, which affects flows in the Snake River; and (2) BIA or Tribe operation and maintenance or disposal of the LOP facilities acquired in the exchange. Neither of these actions would occur but for the water exchange project and title transfer.

The EA for the proposed action states that the BIA and the Tribe intend to maintain all transferred LOP structures, facilities, and easements in place consistent with current configuration. However, post-transfer operations would be conducted in a manner designed to maximize benefits to natural resources and designated critical habitat within the Sweetwater and Webb Creek drainages. This would involve operating Soldiers Meadow Reservoir and Lake Waha in an effort to maintain water availability to provide instream flows in Sweetwater and Webb creeks and restore output at Sweetwater Springs to more natural conditions. Water may also continue to be diverted from Captain John Creek; however, if BIA and the Tribe determine various features of the LOP are not necessary for maintaining reservoir elevations and stream flows sufficient to benefit natural resources within the Lapwai Basin, the BIA would dispose of the asset. This may include structure retirement, removal, and (in some cases) site restoration. All site restoration activities would be conducted in a manner consistent with Lapwai Basin restoration objectives currently maintained by the Tribe. As these activities are not fully defined or have funding, they are not reasonably certain to occur at this time. However, when the projects are planned and funding is in place, the appropriate regulatory compliance, which may include informal or formal consultation, would be conducted.

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

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

2.1 Analytical Approach

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

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

The designations of critical habitat for Snake River salmon and steelhead species use the terms primary constituent element (PCE) or essential features. The new critical habitat regulations (81 FR 7414) replace these terms with 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 Opinion, we use the term PBF to mean PCE or essential feature, as appropriate for the specific critical habitat.

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

- Identify the rangewide status of the species and critical habitat expected to be adversely affected by the proposed action.
- Describe the environmental baseline in the action area.
- Analyze the effects of the proposed action on both species and their habitat using an "exposure-response-risk" approach.
- Describe any cumulative effects in the action area.
- Integrate and synthesize the above factors by: (1) Reviewing the status of the species and critical habitat; and (2) adding the effects of the action, the environmental baseline, and cumulative effects to assess the risk that the proposed action poses to species and critical habitat.
- Reach a conclusion about whether species are jeopardized or critical habitat is adversely modified.
- If necessary, suggest reasonable and prudent alternatives 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' current "reproduction, numbers, or distribution" as described in 50 CFR 402.02.

This Opinion also examines the condition of critical habitat throughout the designated area, evaluates the conservation value of the various watersheds that make up the designated area, and discusses the current function of the essential PBFs that help to form that conservation value. The designations of critical habitat for Chinook salmon (58 FR 68543) and steelhead (70 FR 52630) use the phrases "essential features" and "primary constituent elements," respectively to identify features essential to the conservation of the species. New critical habitat regulations (81 FR 7214) replace these with PBF, the current terminology used to define critical habitat under the ESA. In this Opinion, we use the term PBF to mean PCE or essential feature, as appropriate for the specific critical habitat.

Table 4. Listing status, status of critical habitat designations and protective regulations, and relevant Federal Register decisions notices for ESA-listed species considered in this Opinion. Listing status: "T" means listed as threatened under the ESA; "E" means listed as endangered.

	Listing Status	Critical Habitat	Protective Regulations
Chinook salmon *(Oncorhynchus tshawytscha)*			
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 6/28/05; 70 FR 37160	12/28/93; 58 FR 68543	ESA section 9 applies
Steelhead (*O. mykiss*)			
Snake River Basin	T 1/05/06; 71 FR 834	9/02/05; 70 FR 52630	6/28/05; 70 FR 37160

2.2.1 Status of the Species

This section describes the present condition of the Snake River spring/summer Chinook salmon, Snake River fall Chinook salmon, and Snake River sockeye salmon evolutionarily significant units (ESUs), and the Snake River Basin steelhead distinct population segment (DPS). NMFS expresses the status of a salmonid ESU or DPS in terms of likelihood of persistence over 100 years (or risk of extinction over 100 years). NMFS uses McElhaney et al.'s (2000) description of a viable salmonid population (VSP) that defines "viable" as less than a 5 percent risk of extinction within 100 years and "highly viable" as less than a 1 percent risk of extinction within 100 years. A third category, "maintained," represents a less than 25 percent risk within 100 years (moderate risk of extinction). To be considered viable an ESU or DPS should have multiple viable populations so that a single catastrophic event is less likely to cause the ESU/DPS to become extinct, and so that the ESU/DPS may function as a metapopulation that can sustain population-level extinction and recolonization processes (ICTRT 2007). The risk level of the ESU/DPS is built up from the aggregate risk levels of the individual populations and major population groups (MPGs) that make up the ESU/DPS.

Attributes associated with a VSP are: (1) Abundance (number of adult spawners in natural production areas), (2) productivity (adult progeny per parent), (3) spatial structure, and (4) diversity. A VSP needs sufficient levels of these four population attributes in order to: safeguard the genetic diversity of the listed ESU or DPS; enhance its capacity to adapt to various environmental conditions; and allow it to become self-sustaining in the natural environment (ICTRT 2007). These viability attributes are influenced by survival, behavior, and experiences throughout the entire salmonid life cycle, characteristics that are influenced in turn by habitat and other environmental and anthropogenic conditions. The present risk faced by the ESU/DPS informs NMFS' determination of whether additional risk will appreciably reduce the likelihood that the ESU/DPS will survive or recover in the wild.

2.2.1.1 Snake River Spring/Summer Chinook Salmon

The Snake River spring/summer Chinook salmon ESU was listed as threatened on April 22, 1992 (57 FR 14653). This ESU occupies the Snake River basin, which drains portions of southeastern Washington, northeastern Oregon, and north/central Idaho. The ESU does not include spring/summer Chinook salmon in the Clearwater River drainage. Non-native hatchery stocks were re-introduced to the Clearwater River after native fish were extirpated in the early 1900s by an impassable dam that was once located near the City of Lewiston, Idaho. Several factors led to NMFS' conclusion that Snake River spring/summer Chinook were threatened: (1) Abundance of naturally produced Snake River spring and summer Chinook runs had dropped to a small fraction of historical levels; (2) short-term projections were for a continued downward trend in abundance; (3) hydroelectric development on the Snake and Columbia Rivers continued to disrupt Chinook runs through altered flow regimes and impacts on estuarine habitats; and (4) habitat degradation existed throughout the region, along with risks associated with the use of outside hatchery stocks in particular areas (Good et al. 2005). On May 26, 2016, in the agency's most recent 5-year review for Pacific salmon and steelhead, NMFS concluded that the species should remain listed as threatened (81 FR 33468).

Life History. Snake River spring/summer Chinook salmon are characterized by their return times. Runs classified as spring Chinook salmon are counted at Bonneville Dam beginning in early March and ending the first week of June; summer runs are those Chinook adults that pass Bonneville Dam from June through August. Returning adults will hold in deep mainstem and tributary pools until late summer, when they move up into tributary areas and spawn. In general, spring-run type Chinook salmon tend to spawn in higher-elevation reaches of major Snake River tributaries in mid- through late August; and summer-run Chinook salmon tend to spawn lower in Snake River tributaries in late August and September (although the spawning areas of the two runs may overlap).

Spring/summer Chinook spawn follow a "stream-type" life history characterized by rearing for a full year in the spawning habitat and migrating in early to mid-spring as age-1 smolts (Healey 1991). Eggs are deposited in late summer and early fall, incubate over the following winter, and hatch in late winter and early spring of the following year. Juveniles rear through the summer, and most overwinter and migrate to sea in the spring of their second year of life. Depending on the tributary and the specific habitat conditions, juveniles may migrate extensively from natal reaches into alternative summer-rearing or overwintering areas. Snake River spring/summer Chinook salmon return from the ocean to spawn primarily as 4- and 5-year-old fish, after 2 to 3 years in the ocean. A small fraction of the fish return as 3-year-old "jacks," heavily predominated by males (Good et al. 2005).

Spatial Structure and Diversity. The Snake River ESU includes all naturally spawning populations of spring/summer Chinook in the mainstem Snake River (below Hells Canyon Dam) and in the Tucannon River, Grande Ronde River, Imnaha River, and Salmon River subbasins (57 FR 23458), as well as the progeny of 15 artificial propagation programs (70 FR 37160). The hatchery programs include the South Fork Salmon River (McCall Hatchery), Johnson Creek, Lemhi River, Pahsimeroi River, East Fork Salmon River, West Fork Yankee Fork Salmon River, Upper Salmon River (Sawtooth Hatchery), Tucannon River (conventional and captive broodstock programs), Lostine River, Catherine Creek, Lookingglass Creek, Upper Grande Ronde River, Imnaha River, and Big Sheep Creek programs. The historical Snake River ESU likely also included populations in the Clearwater River drainage and extended above the Hells Canyon Dam complex.

Within the Snake River ESU, the Interior Columbia Technical Recovery Team (ICTRT) identified 28 extant and four extirpated or functionally extirpated populations of spring/summer-run Chinook salmon, listed in Table 5 (ICTRT 2003; McClure et al. 2005). The ICTRT aggregated these populations into five MPGs: Lower Snake River, Grande Ronde/Imnaha Rivers, South Fork Salmon River, Middle Fork Salmon River, and Upper Salmon River. For each population, Table 5 shows the current risk ratings that the ICTRT assigned to the four parameters of a VSP (spatial structure, diversity, abundance, and productivity).

Spatial structure risk is low to moderate for most populations in this ESU (NWFSC 2015) and is generally not preventing the recovery of the species. Spring/summer Chinook salmon spawners are distributed throughout the ESU albeit at very low numbers. Diversity risk, on the other hand, is somewhat higher, driving the moderate and high combined spatial structure/diversity risks shown in Table 5 for some populations. Several populations have a high proportion of hatchery-origin spawners—particularly in the Grande Ronde, Lower Snake, and South Fork Salmon MPGs—and diversity risk will need to be lowered in multiple populations in order for the ESU to recover (ICTRT 2007, ICTRT 2010, NWFSC 2015).

Abundance and Productivity. Historically, the Snake River drainage is thought to have produced more than 1.5 million adult spring/summer Chinook salmon in some years (Matthews and Waples 1991), yet by the mid-1990s counts of wild fish passing Lower Granite Dam dropped to less than 10,000 (IDFG 2007). Wild returns have since increased somewhat but remain a fraction of historic estimates. Between 2005 and 2015, the number of wild adult fish passing Lower Granite Dam annually ranged from 8,808 to 30,338 (IDFG 2016). Natural-origin abundance has increased over the last 5 years for most populations in this ESU, but the increases have not been large enough to change population viability ratings for abundance and productivity; all but one population (Chamberlain Creek) remain at high risk of extinction over the next 100 years (NWFSC 2015). Many populations in Table 5 will need to see increases in abundance and productivity in order for the ESU to recover.

Table 5. Summary of viable salmonid population parameter risks and overall current status for each population in the Snake River spring/summer Chinook salmon evolutionarily significant units (NWFSC 2015).

MPG	Population	VSP Parameter Risk		Overall Viability Rating
		Abundance/ Productivity	Spatial Structure/ Diversity	
South Fork Salmon River (Idaho)	Little Salmon River	*Insf. data*	Low	High Risk
	South Fork Salmon River mainstem	High	Moderate	High Risk
	Secesh River	High	Low	High Risk
	East Fork South Fork Salmon River	High	Low	High Risk
	Chamberlain Creek	Moderate	Low	Maintained

MPG	Population	VSP Parameter Risk		Overall Viability Rating
		Abundance/ Productivity	**Spatial Structure/ Diversity**	
Middle Fork Salmon River (Idaho)	Middle Fk. Salmon River below Indian Ck.	*Insf. data*	Moderate	High Risk
	Big Creek	High	Moderate	High Risk
	Camas Creek	High	Moderate	High Risk
	Loon Creek	High	Moderate	High Risk
	Middle Fk. Salmon River above Indian Ck.	High	Moderate	High Risk
	Sulphur Creek	High	Moderate	High Risk
	Bear Valley Creek	High	Low	High Risk
	Marsh Creek	High	Low	High Risk
Upper Salmon River (Idaho)	North Fork Salmon River	*Insf. data*	Low	High Risk
	Lemhi River	High	High	High Risk
	Salmon River Lower Mainstem	High	Low	High Risk
	Pahsimeroi River	High	High	High Risk
	East Fork Salmon River	High	High	High Risk
	Yankee Fork Salmon River	High	High	High Risk
	Valley Creek	High	Moderate	High Risk
	Salmon River Upper Mainstem	High	Low	High Risk
	Panther Creek			***Extirpated***
Lower Snake (Washington)	Tucannon River	High	Moderate	High Risk
	Asotin Creek			***Extirpated***
Grande Ronde and Imnaha Rivers (Oregon/ Washington	Wenaha River	High	Moderate	High Risk
	Lostine/Wallowa River	High	Moderate	High Risk
	Minam River	High	Moderate	High Risk
	Catherine Creek	High	Moderate	High Risk
	Upper Grande Ronde River	High	High	High Risk
	Imnaha River	High	Moderate	High Risk
	Lookingglass Creek			***Extirpated***
	Big Sheep Creek			***Extirpated***

2.2.1.2 Snake River fall-run Chinook Salmon

The Snake River fall Chinook salmon ESU was listed as threatened on April 22, 1992 (57 FR 14653). This ESU occupies the Snake River basin, which drains portions of southeastern Washington, northeastern Oregon, and north/central Idaho. Snake River fall Chinook salmon have substantially declined in abundance from historic levels, primarily due to the loss of primary spawning and rearing areas upstream of the Hells Canyon Dam complex (57 FR 14653). Additional concerns for the species have been the high percentage of hatchery fish returning to natural spawning grounds and the relatively high aggregate harvest impacts by ocean and in-river fisheries (Good et al. 2005). On May 26, 2016, in the agency’s most recent 5-year review for Pacific salmon and steelhead, NMFS concluded that the species should remain listed as threatened (81 FR 33468).

Life History. Snake River fall Chinook salmon enter the Columbia River in July and August, and migrate past the lower Snake River mainstem dams from August through November. Fish spawning takes place from October through early December in the mainstem of the Snake River, primarily between Asotin Creek and Hells Canyon Dam, and in the lower reaches of several of the associated major tributaries including the Tucannon, Grande Ronde, Clearwater, Salmon, and Imnaha Rivers (Connor and Burge 2003; Ford 2011). Spawning has occasionally been observed in the tailrace areas of the four mainstem dams (Dauble et al. 1999; Dauble et al. 1995; Dauble et al. 1994; Mueller 2009). Juveniles emerge from the gravels in March and April of the following year.

Until relatively recently, Snake River fall Chinook were assumed to follow an "ocean-type" life history (Dauble and Geist 2000; Good et al. 2005; Healey 1991; NMFS 1992) where they migrate to the Pacific Ocean during their first year of life, normally within 3 months of emergence from spawning substrate as age-0 smolts, to spend their first winter in the ocean. Ocean-type Chinook salmon juveniles tend to display a "rear as they go" rearing strategy in which they continually move downstream through shallow shoreline habitats their first summer and fall until reach the ocean by winter (Connor and Burge 2003; Coutant and Whitney 2006). However, several studies have shown that another life history pattern exists where a significant number of smaller Snake River fall Chinook juveniles overwinter in Snake River reservoirs prior to outmigration. These fish begin migration later than most, arrest their seaward migration and overwinter in reservoirs on the Snake and Columbia Rivers, then resume migration and enter the ocean in early spring as age-1 smolts (Connor and Burge 2003; Connor et al. 2002; Connor et al. 2005; Hegg et al. 2013). Connor et al. (2005) termed this life history strategy "reservoir-type." Scale samples from natural-origin adult fall Chinook salmon taken at Lower Granite Dam continue have indicated that approximately half of the returns overwintered in freshwater (Ford 2011). Tiffan and Connor (2012) showed that subyearling fish favor water less than 6 feet deep.

Spatial Structure and Diversity. The Snake River fall Chinook salmon ESU includes one extant population of fish spawning in the mainstem of the Snake River and the lower reaches of several of the associated major tributaries including the Tucannon, Grande Ronde, Clearwater, Salmon, and Imnaha Rivers. The ESU also includes four artificial propagation programs: the Lyons Ferry Hatchery and the Fall Chinook Acclimation Ponds Program in Washington; the Nez Perce Tribal Hatchery in Idaho; and the Oxbow Hatchery in Oregon and Idaho (70 FR 37160). Historically, this ESU included one large additional population spawning in the mainstem of the Snake River upstream of the Hells Canyon Dam complex, an impassable migration barrier (NWFSC 2015). The spawning and rearing habitat associated with the current extant population (Lower Snake River) represents approximately 20 percent of the total historical habitat available to the ESU (Dauble and Geist 2000). Four of the five historic major spawning areas in the Lower Snake population currently have natural-origin spawning. Spatial structure risk for the existing ESU is therefore low and is not precluding recovery of the species (NWFSC 2015).

There are several diversity concerns for Snake River fall Chinook salmon, leading to a moderate diversity risk rating for the extant Lower Snake population. One concern is the high proportion of hatchery fish spawning naturally; between 2010 and 2014, only 31 percent of spawners in the population were natural-origin, and hatchery-origin returns are widespread across the major spawning areas within the population (NWFSC 2015). The moderate diversity risk is also driven by changes in major life history patterns; shifts in phenotypic traits; high levels of genetic homogeneity in samples from natural-origin returns; selective pressure imposed by current hydropower operations; and cumulative harvest impacts (NWFSC 2015). Diversity risk will need to be reduced to low in order for this population to be considered highly viable, a requirement for recovery of the species. Low diversity risk would require that one or more major spawning areas produce a significant level of natural-origin spawners with low influence by hatchery-origin spawners (NWFSC 2015).

Abundance and Productivity. Historical abundance of Snake River fall Chinook salmon is estimated to have been 416,000 to 650,000 fish (NMFS 2006), but numbers declined drastically over the 20th century, with only 78 wild fish passing Lower Granite Dam in 1990 (Joint Columbia River Management Staff 2014). The first hatchery-reared Snake River fall Chinook salmon returned to the Snake River in 1981, and since then the number of hatchery returns has increased steadily, such that hatchery fish dominate the Snake River fall Chinook run. Natural returns have also increased. The recent 10-year (2005–2014) mean abundance of natural-origin fall Chinook is 6,148 adult spawners, above the minimum viability goal of 4,200 spawners and largely driven by relatively high numbers in the most recent 3 years (NWFSC 2015). Current productivity estimated from 1990–2009 brood years is 1.5, meeting the ICTRT's abundance/productivity criteria for a viable population, but falling short of the productivity of 1.7 needed for highly viable status. An increase in productivity could be generated by reductions in mortalities across life stages, such as a reduction in harvest impacts on adults, currently at 40–50 percent, or improvements in juvenile survivals during downstream migration (NWFSC 2015).

Overall, the status of Snake River fall Chinook salmon has clearly improved compared to the time of ESA listing. The single extant population in the ESU is currently meeting the criteria for a rating of "viable" developed by the ICTRT, but the ESU as a whole is not meeting the recovery goals described in the recovery plan for the species, which require the single population to be "highly viable with high certainty" or will require reintroduction of a viable population above the Hells Canyon Dam complex (NWFSC 2015). For recovery of the species, the Lower Snake population will need an increase in estimated productivity combined with a reduction in diversity risk.

2.2.1.3 Snake River Sockeye Salmon

This ESU includes all anadromous and residual sockeye salmon from the Snake River Basin in Idaho, as well as artificially propagated sockeye salmon from the Redfish Lake captive propagation program. The ESU was first listed as endangered under the ESA in 1991, and the listing was reaffirmed in 2005 (70 FR 37160). Reasons for the decline of this species include high levels of historic harvest, dam construction including hydropower development on the Snake and Columbia Rivers, water diversions and water storage, predation on juvenile salmon in the mainstem river migration corridor, and active eradication of sockeye from some lakes in the 1950s and 1960s (56 FR 58619; ICTRT 2003). On May 26, 2016, in the agency's most recent 5-year review for Pacific salmon and steelhead, NMFS concluded that the species should remain listed as endangered (81 FR 33468).

Life History. Snake River sockeye salmon adults enter the Columbia River primarily during June and July, and arrive in the Sawtooth Valley peaking in August. The Sawtooth Valley supports the only remaining run of Snake River sockeye salmon. The adults spawn in lakeshore gravels, primarily in October (Bjornn et al. 1968). Eggs hatch in the spring between 80 and 140 days after spawning. Fry remain in the gravel for 3 to 5 weeks, emerge from April through May, and move immediately into the lake. Once there, juveniles feed on plankton for 1 to 3 years before they migrate to the ocean, leaving their natal lake in the spring from late April through May (Bjornn et al. 1968). Snake River sockeye salmon usually spend 2 to 3 years in the Pacific Ocean and return to Idaho in their fourth or fifth year of life.

Spatial Structure and Diversity. Within the Snake River ESU, the ICTRT identified historical sockeye salmon production in five Sawtooth Valley lakes, in addition to Warm Lake and the Payette Lakes in Idaho and Wallowa Lake in Oregon (ICTRT 2003). The sockeye runs to Warm, Payette, and Wallowa Lakes are now extinct, and the ICTRT identified the Sawtooth Valley lakes as a single MPG for this ESU. The MPG consists of the Redfish, Alturas, Stanley, Yellowbelly, and Pettit Lake populations (ICTRT 2007). The only extant population is Redfish Lake, supported by a captive broodstock program. Hatchery fish from the Redfish Lake captive propagation program have also been outplanted in Alturas and Pettit Lakes since the mid-1990s in an attempt to reestablish those populations (Ford 2011). With such a small number of populations in this MPG, increasing the number of populations would substantially reduce the risk faced by the ESU (ICTRT 2007). The Northwest Fisheries Science Center (NWFSC 2015) reports some evidence of very low levels of early-timed returns in some recent years from outmigrating naturally-produced Alturas Lake smolts, but the ESU remains at high risk for spatial structure.

Currently, the Snake River sockeye salmon run is highly dependent on a captive broodstock program operated at the Sawtooth Hatchery and Eagle Hatchery. Although the captive brood program rescued the ESU from the brink of extinction, diversity risk remains high without sustainable natural production (Ford 2011; NWFSC 2015).

Abundance and Productivity. Prior to the turn of the 20th century (ca. 1880), around 150,000 sockeye salmon ascended the Snake River to the Wallowa, Payette, and Salmon River basins to spawn in natural lakes (Evermann 1896, as cited in Chapman et al. 1990). The Wallowa River sockeye run was considered extinct by 1905, the Payette River run was blocked by Black Canyon Dam on the Payette River in 1924, and anadromous Warm Lake sockeye in the South Fork Salmon River basin may have been trapped in Warm Lake by a land upheaval in the early 20th century (ICTRT 2003). In the Sawtooth Valley, the Idaho Department of Fish and Game eradicated sockeye from Yellowbelly, Pettit, and Stanley Lakes in favor of other species in the 1950s and 1960s, and irrigation diversions led to the extirpation of sockeye in Alturas Lake in the early 1900s (ICTRT 2003), leaving only the Redfish Lake sockeye. From 1991 to 1998, a total of just 16 wild adult anadromous sockeye salmon returned to Redfish Lake. These 16 wild fish were incorporated into a captive broodstock program that began in 1992 and has since expanded so that the program currently releases hundreds of thousands of juvenile fish each year in the Sawtooth Valley (Ford 2011).

With the increase in hatchery production, adult returns to Sawtooth Valley have increased, ranging from 272 to 1,579 during the most recent 5-year period (2010–2014) (NWFSC 2015). The increased abundance of hatchery reared Snake River sockeye reduces the risk of immediate loss, yet levels of naturally produced sockeye returns remain extremely low (NWFSC 2015). The ICTRT's viability target is at least 1,000 naturally produced spawners per year in each of Redfish and Alturas Lakes and at least 500 in Pettit Lake (ICTRT 2007). Very low numbers of adults survived upstream migration in the Columbia and Snake Rivers in 2015 due to unusually high water temperatures. The implications of this high mortality for the recovery of the species are uncertain and depend on the frequency of similar high water temperatures in future years (NWFSC 2015).

The species remains at high risk across all four risk parameters (spatial structure, diversity, abundance, and productivity). Although the captive brood program has been highly successful in producing hatchery *O. nerka*, substantial increases in survival rates across all life history stages must occur in order to reestablish sustainable natural production (NWFSC 2015). In particular, juvenile and adult losses during travel through the Salmon, Snake, and Columbia River migration corridor continue to present a significant threat to species recovery (NMFS 2015a).

2.2.1.4 Snake River Basin Steelhead

The Snake River Basin steelhead was listed as a threatened ESU on August 18, 1997 (62 FR 43937), with a revised listing as a DPS on January 5, 2006 (71 FR 834). This DPS occupies the Snake River basin, which drains portions of southeastern Washington, northeastern Oregon, and north/central Idaho. Reasons for the decline of this species include substantial modification of the seaward migration corridor by hydroelectric power development on the mainstem Snake and Columbia Rivers, and widespread habitat degradation and reduced streamflows throughout the Snake River basin (Good et al. 2005). Another major concern for the species is the threat to genetic integrity from past and present hatchery practices, and the high proportion of hatchery fish in the aggregate run of Snake River Basin steelhead over Lower Granite Dam (Good et al. 2005; Ford 2011). On May 26, 2016, in the agency's most recent 5-year review for Pacific salmon and steelhead, NMFS concluded that the species should remain listed as threatened (81 FR 33468).

Life History. Adult Snake River Basin steelhead enter the Columbia River from late June to October to begin their migration inland. After holding over the winter in larger rivers in the Snake River basin, steelhead disperse into smaller tributaries to spawn from March through May. Earlier dispersal occurs at lower elevations and later dispersal occurs at higher elevations. Juveniles emerge from the gravels in 4 to 8 weeks, and move into shallow, low-velocity areas in side channels and along channel margins to escape high velocities and predators (Everest and Chapman 1972). Juvenile steelhead then progressively move toward deeper water as they grow in size (Bjornn and Rieser 1991). Juveniles typically reside in fresh water for 1 to 3 years, although this species displays a wide diversity of life histories. Smolts migrate downstream during spring runoff, which occurs from March to mid-June depending on elevation, and typically spend 1 to 2 years in the ocean.

Spatial Structure and Diversity. This species includes all naturally-spawning steelhead populations below natural and manmade impassable barriers in streams in the Snake River basin of southeast Washington, northeast Oregon, and Idaho, as well as the progeny of six artificial propagation programs (71FR834). The hatchery programs include Dworshak National Fish Hatchery, Lolo Creek, North Fork Clearwater River, East Fork Salmon River, Tucannon River, and the Little Sheep Creek/Imnaha River steelhead hatchery programs. The Snake River Basin steelhead listing does not include resident forms of *O. mykiss* (rainbow trout) co-occurring with steelhead.

The ICTRT identified 24 extant populations within this DPS, organized into five MPGs (ICTRT 2003). The ICTRT also identified a number of potential historical populations associated with watersheds above the Hells Canyon Dam complex on the mainstem Snake River, a barrier to anadromous migration. The five MPGs with extant populations are the Clearwater River, Salmon River, Grande Ronde River, Imnaha River, and Lower Snake River. In the Clearwater River, the historic North Fork population was blocked from accessing spawning and rearing habitat by Dworshak Dam. Current steelhead distribution extends throughout the DPS, such that spatial structure risk is generally low. For each population in the DPS, Table 6 shows the current risk ratings for the parameters of a VSP (spatial structure, diversity, abundance, and productivity).

The Snake River Basin steelhead DPS exhibit a diversity of life-history strategies, including variations in fresh water and ocean residence times. Traditionally, fisheries managers have classified Snake River Basin steelhead into two groups, A-run and B-run, based on ocean age at return, adult size at return, and migration timing. A-run steelhead predominantly spend 1-year in the ocean; B-run steelhead are larger with most individuals returning after 2 years in the ocean. New information shows that most Snake River populations support a mixture of the two run types, with the highest percentage of B-run fish in the upper Clearwater River and the South Fork Salmon River; moderate percentages of B-run fish in the Middle Fork Salmon River; and very low percentages of B-run fish in the Upper Salmon River, Grande Ronde River, and Lower Snake River (NWFSC 2015). Maintaining life history diversity is important for the recovery of the species.

Diversity risk for populations in the DPS is either moderate or low. Large numbers of hatchery steelhead are released in the Snake River, and the relative proportion of hatchery adults in natural spawning areas near major hatchery release sites remains uncertain. Moderate diversity risks for some populations are thus driven by the high proportion of hatchery fish on natural spawning grounds and the uncertainty regarding these estimates (NWFSC 2015). Reductions in hatchery-related diversity risks would increase the likelihood of these populations reaching viable status.

Abundance and Productivity. Historical estimates of steelhead production for the entire Snake River basin are not available, but the basin is believed to have supported more than half the total steelhead production from the Columbia River basin (Mallet 1974, as cited in Good et al. 2005). Historical estimates of steelhead passing Lewiston Dam (removed in 1973) on the lower Clearwater River were 40,000 to 60,000 adults (Ecovista et al. 2003), and the Salmon River basin likely supported substantial production as well (Good et al. 2005). In contrast, at the time of listing in 1997, the 5-year mean abundance for natural-origin steelhead passing Lower Granite

Dam, which includes all but one population in the DPS, was 11,462 adults (Ford 2011). Counts have increased since then, with between roughly 23,000 and 44,000 adult wild steelhead passing Lower Granite Dam in the most recent 5-year period (2011–2015) (NWFSC 2015). Population-specific abundance estimates exist for some but not all populations. Of the populations for which we have data, three (Joseph Creek, Upper Grande Ronde, and Lower Clearwater) are meeting minimum abundance/productivity thresholds and several more have likely increased in abundance enough to reach moderate risk. Despite these recent increases in abundance, the status of many of the individual populations remains uncertain, and four out of the five MPGs are not meeting viability objectives (NWFSC 2015). In order for the species to recover, more populations will need to reach viable status through increases in abundance and productivity.

Table 6. Summary of viable salmonid population parameter risks and overall current status for each population in the Snake River Basin steelhead distinct population segment (NWFSC 2015). Risk ratings with "?" are based on limited or provisional data series.

MPG	Population	VSP Parameter Risk		Overall Viability Rating
		Abundance/ Productivity	Spatial Structure/ Diversity	
Lower Snake River	Tucannon River	High?	Moderate	High Risk?
	Asotin Creek	Moderate?	Moderate	Maintained?
Grande Ronde River	Lower Grande Ronde	N/A	Moderate	Maintained?
	Joseph Creek	Very Low	Low	**Highly Viable**
	Wallowa River	N/A	Low	Maintained?
	Upper Grande Ronde	Low	Moderate	**Viable**
Imnaha River	Imnaha River	Moderate?	Moderate	Maintained?
Clearwater River (Idaho)	Lower Mainstem Clearwater River*	Moderate?	Low	Maintained?
	South Fork Clearwater River	High?	Moderate	High Risk?
	Lolo Creek	High?	Moderate	High Risk?
	Selway River	Moderate?	Low	Maintained?
	Lochsa River	Moderate?	Low	Maintained?
	North Fork Clearwater River			*Extirpated*
Salmon River (Idaho)	Little Salmon River	Moderate?	Moderate	Maintained?
	South Fork Salmon River	Moderate?	Low	Maintained?
	Secesh River	Moderate?	Low	Maintained?
	Chamberlain Creek	Moderate?	Low	Maintained?
	Lower Middle Fork Salmon R.	Moderate?	Low	Maintained?
	Upper Middle Fork Salmon R.	Moderate?	Low	Maintained?
	Panther Creek	Moderate?	High	High Risk?
	North Fork Salmon River	Moderate?	Moderate	Maintained?
	Lemhi River	Moderate?	Moderate	Maintained?
	Pahsimeroi River	Moderate?	Moderate	Maintained?
	East Fork Salmon River	Moderate?	Moderate	Maintained?
	Upper Mainstem Salmon R.	Moderate?	Moderate	Maintained?
Hells Canyon	Hells Canyon Tributaries			*Extirpated*

*Current abundance/productivity estimates for the Lower Clearwater Mainstem population exceed minimum thresholds for viability, but the population is assigned moderate risk for abundance/productivity due to the high uncertainty associated with the estimate.

2.2.2 Status of Critical Habitat

In evaluating the condition of designated critical habitat, NMFS examines the condition and trends of PBFs which are essential to the conservation of the ESA-listed species because they support one or more life stages of the species. Proper function of these PBFs is necessary to support successful adult and juvenile migration, adult holding, spawning, incubation, rearing, and the growth and development of juvenile fish. Modification of PBFs may affect freshwater spawning, rearing or migration in the action area. Generally speaking, sites required to support one or more life stages of the ESA-listed species (i.e., sites for spawning, rearing, migration, and foraging) contain PBFs essential to the conservation of the listed species (e.g., spawning gravels, water quality and quantity, side channels, or food) (Table 7).

Table 7. Types of sites, essential physical and biological features, and the species life stage each physical and biological feature supports.

Site	Essential Physical and Biological Features (PBFs)	Species Life Stage
Snake River Basin Steelhead[a]		
Freshwater spawning	Water quality, water quantity, and substrate	Spawning, incubation, and larval development
Freshwater rearing	Water quantity & floodplain connectivity to form and maintain physical habitat conditions	Juvenile growth and mobility
	Water quality and forage[b]	Juvenile development
	Natural cover[c]	Juvenile mobility and survival
Freshwater migration	Free of artificial obstructions, water quality and quantity, and natural cover[c]	Juvenile and adult mobility and survival
Snake River Spring/Summer Chinook Salmon, Fall Chinook, & Sockeye Salmon		
Spawning & Juvenile Rearing	Spawning gravel, water quality and quantity, cover/shelter (Chinook only), food, riparian vegetation, space (Chinook only), water temperature and access (sockeye only)	Juvenile and adult.
Migration	Substrate, water quality and quantity, water temperature, water velocity, cover/shelter, food[d], riparian vegetation, space, safe passage	Juvenile and adult.

[a] Additional PBFs pertaining to estuarine, nearshore, and offshore marine areas have also been described for Snake River steelhead and Middle Columbia steelhead. These PBFs will not be affected by the proposed action and have therefore not been described in this Opinion.
[b] Forage includes aquatic invertebrate and fish species that support growth and maturation.
[c] Natural cover includes shade, large wood, log jams, beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks.
[d] Food applies to juvenile migration only.

Table 8 describes the geographical extent within the Snake River of critical habitat for each of the four ESA-listed salmon and steelhead species. Critical habitat includes the stream channel and water column with the lateral extent defined by the ordinary high-water line, or the bankfull elevation where the ordinary high-water line is not defined. In addition, critical habitat for the three salmon species includes the adjacent riparian zone, which is defined as the area within 300 feet of the line of high water of a stream channel or from the shoreline of standing body of water (58 FR 68543). The riparian zone is critical because it provides shade, streambank stability, organic matter input, and regulation of sediment, nutrients, and chemicals.

Table 8. Geographical extent of designated critical habitat within the Snake River for ESA-listed salmon and steelhead.

ESU/DPS	Designation	Geographical Extent of Critical Habitat
Snake River sockeye salmon	58 FR 68543; December 28, 1993	Snake and Salmon Rivers; Alturas Lake Creek; Valley Creek, Stanley Lake, Redfish Lake, Yellowbelly Lake, Pettit Lake, Alturas Lake; all inlet/outlet creeks to those lakes
Snake River spring/summer Chinook salmon	58 FR 68543; December 28, 1993. 64 FR 57399; October 25, 1999.	All Snake River reaches upstream to Hells Canyon Dam; all river reaches presently or historically accessible to Snake River spring/summer Chinook salmon within the Salmon River basin; and all river reaches presently or historically accessible to Snake River spring/summer Chinook salmon within the Hells Canyon, Imnaha, Lower Grande Ronde, Upper Grande Ronde, Lower Snake-Asotin, Lower Snake-Tucannon, and Wallowa subbasins.
Snake River fall Chinook salmon	58 FR 68543; December 28, 1993	Snake River to Hells Canyon Dam; Palouse River from its confluence with the Snake River upstream to Palouse Falls; Clearwater River from its confluence with the Snake River upstream to Lolo Creek; North Fork Clearwater River from its confluence with the Clearwater River upstream to Dworshak Dam; and all other river reaches presently or historically accessible within the Lower Clearwater, Hells Canyon, Imnaha, Lower Grande Ronde, Lower Salmon, Lower Snake, Lower Snake–Asotin, Lower North Fork Clearwater, Palouse, and Lower Snake–Tucannon subbasins.
Snake River Basin steelhead	70 FR 52630; September 2, 2005	Specific stream reaches are designated within the Lower Snake, Salmon, and Clearwater River basins. Table 21 in the Federal Register details habitat areas within the DPS's geographical range that are excluded from critical habitat designation.

Spawning and rearing habitat quality in tributary streams in the Snake River varies from excellent in wilderness and roadless areas to poor in areas subject to intensive human land uses (NMFS 2015b). Critical habitat throughout much of the Interior Columbia (which includes the Snake River and the Middle Columbia River) has been degraded by intensive 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 streamflows, impaired water quality, and reduction of habitat complexity are common problems for critical habitat in non-wilderness areas. Human land use practices throughout the basin have caused streams to become straighter, wider, and shallower, thereby reducing rearing habitat and increasing water temperature fluctuations.

In many stream reaches designated as critical habitat in the Snake River basin, streamflows are substantially reduced by water diversions (NMFS 2015b). 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 Snake River spring/summer Chinook and Snake River Basin steelhead in particular (NMFS 2015b).

Many stream reaches designated as critical habitat for these species are listed on the Clean Water Act 303(d) list for impaired water quality, such as elevated water temperature (IDEQ 2011). Many areas that were historically suitable rearing and spawning habitat are now unsuitable due to high summer stream temperatures, such as some stream reaches in the Upper Grande Ronde. Removal of riparian vegetation, alteration of natural stream morphology, and withdrawal of water for agricultural or municipal use all contribute to elevated stream temperatures. Water quality in spawning and rearing areas in the Snake River has also been impaired by high levels of sedimentation and by heavy metal contamination from mine waste (e.g., IDEQ and EPA 2003; IDEQ 2001).

Migration habitat quality for Snake River salmon and steelhead has also been severely degraded, primarily by the development and operation of dams and reservoirs on the mainstem Columbia and Snake Rivers (NMFS 2008). Hydroelectric development has modified natural flow regimes in the migration corridor causing higher water temperatures and changes in fish community structure that have led to increased rates of piscivorous and avian predation on juvenile salmon and steelhead, and delayed migration for both adult and juveniles. Physical features of dams such as turbines also kill migrating fish.

The present condition of PBF within designated critical habitat and the human activities that affect PBF trends within the action area are further described in the environmental baseline.

2.2.3 Climate Change Implications for ESA-listed Species and their Critical Habitat

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

In the Pacific Northwest, most models project warmer air temperatures, increases in winter precipitation, and decreases in summer precipitation. Average temperatures in the Pacific Northwest are predicted to increase by 0.1 to 0.6°C (0.2°F to 1.0°F) per decade (Mote and Salathé 2009). Warmer air temperatures will lead to more precipitation falling as rain rather than snow. As the snow pack diminishes, seasonal hydrology will shift to more frequent and severe early large storms, changing stream flow timing, which may limit salmon survival (Mantua et al.

2009). The largest driver of climate-induced decline in salmon populations is projected to be the impact of increased winter peak flows, which scour the streambed and destroy salmon eggs (Battin et al. 2007).

Higher water temperatures and lower spawning flows, together with increased magnitude of winter peak flows are all likely to increase salmon mortality. The Independent Scientific Advisory Board (ISAB 2007) found that higher ambient air temperatures will likely cause water temperatures to rise. Salmon and steelhead require cold water for spawning and incubation. As climate change progresses and stream temperatures warm, thermal refugia will be essential to persistence of many salmonid populations. Thermal refugia are important for providing salmon and steelhead with patches of suitable habitat while allowing them to undertake migrations through or to make foraging forays into areas with greater than optimal temperatures. To avoid waters above summer maximum temperatures, juvenile rearing may be increasingly found only in the confluence of colder tributaries or other areas of cold water refugia (Mantua et al. 2009).

Climate change is expected to make recovery targets for salmon and steelhead populations more difficult to achieve. Climate change is expected to alter critical habitat by generally increasing temperature and peak flows and decreasing base flows. Although changes will not be spatially homogenous, effects of climate change are expected to decrease the capacity of critical habitat to support successful spawning, rearing, and migration. Habitat action can address the adverse impacts of climate change on salmon. Examples include restoring connections to historical floodplains and freshwater and estuarine habitats to provide fish refugia and areas to store excess floodwaters, protecting and restoring riparian vegetation to ameliorate stream temperature increases, and purchasing or applying easements to lands that provide important cold water or refuge habitat (Battin et al. 2007; ISAB 2007).

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 includes all streams affected by LOP water diversion or water storage facilities that are involved in the title transfer; the well sites; and the portion of the Snake and Clearwater Rivers where discharge will change as a result of the proposed action. These areas include the Captain John Creek drainage; the Snake River from the confluence with Captain John Creek to Lower Granite Dam; Sweetwater and Webb creek drainages; Lapwai Creek downstream from confluence with Sweetwater Creek to its mouth; and the mainstem of the Clearwater River from the confluence with Lapwai Creek to its mouth.

Water diversions from headwater tributaries have some effect on downstream flows all the way to the ocean, but the effect becomes less discernible with increasing downstream distance. Numerous natural and artificial factors influence gains and losses of water between the action area and the ocean. In consideration of the diminishing effects of the proposed action downstream, the downstream extent of the action area is Lower Granite Dam. Outflow from the Lower Granite pool is regulated by the dam, which overshadows the effect of the proposed action on flows below the dam.

The action area is used by smolt and adult stages of Snake River spring/summer Chinook salmon, Snake River Basin steelhead, Snake River sockeye salmon, and Snake River fall Chinook salmon. The action area may also be used by juvenile fall and spring/summer Chinook salmon, and steelhead for rearing during portions of the year. The action area is designated critical habitat for all listed species of anadromous fish in the Snake River (Table 4). The action area is also EFH for Chinook and coho salmon (PFMC 1999).

The listed species that occur in the action area and the critical habitat designations differ in various parts of the action area (Table 9).

Table 9. Listed species and critical habitat designations within the action area.

Drainage	**Listed Species & Critical Habitat[1]**
Clearwater Mainstem	SRB steelhead, SR fall Chinook salmon
Lapwai Creek basin (includes Webb and Sweetwater Creeks)	SRB steelhead
Captain John Creek	SRB steelhead, SR spring/summer Chinook salmon
Snake River	SRB steelhead, SR fall Chinook salmon, SR spring/summer Chinook salmon, and SR sockeye salmon
Tammany Creek	SRB steelhead, SR spring/summer Chinook salmon
Lindsay Creek	No listed species or critical habitat present

[1]SRB – Snake River Basin; SR – Snake River

2.4 Environmental Baseline

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

The action area contains a diversity of environmental conditions with numerous impacts that commonly occur with agriculture, forestry, road systems, and residential and urban developments. The uppermost portions of the Captain John and Sweetwater/Webb Creek drainages are lands lightly developed for roads, forestry operations, farms, and scattered residences. Stream channels in valley bottoms at lower elevations are moderately to highly altered in places by channel straightening, moving channels out of their natural location, and the presence of levees that prevent floodplain inundation.

Most of the mainstem Snake and Clearwater Rivers within the action area are highly modified. Near their confluence, the river banks are largely armored with riprap, and levees are used on the Clearwater River to maintain sufficient water depth for navigation by commercial vessels. Several marinas have been built on the Lower Snake River. Water levels are higher than normal due to regulation by the Lower Granite Dam. The Lower Granite pool provides a haven for introduced smallmouth bass and pikeminnow that prey on juvenile salmonids. Flows in the lower Clearwater River and Lower Snake are also modified by retaining or releasing water from

Dworshak Reservoir and Hells Canyon Dam. In summer, water temperatures in the Lower Granite pool often exceed the lethal limit for anadromous fish, although fish may find refuge from high temperatures from thermal stratification and areas where temperatures are moderated by an influx of groundwater or upwelling of hyporheic flows.

Headwater portions of the action area are strongly influenced by water diversions that are part of the LOP. The LOP facilities are located in Captain John Creek, Sweetwater/Webb creeks, and Lindsay Creek drainages. Water supply for the LOP is collected from the Captain John Creek and the Sweetwater Creek basins (which includes Webb Creek). Water diversions typically begin in late winter or early spring when temperatures become warm enough to prevent the diversion structures from freezing. Water is stored in Soldiers Meadow Reservoir and Lake Waha in the Lapwai Creek watershed, and Reservoir A in the Lindsay Creek watershed. Under current operations, the LOP provides minimum flows to Sweetwater and Webb Creeks during the irrigation season as described in Table 10. Bypass flows described in Table 10 are waters that are left instream. The Minimum instream flows vary depending on the volume of stored water present on June 1 of each year.

Table 10. Minimum flows required in Sweetwater and Webb Creeks. The incremental add-on is an additional 0 to 1 cubic feet per second allocated to instream flow based on the volume of water stored on June 1 of each year.

Life Stage	Spawning			Juvenile Rearing										
Month	Feb	Mar	Apr	May	Jun	Jul 1-15	Jul 15-18	Jul 18-31	Aug	Sep 1-11	Sep 12-15	Sep 16-30	Oct	Nov, Dec, Jan
Sweetwater Creek Base ByPass Flows	7.8*	7.8*	7.8	3.0	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	Bypass
Incremental Add-In	0.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0	0.0	
Tribal Negotiated 90 AF 2011-2013 (1/28/11)	0.0	0.0	0.0	0.0	0.3	0.5	0.5	0.5	0.5	0.3	0.3	0.0	0.0	
Total Sweetwater Creek ByPass Flows	**7.8**	**7.8**	**7.8**	**3.0**	**3.8**	**4.0**	**4.0**	**4.0**	**4.0**	**3.8**	**3.8**	**2.5**	**2.5**	
Webb Creek Base ByPass Flows	4.0*	4.0*	4.0	1.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	Bypass
Incremental Add-In	0	0	0	0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0	0	
Total Webb Creek ByPass Flows	**4.0**	**4.0**	**4.0**	**1.5**	**2.0**	**2.0**	**2.0**	**2.0**	**2.0**	**2.0**	**2.0**	**1.0**	**1.0**	

Water quality in the action area is compromised in places by high temperatures, nutrient enrichment from livestock and septic systems, and from runoff from farm fields and paved areas. Runoff carries excess fine sediment and a variety of chemical pollutants. High temperatures in summer are exacerbated by shallow domestic wells and surface water withdrawals from the LOP and numerous residential properties that have access to a stream. Waters withdrawn by LOP have a major impact on flows in Sweetwater, Webb, and lower Lapwai creeks during irrigation season, which may run from May through the end of October. Stream flows are diminished in these streams throughout the irrigation season, with occasional exceptions occurring in October when releases of stored water provide higher flows than would occur otherwise in years where natural discharge is well-below the average.

The additive effect of past and present impacts and human activities in the Lapwai Creek drainage has resulted in a flashy stream system that has excessive energy during higher flows, low flows and high temperatures in summer, greatly simplified fish habitat, and generally poor habitat conditions for anadromous fish in places where channels have become straightened and confined by levees or entrenchment. In the absence of the operation of the LOP , water losses from residential and agricultural uses and modifications to the floodplains, channels and riparian vegetation, the drainage likely had much better habitat conditions due in part to unusually high base flows in summer due to seepage from Lake Waha. In spite of generally poor baseline conditions, portions of the Lapwai Creek drainage support relatively high densities of juvenile steelhead.

Improvements in the survival and productivity of steelhead are needed in the Lapwai Creek drainage to meet recovery goals. The NMFS' 2016 *draft Snake River Spring/Summer Chinook Salmon and Steelhead Recovery Plan* requires the lower Clearwater River MPG to become viable or highly viable. An improvement in the status requires greater productivity and abundance. The Lapwai Creek drainage produces a substantial portion of the steelhead in the Lower Clearwater River MPG. Restoring flows in the Lapwai Creek system has greater potential to produce more fish than restoration activities that have a more localized effect. The Lapwai Creek drainage appears to have the potential to produce far more steelhead than present if flows and other habitat alterations are improved. Climate change has likely exacerbated the low flows and high water temperatures in summer. Anecdotal evidence of peak flow timing and precipitation records indicate that the region has been shifting from a mixed snow and rain-driven hydrograph to a hydrograph that is increasingly driven by rain alone. There is the potential to use the LOP reservoirs in the future to augment flows in Sweetwater and Webb Creeks to offset shifts in the hydrograph, should summer flow augmentation be a benefit to listed fish.

Habitat conditions in the mainstem Clearwater and Snake Rivers within the action area have problems characteristic of areas affected by the Federal Columbia River Power System (FCRPS) dams. The dams affect the survival and recovery of the four listed species considered in this Opinion by creating artificial habitat conditions that are favorable for mammals, birds, and fish that prey on salmon and steelhead; by altering temperatures and flow regimes; increasing travel time; and from trauma that can occur when fish pass across a dam. Subyearling fall Chinook salmon have become increasingly dependent on the Lower Granite Reservoir as a rearing area, which is a new life history pattern that has likely emerged in response to releases of cool water from Dworshak Reservoir in summer.

2.5 Effects of the Action

Under the ESA, "effects of the action" means the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline (50 CFR 402.02). Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur.

The purpose of the proposed action is to benefit Snake River Basin steelhead by increasing instream flows in Sweetwater and Webb Creeks, where surfaces waters are presently diverted by the LOP. The surface water diversions will be replaced by wells that are connected to an aquifer that feeds into the mainstem Snake River, where the relative impact on flows is much smaller. In the Lapwai Creek tributaries, the LOP presently diverts the majority of surface flows, which severely depletes the stream of water. In the Snake River, the volume of water used by the LOP would cause nearly unnoticeable effects on discharge.

The proposed action may affect critical habitat and listed fish through several mechanisms: (1) Reducing and eventually eliminating the diversion of surface water from Sweetwater and Webb Creeks; (2) drawing water out of the Grande Ronde reginal aquifer that feeds into the Snake River; (3) effects of well construction; and (4) eventual operation of transferred facilities in Captain John and the Lapwai Creek drainages for the benefit of steelhead. The effects of the action are discussed within each of the major drainage areas where effects of the action differ.

2.5.1 Critical habitat Effects

The proposed action affects critical habitat for all listed species of Snake River salmon and steelhead. The action area spans five different drainage areas that are designated as critical habitat for one or more species (Table 9): lower Clearwater mainstem; Lapwai Creek basin (includes Webb and Sweetwater Creeks); Captain John Creek; Snake River mainstem; and Tammany Creek. Effects of the action on critical habitat are discussed separately for each of these drainage areas. The PBFs of critical habitat affected by the proposed action are water quality and water quantity. The action also affects habitat in Lindsay Creek; however, Lindsay Creek has no designated critical habitat and it is inaccessible to anadromous fish due to a drainage tunnel that is required for outflow into the Clearwater River with the present levee and operation of Lower Granite dam.

Lapwai Creek Basin

The LOP operations affect critical habitat for Snake River Basin steelhead in Sweetwater, Webb, and Lapwai Creeks, extending from the confluence of Lapwai and Sweetwater Creeks to the confluence with the Clearwater River. The majority of the LOP surface water facilities are located in the Lapwai Creek basin. Water quantity and water quality (water temperature) are the PBFs affected by the action. The LOP will continue to divert surface water from Sweetwater and Webb Creeks until the surface water diversions are no longer needed. The volume of water diverted will be reduced incrementally as wells are brought into production. Water diversion out of the Lapwai Creek basin typically starts in May or June and lasts until late September or early October.

Before the title transfer is complete, BOR and LOID will continue to meet minimum flows in Sweetwater and Web Creeks as described in NMFS' 2010 Opinion (NMFS# 2009/06062) and also allocate additional follows to the streams in accordance with the proposed exchange of well water for surface water that is presently diverted out of the Lapwai Creek drainage. Water in excess of the minimum flows will be added incrementally as each well is brought into production, in addition to the extra flows from the pilot well that are presently substituted for an equal volume of surface water. The NMFS (2010) Opinion allows for flows that are higher than the minimum requirements. Summer flows in Sweetwater, Webb, and Lapwai Creeks, and the lower Clearwater River will increase incrementally as well production is exchanged for surface flows diversions. As surface water diversions are replaced by well production, increased volumes of stored water may be released from Soldiers Meadow Reservoir and Lake Waha, and seepage from Lake Waha will also increase. Releases of stored water would be used to augment flows in Sweetwater and Webb Creeks as needed to optimize water temperatures and flows for the benefit of juvenile steelhead. Water temperatures in the Lapwai Creek basin portion of the action area will be moderated by increased flows.

As wells are fully brought into production, late summer flows in Sweetwater and Webb Creeks are expected to increase by as much as 400 to 500 percent from baseline. Lapwai Creek would also see an increase around 100 to 200 percent from baseline. Surface water gained from the exchange would be protected by the Idaho State Water Bank to the mouth of Lapwai Creek. The increased flows would benefit critical habitat by more closely resembling natural flow conditions and by reducing water temperatures. The action will improve water quantity and water quality (temperature) PBFs of steelhead critical habitat in Webb, Sweetwater, and lower Lapwai Creeks. Water quantity will be improved directly by reducing the volume of water diverted from the Lapwai Creek basin. Water temperature is likely to improve slightly from the increased surface flows due to increases in thermal inertia and exchange of surface and subsurface flows (Poole and Berman 2001).

Future operations of LOP facilities in the Lapwai Cree drainage by the BIA and Tribe will cause interrelated and interdependent effects to critical habitat in Lapwai Creek. The specific operations are not specified at this time, but the Environmental Assessment for the proposed action states that the reservoirs and other facilities in the Lapwai Creek drainage would be managed to optimize flows to benefit steelhead and their critical habitat. Low flows ion summer are a PBF that is impaired in the Lapwai Creek drainage. Future use of water storage and conveyance facilities to augment flows in summer will improve water quantity and be beneficial to critical habitat in the Lapwai Creek drainage.

Clearwater River Mainstem

The mainstem of the Clearwater River is designated as critical habitat for Snake River fall Chinook salmon and Snake River Basin steelhead. Within the action area, steelhead use the mainstem Clearwater River almost exclusively as a migratory corridor, while fall Chinook salmon use the area for spawning, rearing, and migration. Juvenile steelhead may occasionally use the mainstem Clearwater River for rearing; however, habitat conditions in the river are poorly suited for this purpose and juveniles are generally unlikely to be found in the mainstem.

As wells come on line and diversions from the LOP are reduced, increased outflow from Lapwai Creek will increase flows in the Clearwater River below the confluence. The increased flow described above will benefit critical habitat in the Clearwater River, but the effect is likely to be extremely small since the discharge in the Clearwater River can be two to three orders of magnitude larger than flows in Lapwai Creek due to the vastly larger drainage area of the Clearwater Basin. Increased flows from the proposed action are likely to result in negligible increases in water depth and water velocity in the lower 10 miles of the Clearwater River during the irrigation season. Although the effects described above are beneficial, the general characteristics of PBFs in the lower Clearwater River will be similar to present.

Captain John Creek

Once the title transfer is complete, the Captain John Creek diversion is likely to continue to be operated in the same manner as it present. The effects of the present operations are analyzed in the 2010 Opinion for the LOP. In the 2010 Opinion, the effect of the Captain John Creek diversion on critical habitat in Captain John Creek and in the mainstem Snake River was found to be negligible since the volume of water diverted is percentage roughly 3 percent of the peak flows in Captain John Creek and a much smaller percentage of flows in the Snake River. The volume of water diverted was found to be too small to cause meaningful effects on critical habitat in Captain John Creek or the Snake River.

Snake River mainstem

The mainstem of the Snake River is critical habitat for all listed species of salmon and steelhead in the Snake River drainage. All of the listed species use the Snake River action area as a migration corridor, and fall Chinook salmon may also use the action area for spawning and rearing. The primary effect of the proposed action on PBFs in the Snake River is a minor decrease in discharge downstream from the Lower Granite pool, in comparison to the baseline. This decrease will occur due to a decrease in groundwater inflow which is caused by the pumping of water by the wells in the LOP.

The LOID water rights associated with the well field will allow the wells to withdraw up to 8,500 ac-ft of water annually, at a maximum rate of 18 cfs. The shift toward well production will cause decreased inflow to the Snake River from the Grande Ronde aquifer, while inflow to the Snake River from the Clearwater River will increase from higher surface flows in Sweetwater and Webb Creeks. Flow reductions in the Snake River from the LOP are expected to shift downstream from the top end of the Lower Granite pool toward the middle of the Lower Granite pool, near Chief Timothy Park (BOR 2017). The changes in inflow and outflow will at least partly offset each other, but the offsetting effects may not occur at exactly the same time, and the flow increases may not entirely compensate for a larger volume of water that might be withdrawn from the wells when they are operating at full capacity. The balance of inflows to and outflows from the Snake River is dependent on the timing and volume of future releases of stored water from the LOP and the timing and volume of water withdrawals from the wells; which will vary continuously each irrigation season. Water withdrawals in Captain John Creek described above will remain the same as baseline, and affect flows only for a brief period in late winter or early spring.

Assuming the water usage in Lewiston Orchards will remain the same or increase, this water exchange action may cause some net reduction in flow in the Snake River compared to the baseline during June through October. The wells are not limited by the storage and conveyance capacities of the surface water system, which will enable the wells at some point to deliver a greater volume of water than present, up to the full water right. The volume of water that has been available to LOID with existing surface facilities has consistently been less than the full water right. The maximum rate of water withdrawals from the wells at full capacity is 18 cfs. In June, when the majority of smolts have emigrated from the Snake River, mean monthly flow (93,983 cfs) would be reduced no more than 0.02 percent when wells are operating at full capacity. Mean monthly flow in the Snake River at Lower Granite Dam is lowest in the month of August. A well production rate of 18 cfs in the month of August with no offsetting inputs from Lapwai Creek would reduce mean August flows in the Snake River at Lower Granite Dam (24,600 cfs) by no more than 0.07 percent. The 0.07 percent estimate is based on the lowest average monthly flows measured at the stream gage below the dam from 1979–1985; with the assumption that that discharge from the regional aquifer into the Snake River changes instantaneously as water is pumped from the wells. In reality, the effect on flow would be smaller than the 0.07 percent estimate.

The 18 cfs loss rate from the wells would be partly offset by release of stored water from the LOP, and the response of the regional aquifer to drawdown is likely to exhibit a time lag of several hours to several days or more in response to well operation. Under present operations, the amount of water diverted from the Sweetwater Creek drainage has averaged 17.0 cfs in July; 21.6 cfs in August; and 12.9 cfs in October. All of that water will be restored to Sweetwater Creek when well water is substituted for the surface water diversions. There has typically been a sufficient volume of stored water available to completely offset the 18 cfs loss of inflow. A time lag in the aquifer response and the 7-mile distance from the wells to the point of the aquifer discharge also dampens the fluctuation in aquifer discharge due to pumping.

The net effect of the proposed action on the water quantity PBF in the Snake River will be nearly the same as the baseline until the LOP switches entirely to well water. Once the wells are operational, water usage will no longer be limited by storage capacity and water losses from the Snake River are likely to increase by a small increment. The maximum instantaneous flow decrease would be something less than 18 cfs due to incremental increases in flows in Sweetwater Creek and the buffering capacity of the regional aquifer and flow augmentation in Sweetwater and Webb Creeks. A 0.07 percent reduction in Snake River inflow to the Lower Granite reservoir would not have cause a measurable change in flow characteristics related to water quantity such as depth, velocity, or wetted area. The change in discharge is also too small to cause a measurable change in water temperature.

Tammany Creek

The proposed well fields are located in the Tammany Creek drainage. Tammany Creek is designated critical habitat for Snake River Basin steelhead and Snake River spring/summer Chinook salmon. Water quality can be affected by well drilling activities if sediment-laden wastewater from the drill rig is allowed to flow into a stream; or if drill cuttings (soil and rock) are disposed of in a manner where they can become washed into a stream channel during rain or snowmelt events. Water quantity could be affected by a well if it draws water from an aquifer that contributes to surface flows in Tammany Creek.

Conservation measures in the proposed action make sediment effects unlikely to occur due to a requirement that requires all wastewater from the drill rig to be piped into the LOID irrigation system as a means of preventing discharges into Tammany Creek. This technique eliminates all wastewater discharges into Tammany Creek. Sediment delivery to surface waters from the disposal of well cuttings is unlikely because the proposed action requires that the cuttings be placed where they will not wash into a stream. The proposed action also requires erosion control measures at the wells sites and immediate repair of any fluid leakage to prevent water contamination.

Water quantity in Tammany Creek could be affected by wells drilled into shallow aquifers that are hydrologically connected to surface flows. The proposed action was designed to avoid affecting flows in Tammany Creek by drilling into a deep regional aquifer that draws water from the Snake River, as described above. The drilling depth places the wells at an elevation below the mouth of Tammany Creek, which eliminates the possibility of intercepting unconfined subsurface flows that feed into Tammany Creek. A pilot well was drilled to a depth of 1900 feet in 2015 and tested in 2016 to see if pumping would affect nearby wells. The tests did not detect any drawdown from nearby wells in Tammany Creek. Based on the elevation of the well sand the strike and dip angles of the underlying geologic formations, the aquifer most likely draws water that would otherwise flow into the mainstem Snake River in or near the Lower Granite Pool. Water quantity in Tammany Creek would not change from the proposed action since surface flows in Tammany Creek are not influenced by the Grande Ronde aquifer.

2.5.2 Species Effects

Snake River Flow Effects Common to All Listed Species

As described above, flows in the Snake River, below the confluence with the Clearwater River, may be slightly lower than present during the irrigation season once the LOP water usage switches entirely to well production. Listed species and lifestages present in the Lower Snake River during the irrigation season may include the smolt stage of all listed species, the parr stage of all species other than sockeye salmon, and adults of all species migrating upstream. Although all the above lifestages and species may be affected by the proposed action, nearly all smolt migration is completed before the irrigation season begins and, with exception of steelhead, most adult migration begins after or near the end of the irrigation season. Thus, smolts and adults are not likely to be present in large numbers while the lower flows are occurring.

Smolt survival in the Snake River is strongly influenced by travel time, which is affected by the amount of flow. Flow reductions reduce water velocity, which slows downstream migration. Longer migration times reduce survival of smolts by increased energetic costs by and exposing fish to higher rates of predation. It also exposes the fish to modest increases in risk of death from injury, disease, and physiological stress (NMFS 2014 – supplemental FCRPS Opinion). Under the baseline, migration is slowed by the combined effects of hydropower dams in the lower Snake River and water withdrawals throughout the Snake River basin, including the LOP. The proposed action adds to the baseline a minor incremental reduction in flow, but with negligible effects on travel time. The majority of smolts pass through the action area before the irrigation season begins. A small number of smolts trickle downstream though June or July, when the maximum flow reduction from well production would be less than 0.02 percent to 0.04 percent of the average flow in the Snake River in June and July, respectively. Flow augmentation from the LOP will reduce the effect of water withdrawals on travel time during the transition to a groundwater system. When the LOP surface facilities are no longer needed, the combined volume of stored water and natural flows from the Sweetwater Creek drainage are likely to substantially offset the 18 cfs reduction in inflow from the Grande Ronde aquifer as described above. Therefore, the effect on flows and therefore travel time will be miniscule, and the number of smolts potentially affected will be small.

The effect of the proposed action on adult salmon and steelhead travel time is negligible. Adult migrants tend to benefit from decreased flows by reducing their energetic costs and reducing travel time. However, a flow reduction less than 0.04 percent is too small to make a meaningful difference. Flows and velocities in the fish ladders that adults rely on for upstream migration are relatively fixed by the dimensions and configuration of the ladders and hydropower operations can negate the effect of the proposed action on flows through manipulation of gates that control the amount of spill.

Water temperatures in the Snake River are influenced by alteration of flow. A decrease in surface flow increases the rate that water gains heat through absorption of solar radiation and conductance with warm air. High water temperatures in summer occasionally deter movements of adult fish. When temperatures become excessive, migrating adults can be forced to seek pockets of cooler water and delay movement until water temperature become more favorable. The proposed action may reduce surface flows in summer through reduced influx of groundwater from the Grande Ronde aquifer by 18 cfs or less. However, water in the Grande Ronde aquifer is heated by geothermal energy. The proposed action will reduce the inflow of warm water from the Grande Ronde aquifer in summer. The net effect of reduced inflow may be a small loss or gain of heat depending on the ambient water temperatures, but the amount of heat involved is not enough to cause a measurable temperature change in the Snake River.

Snake River Basin steelhead

The proposed action affects all freshwater life stages of Snake River Basin steelhead. The changes in critical habitat described above will be beneficial to all freshwater life stages of listed steelhead in Sweetwater, Webb, and Lapwai Creeks. The increased flows in these three Clearwater River tributaries are likely to increase steelhead survival and production since low flows have been an overarching limiting factor in these streams. Effects of the action on listed steelhead in the mainstem Clearwater River are likely to be negligible due to the relatively minor effect of the proposed action on flow and temperature as explained for the Snake River above.

The proposed action will maintain baseline habitat conditions in Captain John and Tammany Creeks. After title transfer, water diversion from Captain John Creek will continue to diminish flows for a brief period in spring when discharge is near its peak, but this reduction is minor given peak flows and unlikely to alter passage times for smolts or adults over a six-mile distance. Flows in Tammany Creek are unaltered under the baseline and this will continue with the proposed action.

Future management of the LOP diversion, storage, and conveyance facilities in Captain John and Lapwai Creeks is interrelated and interdependent with the proposed water exchange and title transfer. Future operations are intended to benefit Snake River steelhead in the Lapwai Creek basin by storing water and releasing it during low flow periods to benefit fish and Snake River Basin steelhead in particular. The specifics of the future management of the facilities to be transferred to the BIA have yet to be developed, but releasing stored water in summer is clearly beneficial. A primary limiting factor for steelhead in the Lapwai Creek drainage is low lows, which would be increased by flow augmentation.

Snake River spring/summer Chinook salmon

Within the action area, spring/summer Chinook salmon occur only in Captain John Creek and the mainstem Snake River. Changes in flow and water temperature as described above affect all smolts and adults that pass through the action area. A small number of juvenile fish might use the lower Snake River for rearing, but juveniles generally do not use the mainstem Snake River for summer rearing. Even if juvenile spring/summer Chinook salmon used the Snake River for rearing, the proposed action would not change the environment in a manner that would affect their survival. Factors important for survival are cover, food, and temperature, which are not habitat elements that would be altered in a measurable way by the proposed action.

Snake River sockeye salmon

Within the action area, sockeye salmon occur only in the mainstem Snake River, which is used as a migration corridor by smolts and adults. Adults are more likely to occur in the action area during the irrigation season than smolts. The migration period for smolts lies almost entirely outside the irrigation season, but a few individuals may still be migrating in June. The 0.02% reduction in mean June discharge is unlikely to appreciably alter water velocity and passage times, or appreciably increase water temperature. The proposed action would not change the environment in a manner that would affect smolt survival

Unlike sockeye salmon smolts, the majority of adult sockeye salmon are likely to pass through the action area during the irrigation season. Upstream passage of adult sockeye salmon can be blocked by excessive temperatures at the fish ladders. The proposed action may cause a very small increase in average water surface temperature due to reduced flows, which could conceivably contribute to thermal blockage. This problem occurred in 2015, resulting in a nearly complete loss of an entire cohort. Since 2015, risks of another temperature blockage have been greatly reduced by changing the source of water used in the fish ladders. Previously, the ladders used water near the surface of the river, which was hotter than deeper waters in the river. The ladders were modified to draw cooler water from deeper parts of the river. With the deeper water source, the proposed action is unlikely to cause or contribute to thermal blockage at the fish ladders.

Snake River fall Chinook salmon

Snake River fall Chinook salmon occur in the mainstem Clearwater and mainstem Snake River. The incubation period, early juvenile rearing, and adult migration may all occur during the irrigation season. The incremental flow increases in Lapwai Creek tributaries as wells are brought online will add to flows in the lower 10 miles of the Clearwater River during the summer. Although beneficial in nature, increases in flows from the LOP are likely to be too small to have a meaningful effect on fall Chinook salmon in the Clearwater River in most years. Increased discharge into the Clearwater River may improve the quality of early juvenile rearing habitat in a small area near the mouth of Lapwai Creek during drought years by moderating temperatures and increasing the accessibility of shallow nearshore rearing areas.

In the Lower Granite pool, a reduction of inflow to the Snake River from the Grande Ronde aquifer caused by well operations may shrink the amount of deep, cool water available to subyearling fish in summer. The drawdown effect of the wells on fall Chinook salmon is likely to be minor due to thermal stratification in the Lower Granite pool and dispersal of inflows over a relatively wide area, which reduces the drawdown effect on temperature at any particular location Subyearling fall Chinook salmon found in the Lower Granite pool in early summer rear in shallow, near-shore areas to avoid predators, but may move to deeper pools in late summer or early fall. Fall Chinook salmon are unlikely to be affected in a meaningful way by the proposed action since the small changes in flow and temperature in summer are unlikely to reach a magnitude that changes fish behavior or their metabolism.

2.6 Cumulative Effects

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

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 2.3).

NMFS queried websites and available databases from the Idaho Department of Lands (IDL), Idaho Transportation Department (ITD), and Idaho Department of Water Resources (IDWR) to identify future actions. Queries with IDWR found no new water rights applications or well construction permits in the action area. There query found no planned IDL activities in the action. Queries with ITD found plans to widen US-95 along Lapwai Creek, upstream of the action area. This action may alter stream temperatures or sediment delivery downstream, within the action area. Specific effects cannot be predicted at this stage of ITD project development; however, the proposed action might partly mitigate effects of highway widening on water temperatures. The NMFS is unaware of any other cumulative effects.

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 resulting from implementing the proposed action. In this section, we add the effects of the action (Section 2.4) to the environmental baseline (Section 2.3) and the cumulative effects (Section 2.5), taking into account the status of the species and critical habitat (Section 2.2), to formulate the agency's Opinion as to whether the proposed action is likely to: (1) Reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing its numbers, reproduction, or distribution; or (2) appreciably diminishes the value of designated or proposed critical habitat for the conservation of the species.

Under the environmental baseline described in NMFS (2010) Opinion on the operation and maintenance of the LOP, present operations cause adverse effects to listed fish and critical in the habitat in Sweetwater, Webb, Lapwai, and Captain John Creeks due to the diversion of water out of these basins. The diversions have minor effects on flows in the Snake and Clearwater Rivers.

The proposed action involves well drilling and an incremental switch from the use of surface water from the Sweetwater Creek drainage to the use of groundwater to provide irrigation water to LOID. Our analysis has examined differences in effect between the proposed action and continuance of baseline operations. The purpose and principal effect of the proposed action is to reduce the impacts of existing LOP operations to Snake River Basin steelhead by increasing instream flows in the Lapwai Creek portion of the action area. The LOP presently diverts the majority of flow out of Sweetwater and Webb Creeks during irrigation season, which likely reduces steelhead production and survival in the action area. With the proposed action, the point of impact from the water withdrawals will shift downstream to the mainstem Snake River where the relative impact on flows is much smaller.

We also noted that the BIA or Tribe future management of the LOP diversion, storage, and conveyance facilities in Captain John and Lapwai Creeks is interrelated and interdependent with the proposed water exchange and title transfer. The objectives of that future operation involve improving flows for fish in the Lapwai Creek watershed by storing water and releasing it during low flow periods to benefit fish and Snake River Basin steelhead in particular. The specifics of the future management of the facilities to be transferred to the BIA have yet to be developed, but will be after the BIA receives title to the facilities. The NMFS will then complete a project-specific consultation on the future management action.

In the Clearwater River portion of the action area, the proposed action will incrementally increase discharge during the irrigation season in Sweetwater, Webb, and Lapwai Creeks, and in the Clearwater River from the mouth of Lapwai Creek to the confluence with the Snake River. The action will improve PBFs for water quantity and water quality (flow and temperature). The effects of the flow increases on critical habitat and Snake River Basin steelhead are substantial in Sweetwater and Webb Creeks; moderate in Lapwai Creek, and negligible in the Clearwater River. Once the wells are in full production, flows in Sweetwater and Webb Creeks will be restored to amounts that more closely resemble a natural flow regime, with the added capacity to augment flows if necessary. Increased discharge in Lapwai Creek may open up additional rearing habitat that has been unusable due to intermittent flows and extreme water temperatures in summer. Steelhead in Sweetwater, Webb, and Lapwai Creeks are likely to benefit from increased habitat quality and increased habitat availability. A shift from intermittent to perennial flows is likely to increase the amount of food available to steelhead and increase opportunities for growth, production, and survival.

In the Snake River below the confluence with the Clearwater River, adults and smolts of all listed Snake River species occur at some point during the year. The action will slightly modify PBFs for water quantity and water quality (flow and temperature). Under the baseline, the LOP seldom used the full 8,500 ac-ft of allocated water due to variation in precipitation and water storage limitations. The proposed action will cause minor changes in timing and volume of water withdrawals due to less reliance on stored water and the added capability to pump up to 8,500 ac-ft of water on an annual basis. The proposed action may reduce flows in Snake River downstream from the input from the aquifer slightly more than occurs under the baseline as wells are added incrementally. Flows in the Snake River may be reduced by as much as 0.07 percent % before the LOP water source is changed entirely to well water.

The proposed action will incrementally reduce the amount of water diverted out of the Lapwai Creek basin and eventually eliminate water transfers out of the basin. Prior to the title transfer and implementation of BIA and Tribe management, flows in Sweetwater and Webb Creeks will be increased by roughly the same amount that water is pumped from the wells. The amount of water left instream in Sweetwater and Webb Creeks will be the same as the amount of water withdrawn by the wells. The timing and volume of water releases will roughly coincide with the volume of water withdrawn by well operations, and LOP flow increases in will largely offset decreases in inflow to the Snake River from the Grande Ronde aquifer.

After the title transfer and implementation of BIA and Tribe management, the timing and volume of water releases may not coincide with the water withdrawn by well operation. Instead, stored water may be released sooner or later, as needed, to optimize flows in the Lapwai Creek drainage to benefit steelhead. At times, decreased inflow to the Snake River from the Grande Ronde aquifer due to well operations may exceed the instream flows from the Lapwai Creek drainage. Differences in the timing and volumes of inflow to the Snake River from the Lapwai Creek drainage and inflow to the river from the Grande Ronde aquifer will be buffered by the lag time in the response of the regional aquifer to pumping.

Critical habitat in the mainstem Snake River for all listed species will be adversely affected by the proposed action and future operations when the amount of water left instream in the Lapwai Creek drainage is less than the amount of water pumped by the wells. This circumstance may occur under the proposed as well production approaches full capacity, and is likely to occur under future operations. The flow reductions in the Snake River when well production exceeds the amount of water left instream in the Lapwai creek drainage are likely to cause a very small, decrease in the survival of the smolt stage of Snake River fall and spring/summer Chinook salmon, and Snake River Basin steelhead; adversely affecting the small portion of the smolts that linger in the action area into June and beyond. The decreased survival of these fish is unlikely to cause a discernable change in the number of returning adults because: 1) The majority of smolts pass through the action area before the irrigation season, and 2) releases of stored water into the

Lapwai Creek system (and translating to Snake River) will partly offset the water withdrawals from the wells. Snake River sockeye salmon smolts are unlikely to occur in the action area during the irrigation season.

The status of Snake River basin steelhead is likely to improve for Snake River steelhead in the Lapwai Creek drainage due to increased abundance and productivity in portions of the drainage. Abundance and productivity of Snake River fall Chinook salmon may improve slightly from improved habitat conditions in Lapwai Creek near its mouth and the Clearwater River near the confluence with Lapwai Creek. Survival of subyearling Snake River fall Chinook salmon residing in the Lower Granite pool may decrease slightly from reduced inflow of cool water from the Grande Ronde aquifer. Neither effect is likely to be large enough to cause a meaningful change in the status of fall Chinook salmon. The status Snake River sockeye salmon and spring/summer Chinook salmon is unlikely to change from the baseline. Both species use the area as a migration corridor. The change in discharge resulting from the proposed action or interrelated or interdependent actions is not large enough to have a measurable effect on survival of migrating adults or smolts. No change in the abundance or productivity of Snake River Basin steelhead or Snake River spring/summer Chinook salmon is likely to occur in the Captain John Creek drainage since no changes to the present operation of the Captain John canal are proposed.

When effects of the action are added to the baseline and cumulative effects, increased flows in Sweetwater, Webb, and Lapwai Creeks are likely to benefit listed steelhead and its critical habitat in these drainages. The benefits are likely to greatly exceed the losses of smolts caused by decreased flow in the Snake River. Snake River Basin steelhead, fall, and spring/summer Chinook salmon will experience a very small increase in juvenile mortality that is unlikely to cause a discernable change in the number of returning adults.

Water quantity for Snake River spring/summer Chinook salmon will be roughly the same until the title is transferred; afterward water quantity may be slightly lower when wells are operating at full capacity. Critical habitat for Snake River fall Chinook salmon will improve in a small area near the mouth of Lapwai Creek due to increased flows, while conditions will diminish slightly in Lower Granite pool due to decreased groundwater inflow when wells are operating. Water quantity for Snake River sockeye salmon will be largely unchanged for smolts, which migrate before irrigation season begins, and slightly reduced for adults, which migrate during irrigation season. Decreased water quantity will likely increase risks of juvenile mortality for all species except for sockeye salmon, but the increased risk is unlikely to be large enough to cause a measurable change. Measureable improvements to water quantity and water quantity are likely to occur in the Lapwai Creek drainage, while elsewhere in the action area, these PBFs are unlikely to exhibit measureable changes.

2.8 Conclusion

After reviewing and analyzing the current status of the listed species and critical habitat, the environmental baseline within the action area, the effects of the proposed action, any effects of interrelated and interdependent activities, and cumulative effects, it is NMFS' opinion that the proposed action is not likely to jeopardize the continued existence of Snake River Basin steelhead, Snake River fall Chinook salmon, Snake River spring/summer Chinook salmon, and Snake River sockeye salmon; nor adversely modify designated critical habitat for these species. The action causes largely beneficial effects to Snake River steelhead and its critical habitat.

2.9 Incidental Take Statement

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

2.9.1 Amount or Extent of Take

The proposed action is reasonably certain to result in incidental take of listed Snake River Basin steelhead, and Snake River spring/summer and fall Chinook salmon. NMFS is reasonably certain the incidental take described here will occur because: the action will reduce flow in the lower Snake River by as much as 0.07 percent in summer, which will reduce smolt survival by a very small increment. A portion of migrating steelhead, and spring/summer and fall Chinook salmon smolts will encounter slightly lower water velocities in the action area due to reductions in flow when the proposed wells are pumping water from the regional aquifer. The reductions in velocity caused by the proposed action in isolation have little potential to cause incidental take, but when the proposed action is added to water velocity reductions caused by other water withdrawals throughout the Snake River basin and effects of the hydropower dams, a small decrease in survival is likely to occur. Reduced water velocity is likely to harm or kill steelhead, and spring/summer and fall Chinook salmon smolts by increasing energetic costs, risk of death from injury, disease, and physiological stress, and exposure to higher rates of predation. The amount of incidental take caused by the proposed action cannot be quantified since the take resulting from the proposed action cannot be distinguished from mortality that is occurring from other causes.

Because reduced flow is the cause of take from the proposed action and take cannot be quantified for reasons described above, the net decrease in discharge in the Snake River resulting from the proposed action serves as a quantifiable habitat indicator and surrogate for take. The net decrease in mean monthly discharge shall be calculated each month by adding the volume of water diverted through the Sweetwater canal and the volume of water pumped from the wells, and subtracting the amount of water provided to Sweetwater and Webb Creeks for instream flows.

Using the net decrease in Snake River discharge as a quantifiable surrogate for take, the anticipated take would be exceeded if monitoring finds the following condition:

1. The net decrease in Snake River mean monthly discharge (calculation method specified above) exceeds 18 cfs.

2.9.2 Effect of the Take

In the 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 Snake River Basin steelhead, Snake River fall Chinook salmon, Snake River spring/summer Chinook salmon, and Snake River sockeye salmon, or result in destruction or adverse modification of critical habitat.

2.9.3 Reasonable and Prudent Measures

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

The BOR shall:

1. Continue to provide minimum flows below the diversion dams in Sweetwater and Webb Creeks, as described in NMFS 2010 Opinion (NWR-2009-06062).

2. In addition to the minimum instream flows specified in the 2010 opinion, for each well that is fully operational and connected to the water distribution, provide additional instream flows to Sweetwater and Webb Creeks in amounts equal to the sustainable productive rate of the well.

3. Monitor the net decrease in mean monthly Snake River flows from LOP water use to ensure the extent of take is not exceeded.

4. Provide to NMFS an annual report of all reporting elements identified in the proposed action and this Opinion.

2.9.4 Terms and Conditions

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

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.

1. The following terms and conditions implement RPM 1:

    a. Provide minimum flows below the diversion dams in Sweetwater and Webb Creeks, as described in NMFS 2010 Opinion (NWR- 2009-06062).

2. The following terms and conditions implement RPM 2:

    a. The BOR, in cooperation with the Tribe and LOID shall jointly establish a method to calculate the sustainable production rate of each well.

    b. In addition to the minimum flows described in Term and Condition 1(a), the BOR shall allocate to instream flows in Webb and Sweetwater Creeks an amount of water equal to the sustainable production rate of the well(s).

    c. The in-lieu water exchange quantity in Sweetwater and Webb Creeks shall be left instream through the Idaho State Water Bank for instream flows.

    d. The LOID, the Tribe, NMFS, and BOR shall cooperatively establish bypass flows at the Sweetwater and Webb Creek diversion dams on an annual basis.

3. The following terms and conditions implement RPM 3:

    a. Monitor flows in Sweetwater and Webb Creeks using the existing gages.

    b. On a monthly basis, calculate the net decrease in mean monthly Snake River flows from LOP water use by subtracting the volume of water pumped from the wells from the by-pass flows in Sweetwater and Webb Creeks. A different calculation method may be used if found by NMFS, BOR, and the Tribe to be more accurate.

    c. Notify NMFS immediately if the observed or projected net decrease in mean monthly Snake River flows described in Term and Conditions 3(b) exceeds 18 cfs.

4. The following terms and conditions implement RPM 4:

   a. Provide NMFS an annual report of all reporting elements identified in the proposed action and in this Opinion. All completed monitoring reports, and other written correspondence related to the proposed action shall be sent to the address below no later than May 20 of each year:

      National Marine Fisheries Service
      Attention: WCR-2017-7167
      800 East Park Boulevard
      Plaza IV, Suite 220
      Boise, Idaho 83712

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).

Please notify NMFS if the BOR or another entity, carries out these recommendations so that we will be kept informed of actions that minimize or avoid adverse effects and those that benefit listed species or their designated critical habitats.

1. Before the well field is completed, operate the wells at the highest capacity that is practicable, enabling highest possible equivalent increase in flows in Sweetwater, Webb, and Lapwai Creeks.

2.11 Reinitiation of Consultation

This concludes formal consultation for the Lewiston Orchards Project Water Exchange and Title Transfer.

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

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

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

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

3.1 Essential Fish Habitat Affected by the Project

The proposed action benefits EFH for Chinook and coho salmon in the Lapwai Creek drainage by increasing instream flows in summer. The proposed action adversely affects EFH for Chinook salmon in the mainstem Snake River from Captain John Creek to Lower Granite Dam by reducing flows. The effects of the proposed action on EFH for Chinook salmon are similar to those described for Chinook salmon in this Opinion, and for coho salmon, the effects are similar to those described for Snake River Basin steelhead.

3.2 Adverse Effects on Essential Fish Habitat

The proposed action will have the following adverse effects on EFH designated for Chinook and coho salmon:

- The proposed action would reduce discharge in the Snake River by no more than 0.07 percent in the summer. The flow reductions would be partly offset by increased flows in Sweetwater and Webb Creeks.

The effects of the proposed action on EFH for Chinook salmon are similar to those described for Chinook salmon in this Opinion, and for coho salmon, the effects are similar to those described for Snake River Basin steelhead.

3.3 Essential Fish Habitat Conservation Recommendations

1. Provide minimum flows below the diversion dams in Sweetwater and Webb Creeks, as described in NMFS 2010 Opinion (NWR- 2009-06062).

2. Before the well field is completed, operate the wells at the highest capacity that is practicable.

Fully implementing these EFH conservation recommendations would protect, by avoiding or minimizing the adverse effects described in Section 3.2, above, on designated EFH for Pacific Coast salmon within the action area.

3.4 Statutory Response Requirement

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

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

3.5 Supplemental Consultation

The BOR 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 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 user of this Opinion is the BOR. Other interested users could include the BIA and LOID. Individual copies of this Opinion were provided to the BOR. This Opinion will be posted on the Public Consultation Tracking System website (https://pcts.nmfs.noaa.gov/pcts-web/homepage.pcts). The format and naming adheres to conventional standards for style.

4.2 Integrity

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

4.3 Objectivity

Information Product Category: Natural Resource Plan

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

Best Available Information: This consultation and supporting documents use the best available information, as referenced in the References section. The analyses in this Opinion and EFH consultation 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.

5. REFERENCES

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