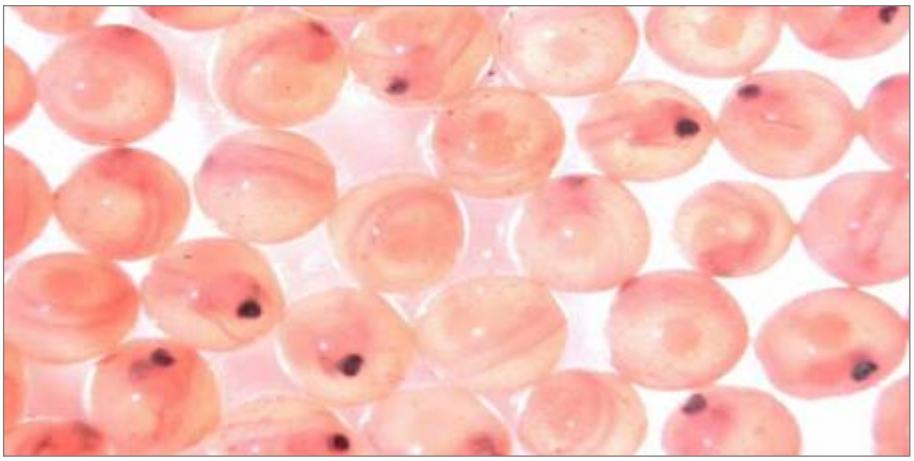
FINAL~~DRAFT~~ ENVIRONMENTAL ASSESSMENT

Environmental Assessment to Analyze Impacts of a NOAA's National Marine Fisheries Service Determination to Issue Section 10 Permits for the Continued Operation of Eight Hatchery Programs within the Tucannon, Grande Ronde, and Imnaha River Basins



Prepared by the
National Marine Fisheries Service, Northwest Region

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Cover Sheet
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Title of Environmental Review:	Environmental Assessment to Analyze Impacts of a NOAA's National Marine Fisheries Service Determination to Issue Section 10 Permits for the Continued Operation of Eight Hatchery Programs within the Tucannon, Grande Ronde, and Imnaha River Basins
Evolutionarily Significant Units/ Distinct Population Segments:	Snake River Spring/Summer-run Chinook salmon and Snake River Basin Steelhead
Responsible Agency and Official:	Barry Thom Deputy Regional Administrator National Marine Fisheries Service West Coast Region 7600 Sand Point Way N.E., Building 1 Seattle, WA 98115
Contacts:	Lance Kruzic Sustainable Fisheries Division National Marine Fisheries Service West Coast Region 2900 NW Stewart Parkway Roseburg, OR 97471
Legal Mandate:	Endangered Species Act (ESA) of 1973, as amended and implemented – 50 CFR Part 223
Location of Proposed Activities:	Tucannon, Grande Ronde, and Imnaha River Basins in northeast Oregon and southeast Washington
Activity Considered:	Operation of eight hatchery supplementation programs intended to benefit the conservation and recovery of Snake River spring/summer Chinook salmon and summer steelhead. The operators are the Nez Perce Tribe, Confederated Tribes of the Umatilla Indian Reservation, Oregon Department of Fish and Wildlife, and the Washington Department of Fish and Wildlife. The Federal action considered in this environmental assessment is the issuance of ESA section 10 permits by NMFS to the hatchery operators.

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EXECUTIVE SUMMARY

THE FOLLOWING IS NEW TEXT FROM THE DRAFT ENVIRONMENTAL ASSESSMENT AND IS PROVIDED AS AN EXECUTIVE SUMMARY OF THE REVIEW PROCESS AND DEVELOPMENT OF THE FINAL ENVIRONMENTAL ASSESSMENT

A draft Environmental Assessment (EA) to analyze impacts of NOAA's National Marine Fisheries Service (NMFS) issuance of an Endangered Species Act section 10(a)(1)(A) research/enhancement permits for the continued operation of eight hatchery programs within the Tucannon, Grande Ronde, and Imnaha River Basins was released by the National Marine Fisheries Service (NMFS) for a 30-day public comment period on May 24, 2013 (78 FR 31518). The comment period for review of the EA on this action expired on June 24, 2013. NMFS did not receive any comments.

The final EA includes changes from the draft EA where clarification of existing information was needed. All new text is in the redline/strikeout format.

1. PURPOSE OF AND NEED FOR THE PROPOSED ACTION

1.1. Background

NOAA's National Marine Fisheries Service (NMFS) is the lead agency responsible for administering the Endangered Species Act (ESA) as it relates to listed salmon and steelhead. Actions that may affect listed species are reviewed by NMFS under section 7 or section 10 of the ESA or under section 4(d), which can be used to limit the application of take prohibitions described in section 9. NMFS issued a final rule pursuant to ESA section 4(d) (4(d) Rule), adopting regulations necessary and advisable to conserve threatened species (50 CFR 223.203). Hatchery actions are subject to ESA review because they affect the listed Evolutionarily Significant Unit (ESU) and/or Distinct Population Segment (DPS). For the purposes of this environmental assessment (EA), NMFS is required to evaluate hatchery programs and issue ESA take coverage to the operators. This take authorization can be issued via a section 7 consultation, a section 10 permit, or from approval of a Hatchery and Genetic Management Plan (HGMPs) under the 4(d) Rule.

Hatchery operators have expressed a need to receive take coverage for the existing hatchery programs. The hatchery operators have developed HGMPs and submitted them to NMFS for review. Section 2.2, Alternative 2, Proposed Action, below, has further information on the scope of the programs from the HGMPs. NMFS intends to process and evaluate the HGMPs and issue the appropriate section 10 permits to the operators, if the actions meet the requirements of the ESA.

When reviewing applications for section 10 permits, NMFS must consider whether the submitted materials, including HGMPs, satisfactorily address the criteria contained in section 10(a)(1)(A) of the ESA. If NMFS determines that the HGMPs "...are not likely to appreciably reduce the likelihood of survival and recovery..." and otherwise satisfy criteria necessary for a section 10 permit, then NMFS can approve the HGMPs by issuing the appropriate section 10 permit to the operators. NMFS' issuance of section 10 permits for the activities described in the HGMPs constitutes the Federal action that is subject to analysis as required by the National Environmental Policy Act (NEPA). NMFS seeks to consider, through NEPA analysis, how its pending action may affect the natural and physical environment and the relationship of people with that environment. NMFS is also required to review compliance of ESA actions with other applicable laws and regulations. The NEPA analysis provides an opportunity to consider, for example, how the action may affect conservation of non-listed species, and socioeconomic objectives that seek to balance conservation with wise use of affected resources and other legal and policy mandates.

1.2. Description of the Proposed Action

The federal action is to issue ESA section 10 permits to the appropriate tribes and state agencies for the continued operation of summer steelhead and Chinook salmon hatchery programs in the northeast Oregon and southeast Washington portion of the ESA-listed Snake River Spring/Summer-run Chinook Salmon Evolutionarily Significant Unit (ESU) and Snake River

Basin Steelhead Distinct Population Segment (DPS)[1]. The programs are proposed by the Bureau of Indian Affairs, the Oregon Department of Fish and Wildlife (ODFW), and the Washington Department of Fish and Wildlife (WDFW). The programs will be operated by the Nez Perce Tribe (NPT), the Confederated Tribes of the Umatilla Indian Reservation (CTUIR), ODFW, and WDFW (collectively referred to as the "operators" in this document). The Lower Snake River Compensation Plan (LSRCP) and Bonneville Power Administration (BPA) fund and assist in administration of the hatchery programs. The Proposed Action would be expected to result in the implementation of hatchery programs as described in the following eight submitted HGMPs:

- Catherine Creek Spring/Summer Chinook Salmon Hatchery Program (ODFW 2011a).
- Upper Grande Ronde Spring Chinook Salmon Hatchery Program (Confederated Tribes of the Umatilla Indian Reservation 2011).
- Wallowa/Lostine Spring Chinook Salmon Hatchery Program (Nez Perce 2011).
- Lookingglass Spring/Summer Chinook Salmon Hatchery Program (ODFW 2011b).
- Imnaha Spring/Summer Chinook Salmon Hatchery Program (ODFW 2011c).
- Little Sheep Creek Summer Steelhead Hatchery Program (ODFW 2011d).
- Tucannon River Endemic-Stock Spring Chinook Salmon Supplementation Hatchery Program (WDFW 2011a).
- Tucannon River Summer Steelhead Endemic-Stock Hatchery Program (WDFW 2011b).

The following activities would occur as part of the proposed HGMPs:

- Broodstock collection, spawning, incubation, and rearing
- Volitional and direct release of juvenile hatchery-origin salmon and steelhead
- Monitoring and evaluation activities including fish tagging, and spawning ground and juvenile surveys through electrofishing, rotary trap, screw trap, dip net, hook and line, cast netting, snorkel, stream walking, and seining
- Management of adult hatchery-origin returns[2]

1.3. Purpose of and Need for the Proposed Action

NMFS's purpose and need for the Proposed Action is three-fold:

- Ensure the proposed hatchery programs comply with the requirements of the ESA;
- Meet NMFS's tribal treaty rights trust and fiduciary responsibilities;
- Work collaboratively with co-managers to protect and conserve listed species.

The applicants' purpose and need for the Proposed Action is also three-fold:

- Comply with the requirements of the ESA;

[1] An "evolutionarily significant unit" (ESU) of Pacific salmon (Waples 1991) and a "distinct population segment" (DPS) of steelhead (71 FR 834, January 5, 2006) are considered to be "species," as defined in section 3 of the ESA. Unless otherwise stated, this document uses the term "species" to refer to both ESUs and DPSs.

[2] Adult hatchery-origin returns surplus to broodstock or naturally spawning goals may be transferred and released to habitat that has not been fully utilized, distributed for consumption, or recycled for harvest.

- Continue operation of existing hatchery programs to preserve and assist in the rebuilding of salmon and steelhead populations in northeast Oregon and southeast Washington;

- Continue operation of existing hatchery programs to support harvest in tribal, recreational, and commercial fisheries.

1.4. Action Area

The action area (or project area) is the geographic area where the proposed action would take place. It includes the places where the proposed Snake River spring/summer Chinook salmon and steelhead hatchery programs would (1) collect broodstock; (2) spawn, incubate, and rear fish; (3) release fish; (4) conduct monitoring and evaluation activities; or (5) manage adult hatchery-origin returns. The action area includes the Grande Ronde, Imnaha, and Tucannon River Basins, as well as the following hatchery and satellite facilities and their immediate surroundings (Figure 1):

- Catherine Creek Acclimation Facility (located on Catherine Creek, a tributary to the Grande Ronde)
- Lookingglass Hatchery (located on Lookingglass Creek, a tributary to the Grande Ronde River)
- Upper Grande Ronde Acclimation Facility (located on the Grande Ronde River)
- Lostine Acclimation Facility (located on the Lostine River, a tributary to the Wallowa River; the Wallowa River is a tributary to the Grande Ronde River)
- Northeast Oregon Hatchery (i.e., the Lostine River Hatchery)
- Imnaha Satellite Facility (also referred to as Gumboot Facility; located on the Imnaha River)
- Lyons Ferry Hatchery (located on the Snake River, directly below the confluence with Palouse River)
- Tucannon Hatchery (located on the Tucannon River)
- Curl Lake Acclimation Pond (located on the Tucannon River)
- Little Sheep Creek Acclimation Facility (located on Little Sheep Creek, a tributary to the Imnaha)
- Irrigon Hatchery (located on the Columbia River, near Irrigon, Oregon)
- Wallowa Hatchery (located on the Wallowa River, a tributary to the Grande Ronde River)
- Oxbow Hatchery (located on Columbia River in Oregon)
- Bonneville Hatchery (located on Columbia River in Oregon)

The analysis area is the geographic extent that is being evaluated for a particular resource. For some resources, the analysis area may be larger than the action area, since some of the effects of the alternatives may occur outside the action area. The analysis area for each resource is described in Chapter 3, Affected Environment.

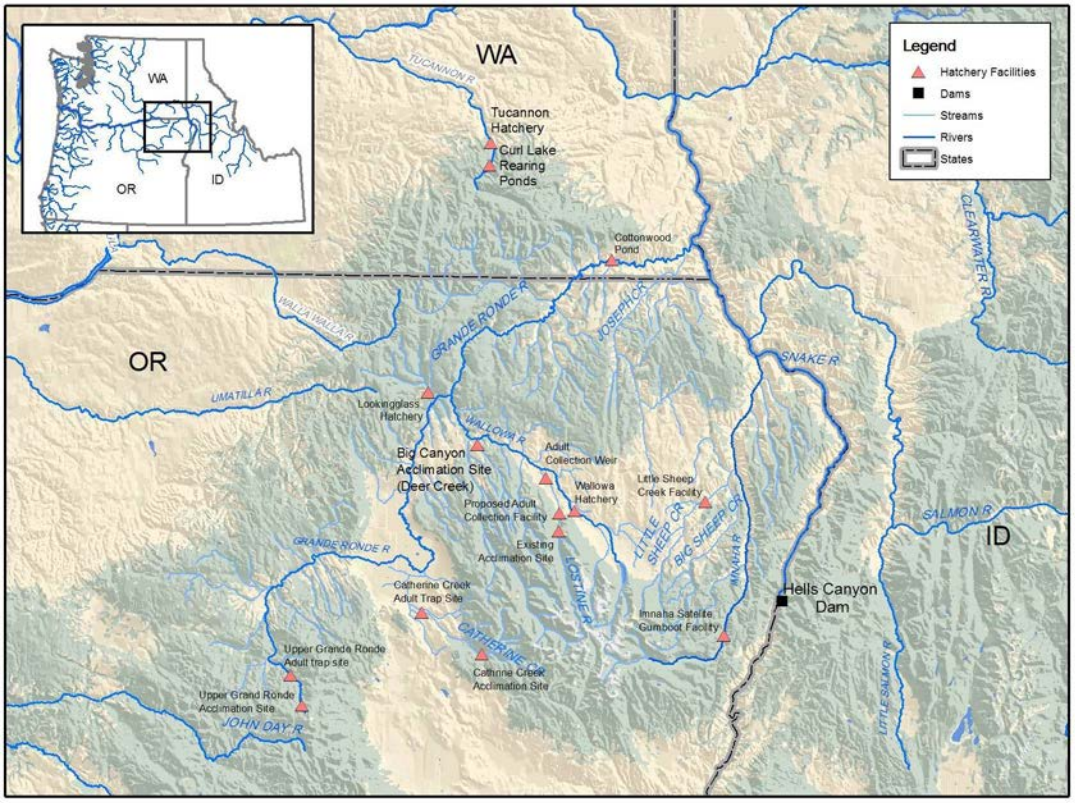

Figure 1. Hatchery facilities and satellite facilities in northeast Oregon and southeast Washington, and the river systems in the action area of the proposed hatchery programs. Note that Cottonwood Pond and Big Canyon Acclimation Site are on this map but not used by the proposed hatchery programs (Subsection 1.2, Description of Proposed Action). Also note that Lyons Ferry Hatchery is in the action area but not on this map. It is located on the Snake River, directly below the confluence with Palouse River.

1.5. Relationship to Other Plans and Policies

In addition to NEPA and ESA, other plans, regulations, agreements, treaties, laws, and Secretarial and Executive Orders also affect hatchery operations in the Tucannon, Imnaha and Grande Ronde River Basins. They are summarized below to provide additional context for the proposed hatchery programs.

1.5.1. Northeast Oregon Hatchery Program EIS

A final Environmental Impact Statement (EIS) was issued in July 2004 for the Northeast Oregon Hatchery Program, Grande Ronde - Imnaha Spring Chinook Hatchery Project (BPA 2004). The EIS includes an analysis of the effects of construction of a new hatchery facility on the Lostine River that will be operated by the Nez Perce Tribe. The EIS also evaluated effects of upgrading the Imnaha River weir. The final EIS (BPA 2004) is hereby incorporated by reference for its information related to hatchery construction and Imnaha River weir upgrades.

1.5.2. Marine Mammal Protection Act

The Marine Mammal Protection Act of 1972 (16 USC 1361) as amended, establishes a national policy designated to protect and conserve wild marine mammals and their habitats. This policy was established so as not to diminish such species or populations beyond the point at which they cease to be a significant functioning element in the ecosystem, nor to diminish such species below their optimum sustainable population. All marine mammals are protected under the Marine Mammal Protection Act.

The Marine Mammal Protection Act prohibits, with certain exceptions, the take of marine mammals in United States waters and by United States citizens on the high seas, and the importation of marine mammals and marine mammal products into the United States. The term "take," as defined by the Marine Mammal Protection Act, means to "harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal." The Marine Mammal Protection Act further defines harassment as "any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild; or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing a disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering but which does not have the potential to injure a marine mammal or marine mammal stock in the wild."

NMFS is responsible for reviewing federal actions for compliance with the Marine Mammal Protection Act. Changes in fish production can indirectly affect marine mammals by altering the number of available prey (salmon and steelhead).

1.5.3. Executive Order 12898

In 1994, the President issued Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority and Low-income Populations*. The objectives of the Executive Order include developing federal agency implementation strategies, identifying minority and low-income populations where proposed federal actions could have disproportionately high and adverse human health and environmental effects, and encouraging the participation of minority and low-income populations in the NEPA process. Changes in hatchery production have the potential to affect the extent of harvest available for minority and low-income populations.

1.5.4. *U.S. v. Oregon*

The *U.S. v. Oregon* Management Agreement includes negotiated and agreed upon commitments for hatchery production program levels for spring/summer Chinook salmon and steelhead between 2008 and 2017. The proposed HGMPs are consistent with production tables in the *U.S. v. Oregon* Management Agreement. The Management Agreement sets forth production commitments and acknowledges that review under the ESA, continued evaluation, or both, may trigger consideration of a modification of Snake River spring/summer Chinook salmon or steelhead program production (Management Agreement, pages 4 to 5).

1.5.5. Secretarial Order 3206

Secretarial Order 3206 (*American Indian Tribal Rights, Federal-Tribal Trust Responsibilities and the ESA*) issued by the secretaries of the Departments of Interior and Commerce, clarifies the responsibilities of the agencies, bureaus, and offices of the departments when actions taken under the ESA and its implementing regulations affect, or may affect, Indian lands, tribal trust resources, or the exercise of American Indian tribal rights as they are defined in the order. Secretarial Order 3206 acknowledges the trust responsibility and treaty obligations of the United States toward tribes and tribal members, as well as its government-to-government relationship when corresponding with tribes. Under the order, NMFS and the U.S. Fish and Wildlife Service (Services) "will carry out their responsibilities under the [ESA] in a manner that harmonizes the federal trust responsibility to tribes, tribal sovereignty, and statutory missions of the [Services], and that strives to ensure that Indian tribes do not bear a disproportionate burden for the conservation of listed species, so as to avoid or minimize the potential for conflict and confrontation."

More specifically, the Services shall, among other things, do the following:

- Work directly with Indian tribes on a government-to-government basis to promote healthy ecosystems (Sec. 5, Principle 1)
- Recognize that Indian lands are not subject to the same controls as federal public lands (Sect. 5, Principle 2)
- Assist Indian tribes in developing and expanding tribal programs so that healthy ecosystems are promoted and conservation restrictions are unnecessary (Sec. 5, Principle 3)
- Be sensitive to Indian culture, religion, and spirituality (Sec. 5, Principle 4)

1.5.6. The Federal Trust Responsibility

The United States government has a trust or special relationship with Indian tribes. The unique and distinctive political relationship between the United States and Indian Tribes is defined by statutes, executive orders, judicial decisions, and agreements and differentiates tribes from other entities that deal with, or are affected by the federal government. Executive Order 13175, *Consultation and Coordination with Indian Tribal Governments,* acknowledges that the United States has recognized Indian tribes as domestic dependent nations under its protection. The federal government has enacted numerous statutes and promulgated numerous regulations that establish and define a trust relationship with Indian tribes. The relationship has been compared to one existing under common law trust, with the United States as trustee, the Indian tribes or individuals as beneficiaries, and the property and natural resources of the United States as the trust corpus (Cohen 2005). The trust responsibility has been interpreted to require federal agencies to carry out their activities in a manner that is protective of Indian treaty rights. This policy is also reflected in the March 30, 1995, document, *Department of Commerce - American Indian and Alaska Native Policy*.

1.5.7. Treaty with the Walla Walla, Cayuse, and Umatilla Tribes and Bands of Indians

The CTUIR is a signatory to the Treaty with the Walla Walla, Cayuses, and Umatilla Tribes and Bands of Indians (June 9, 1855, 12 Stat 945). Article 1 of this treaty ensures the right to fish is all "usual and accustomed" fishing places. "Usual and accustomed" fishing places have been defined as all sites where tribal members customarily fished at or before the time the treaty was signed regardless of the distance from the Tribe's usual home or whether other Tribes also fished in the same waters (e.g., *United States v. Washington*, 520 F.2d 676,689 (9th Cir. 1975); *United States v. Washington*, 730 F.2d 1314, 1318 (9th Cir. 1984). The hatcheries that are the subject of this EA will provide harvest for these tribes at many of their usual and accustomed fishing areas.

1.5.8. Treaty with the Nez Perce Indians

The Nez Perce Tribe, in its 1855 Treaty with the United States, reserved "[t]he exclusive right of taking fish in all the streams where running through or bordering said reservation is further secured to said Indians; as also the right of taking fish at all usual and accustomed places in common with citizens of the Territory..." (12 Stat. 957). The hatcheries that are the subject of this EA will provide harvest for the Nez Perce Tribe at many of their usual and accustomed fishing areas.

1.5.9. Clean Water Act

The Clean Water Act (33 USC 1251, 1977, as amended in 1987), administered by the U.S. Environmental Protection Agency and state water quality agencies, is the principal federal legislation directed at protecting water quality. Each state implements and carries forth federal provisions, as well as approves and reviews National Pollutant Discharge Elimination System applications, and establishes total maximum daily loads for rivers, lakes, and streams. The states are responsible for setting the water quality standards needed to support all beneficial uses, including protection of public health, recreational activities, aquatic life, and water supplies.

The Washington State Water Pollution Control Act, codified as Revised Code of Washington Chapter 90.48, designates the Washington Department of Ecology (Ecology) as the agency responsible for carrying out the provisions of the federal Clean Water Act within Washington State. The agency is responsible for establishing water quality standards, making and enforcing water quality rules, and operating waste discharge permit programs. These regulations are described in Washington Administrative Code (WAC) 173. Hatchery operations are required to comply with the Clean Water Act.

1.5.10. Bald Eagle and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (16 USC 668-668c), enacted in 1940, and amended several times since then, prohibits the taking bald eagles, including their parts, nests, or eggs. The act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." The U.S. Fish and Wildlife Service, who is responsible for carrying out provisions of this Act, define "disturb" to include a "decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or nest abandonment, by

substantially interfering with normal breeding, feeding, or sheltering behavior." Changes in hatchery production have the potential to affect eagle productivity through changes in its prey source (salmon and steelhead).

1.5.11. State Endangered, Threatened, and Sensitive Species Act

This EA will consider the effects of hatchery programs and harvest actions on state endangered, threatened, and sensitive species. The State of Washington has species of concern listings (Washington Administrative Code Chapters 232-12-014 and 232-12-011) that include all state endangered, threatened, sensitive, and candidate species. These species are managed by WDFW, as needed, to prevent them from becoming endangered, threatened, or sensitive. The state-listed species are identified on WDFW's website (*http://wdfw.wa.gov/conservation/endangered/*); the most recent update occurred in June 2008. The criteria for listing and de-listing, and the requirements for recovery and management plans for these species are provided in Washington Administrative Code Chapter 232-12-297. The state list is separate from the federal ESA list; the state list includes species status relative to Washington state jurisdiction only. Critical wildlife habitats associated with state or federally listed species are identified in Washington Administrative Code Chapter 222-16-080.

Oregon also has a state ESA (Oregon Administrative Rules 635-100-0001-0180). ODFW is responsible for fish and wildlife under the Oregon ESA, and the Oregon Department of Agriculture is responsible for plants. The Oregon ESA generally affects only the actions of state agencies on state-owned or leased lands. Species listed under the state endangered, threatened, and sensitive species list are reviewed in this EA if the Proposed Action or its alternatives may affect these species.

1.5.12. Washington Hatchery and Fishery Reform Policy

WDFW's Hatchery and Fishery Reform Policy (Policy C-3619) was adopted by the Washington Fish and Wildlife Commission in 2009 (WFWC 2009). Its purpose is to advance the conservation and recovery of wild salmon and steelhead by promoting and guiding the implementation of hatchery reform. The policy applies to state hatcheries and its intent is to improve hatchery effectiveness, ensure compatibility between hatchery production and salmon recovery plans and rebuilding programs, and support sustainable fisheries.

1.5.13. Recovery Plans for Snake River Spring/Summer Chinook Salmon and Steelhead

Broad partnerships of federal, state, local, and tribal governments and community organizations collaborated in the development of the three draft management unit plans (one for each state) for Snake River spring/summer Chinook salmon and steelhead (NMFS 2010a; SRSRB 2011; NMFS 2012). The management unit plans include conservation goals and proposed habitat, hatchery, and harvest actions needed to achieve conservation goals for each watershed within the geographic boundaries of the listed ESU and DPS. In addition, NMFS has developed a draft Snake River Harvest Module and a draft Snake River Hydro Module. After review and finalization of these management unit plans and modules, they will be consolidated into a

DPS/ESU-wide Snake River Recovery Plan. Snake River fall Chinook salmon will be addressed in a separate recovery plan that is in development.

1.5.14. Oregon Native Fish Conservation Policy

The purpose of Oregon's Native Fish Conservation Policy (Oregon Administrative Rules 635-007-0502 through -0509) is to ensure the conservation and recovery of native fish in Oregon and to focus on natural-origin, native fish. The policy is based on the premise that "…locally adapted populations provide the best foundation for maintaining and restoring sustainable naturally produced native fish." (Oregon Administrative Rule 635-007-0505(2)). The intent of this policy is to provide a basis for managing hatchery programs, fisheries, habitat, predators, competitors, and pathogens in balance with sustainable production of natural-origin fish.

1.5.15. Oregon Fish Hatchery Management Policy

The Oregon Fish Hatchery Management Policy (Oregon Administrative Rules 635-007-0542 through -0548) describes best management practices that are intended to help ensure the conservation of both hatchery-origin and natural-origin fish in Oregon through the responsible use of hatchery programs. The Hatchery Management Policy complements and supports the Native Fish Conservation Policy (Oregon Administrative Rules 635-007-0502 through -0509) and is implemented through the development of conservation plans.

1.5.16. Oregon Fish Health Management Policy

The purpose of the Fish Health Management Policy is to describe measures that minimize the impact of fish diseases on the state's fish resources. This policy applies to all ODFW hatchery operations and programs.

1.5.17. Federal Columbia River Power System (FCRPS) Biological Opinion

The 2008 FCRPS Reasonable and Prudent Alternative (RPA) proposed new and expanded hatchery facilities for conservation hatchery programs that promote salmon and steelhead recovery. In addition, the RPA directed the action agencies to 1) ensure that hatchery programs funded by the FCRPS are not impeding recovery of ESA-listed salmon ESUs or steelhead DPSs, and 2) preserve and rebuild genetic resources through safety-net and conservation actions to reduced short-term extinction risk and promote recovery. Several of the hatchery programs included in the Proposed Action considered in this EA are specifically identified as projects to implement under the RPA:

- Catherine Creek Spring/Summer Chinook Salmon Hatchery Program
- Upper Grande Ronde Spring Chinook Salmon Hatchery Program
- Wallowa/Lostine Spring Chinook Salmon Hatchery Program (Nez Perce 2011).
- Imnaha Spring/Summer Chinook Salmon Hatchery Program (ODFW 2011c).
- Tucannon River Endemic-Stock Spring Chinook Salmon Supplementation Hatchery Program (WDFW 2011a).
- Tucannon River Summer Steelhead Endemic-Stock Hatchery Program (WDFW 2011b).

1.5.18. Lower Snake River Compensation Plan

The Lower Snake River Compensation Plan (LSRCP) was established by Congress as compensation for lost fish resources and fisheries resulting from construction and operation of hydroelectric projects in the Snake River (90 Stat. 2917). The LSRCP presently funds and guides components of the proposed hatchery programs along with BPA.

1.5.19. Columbia Basin Fish and Wildlife Program

The Northwest Power and Conservation Council (Council), an interstate agency with representatives from Idaho, Montana, Oregon and Washington, was established under the authority of the Pacific Northwest Electric Power Planning and Conservation Act of 1980. The Act directs the Council to develop a program to "protect, mitigate, and enhance fish and wildlife, including related spawning grounds and habitat, on the Columbia River and its tributaries… affected by the development, operation, and management of [hydroelectric projects] while assuring the Pacific Northwest an adequate, efficient, economical, and reliable power supply." The Act also directs the Council to ensure widespread public involvement in the formulation of regional power and fish and wildlife policies. As a planning, policy-making and reviewing body, the Council develops the Program, and then monitors its implementation by BPA, the U.S. Army Corps of Engineers and the Federal Energy Regulatory Commission (FERC) and its licensees. The Council is presently implementing its 2009 Fish and Wildlife Program and has announced plans to initiate a Program amendment in mid-2013.

The Council emphasizes implementation of fish and wildlife projects based on needs and actions described in the FCRPS biological opinion, ESA recovery plans, and the 2008 Columbia Basin Fish Accords. The Council also sponsors independent science review of Columbia Basin Fish and Wildlife Program actions proposed for funding and follows up with science reviews of the actions from the Independent Science Review Panel. It also sponsors the Independent Science Advisory Board, which serves NMFS, Columbia River Indian Tribes, and the Council by providing independent scientific advice and recommendations regarding specific scientific issues.

2. ALTERNATIVES INCLUDING THE PROPOSED ACTION

Alternatives considered in this EA are: (1) Do not issue section 10 permits for the continued operation of the eight hatchery programs as described in the HGMPs (No-action); or (2) Issue section 10 permits for the continued operation of the hatchery programs as described in the HGMPs (Proposed Action). The following describes the alternatives.

2.1. Alternative 1 (No-action) – Do Not Issue Section 10 Permits for the Continued Operation of the Eight Hatchery Programs

Under this alternative, the Secretary of Commerce would not approve the HGMPs and, therefore, not issue section 10(a)(1)(A) permits to the applicants, in which case activities conducted under the HGMPs would not be exempted from section 9 take prohibitions. If the HGMPs are not approved under the No-action Alternative, several possible outcomes could occur:

- The applicants could pursue authorization of the existing hatchery programs under the 4(d) Rule.
- The applicants could also choose to continue to operate the existing hatchery programs without ESA authorization and be subjected to ESA take violations.
- The applicants could choose to terminate all of the hatchery programs because they would not have ESA authorization.

For analysis purposes, NMFS has defined the No-action Alternative as the termination of existing hatchery programs. All of the activities associated with the hatchery programs would be terminated: no hatchery fish would be released, no hatchery broodstock would be collected, the hatchery facilities would not use water for operation, and the hatcheries would not release hatchery water effluent. This formulation of the No-action Alternative as termination of hatchery operations is considered a reasonable alternative approach for the purposes of analysis because it represents one end of the spectrum of potential effects. This definition of the No-action Alternative also provides a reasonable low end on the range of effects to evaluate and to compare to the Proposed Action.

2.2. Alternative 2 (Proposed Action) – Issue Section 10 Permits for the Continued Operation of the Eight Hatchery Programs

Under this alternative, NMFS would approve the existing hatchery programs by issuing ESA section 10 permits to the operators, and the hatchery programs and associated Best Management Practices (BMPs) would be implemented as described in the submitted HGMPs. BMPs are protocols for the operation of hatcheries and hatchery programs to appropriately meet the objectives of the hatchery program. Typical BMPs would include (1) ensuring adequate alarm systems are in operation to protect rearing fish from flow disruptions, (2) ensuring that water supplies have back-up power generation in case of an electrical outage to protect rearing fish, (3) requiring appropriate disinfection procedures to prevent pathogen transmission between stocks of fish onsite, (4) providing the correct amount and type of food to achieve desired growth rates, (5) adequately screening

hatchery intake water supplies to prevent fish loss, (6) ensuring that the hatchery is operated in compliance with its National Pollution Discharge Elimination System (NPDES) permit, and (7) documenting the survival and production of hatchery fish at each life stage while in the hatchery.

There are eight hatchery programs included under this NEPA review that rear summer steelhead and spring Chinook salmon (Table 1). Eight separate section 10 permits would be issued collectively to Bureau of Indian Affairs, ODFW, and WDFW.

Table 1. List of the eight hatchery programs included as part of the Proposed Action.

Hatchery Program	Proposed Release Level[2]	Listed Hatchery Stock?	Type of Take
Catherine Creek Spring/Summer Chinook Salmon Program	150,000 yearling smolts	Yes	Adult broodstock collection and transport, adult handling and sampling, juvenile sampling tagging
Upper Grande Ronde Spring Chinook Salmon Program	250,000 yearling smolts	Yes	Adult broodstock collection and transport, adult handling and sampling, juvenile sampling tagging
Wallowa/Lostine Spring Chinook Salmon Program	250,000 yearling smolts	Yes	Adult broodstock collection and transport, adult handling and sampling, juvenile sampling tagging
Lookingglass Spring/Summer Chinook Salmon Program	250,000 yearling smolts	Yes	Adult broodstock collection, adult handling and sampling, juvenile sampling tagging
Imnaha Spring/Summer Chinook Salmon Program	490,000 yearling smolts	Yes	Adult broodstock collection and transport, adult handling and sampling, juvenile sampling tagging
Little Sheep Creek Summer Steelhead Program	215,000 yearling smolts[3]	Yes	Adult broodstock collection, adult handling and sampling, juvenile sampling tagging
Tucannon River Endemic-Stock[1] Spring Chinook Salmon Supplementation Program	225,000yearling smolts	Yes	Adult broodstock collection and transport, adult handling and sampling, juvenile sampling tagging
Tucannon River Summer Steelhead Endemic-Stock Program	150,000 yearling smolts	Yes	Adult broodstock collection and transport, adult handling and sampling, juvenile sampling tagging

[1] "Endemic" refers to fish derived from the local, native wild-origin stock.

[2] Actual release levels may be up to 10 percent higher or lower than proposed release levels because of variations in hatchery survival.

[3] The full production target is 330,000 yearling smolts to meet the 2,000 hatchery-adult return goal; however, surplus adult returns in recent years have resulted in lowering the smolt production to 215,000 yearling smolts.

2.3. Alternatives Considered But Not Analyzed in Detail

Alternatives that would consider increases or decreases in hatchery production levels, or changes in BMPs, were considered, but determined to not be measurably different than the alternatives already being considered or not likely to meet the purpose and need for action.

- Approval of HGMPs under limit 5 of the 4(d) Rule – NMFS would determine that the proposed hatchery programs, as described in the HGMPs, meet the criteria under limit 5 of the 4(d) Rule. Under this alternative, the only change from the Proposed Action Alternative would be a difference in ESA regulatory

authorization for these hatchery programs. The impacts under this alternative would not differ from the impacts that would occur under the Proposed Action Alternative in this EA, and, therefore, a separate review would not provide informative analysis information.

- Status quo operation of the hatchery program – Under this alternative, the hatchery operators would continue to operate the program as under baseline conditions. This alternative was not evaluated in detail because it is not measurably different from the Proposed Action; no additional information about potential effects on the environment would be revealed from an analysis of status quo conditions.

- Best Management Practices (BMPs) – Under this alternative, NMFS would approve the proposed hatchery programs by issuing section 10 permits, and the hatchery programs would be implemented as described in the HGMPs. However, under this alternative, additional BMPs would be applied to reduce adverse impacts of the hatchery programs on natural-origin Snake River populations. The proposed HGMPs have already implemented reforms that include BMPs considered necessary and appropriate for the proposed hatchery programs. Additional BMPs are unlikely to provide measurable benefit beyond the proposed BMPs included under Alternative 2 as the Proposed Action. Therefore, this alternative is not measurably different than the Proposed Action.

- Greater levels of hatchery production than those proposed – The operators could have proposed hatchery production levels greater than currently in the HGMPs submitted to NMFS. However, higher production levels would exceed the capacity of the production facilities in some cases and could potentially reduce the survival of the artificially propagated fish and, thus, would not meet the purpose and need, which includes meeting protection- and conservation-related requirements of the ESA.

- Lower levels of hatchery production than those proposed – The operators could have proposed production levels lower than proposed in the HGMPs. However, because the No-action Alternative will serve as a bookend with production being zero, any incrementally different level of production between zero and the proposed levels would not provide a large enough range to allow meaningful evaluation; it is also unlikely that a lower production level would meet the purpose and need, which includes meeting NMFS's tribal treaty rights trust and fiduciary obligations.

- ~~Continue to operate the hatchery programs as they were operated in the past – The operators could have proposed to operate the hatchery programs as operated prior to 2011. The existing hatchery programs in northeast Oregon and southeast Washington have undergone reform over the last decade. Hatchery programs were substantially different prior to ESA listings in the 1990s. Because hatchery reforms were directed at reducing effects of hatchery production that was harmful to natural production, consideration of past hatchery practices as an alternative~~

~~would not fulfill the purpose and need, which includes meeting protection- and conservation-related requirements of the ESA.~~

3. AFFECTED ENVIRONMENT

3.1. Introduction

Chapter 3, Affected Environment, describes baseline conditions for nine resources that may be affected by implementation of the EA alternatives:

- Water quantity (Subsection 3.2)
- Water quality (Subsection 3.3)
- Fish listed under the ESA (Subsection 3.4)
- Fish not listed under the ESA (Subsection 3.5)
- Instream fish habitat (Subsection 3.6)
- Wildlife and marine mammals (Subsection 3.7)
- Socioeconomics (Subsection 3.8)
- Tourism and recreation (Subsection 3.9)
- Environmental justice (Subsection 3.10)

No other resources were identified during internal scoping that would potentially be impacted by the Proposed Action or alternatives. Baseline conditions include effects of the past operation of northeast Oregon and southeast Washington hatchery programs.

The action area (or project area) is the geographic area where the Proposed Action would take place. It includes the places where fish would be spawned, incubated, reared, acclimated, released, or harvested under the proposed hatchery programs (Subsection 1.4, Action Area). Each resource's analysis area includes the action area as a minimum area but may include locations beyond the action area if some of the effects of the EA's alternatives on that resource would be expected to occur outside the action area (Subsection 1.4, Action Area).

3.2. Water Quantity

Hatchery programs can affect water quantity when they take water from a well (groundwater) or a neighboring tributary streams (surface water) to use in the hatchery facility for broodstock holding, egg incubation, juvenile rearing, and juvenile acclimation. All water, minus evaporation, that is diverted from a river or taken from a well is discharged to the adjacent river or bay from which the water was appropriated after it circulates through the hatchery facility (non-consumptive use). When hatchery programs use groundwater, they may reduce the amount of water for other users in the same aquifer. When hatchery programs use surface water, they may lead to dewatering of the stream between the water intake and discharge structures, which may impact fish and wildlife if migration is impeded or dewatering leads to increased water temperatures. Generally, water intake and discharge structures are located as close together as possible to minimize the area of the stream that may be impacted by a water withdrawal.

Thirteen hatchery facilities are currently used to support eight hatchery programs in northeast Oregon and southeast Washington (Subsection 1.4, Action Area). Two of the hatchery facilities use groundwater exclusively except in the case of emergencies (Lyons

Ferry and Irrigon Hatcheries), seven of the acclimation facilities use surface water exclusively (Catherine Creek Acclimation Facility, Upper Grande Ronde Acclimation Facility, Lostine Acclimation Facility, Imnaha Satellite Facility, Curl Lake Acclimation Pond, Little Sheep Creek Acclimation Facility, Oxbow Hatchery), and four facilities use both groundwater and surface water (Lookingglass Hatchery, Tucannon Hatchery, Wallowa Hatchery, Bonneville Hatchery) (Table 2).

Up to 2 percent of the water in Catherine Creek and Tanner Creek is temporarily diverted at the Catherine Creek Acclimation Facility and Bonneville Hatchery for lower Snake River hatchery programs (Table 2). Up to 6 percent of the water in the Imnaha River is temporarily diverted to the Imnaha Satellite Facility (Table 2). Up to 94 percent of the water in Lookingglass Creek is temporarily diverted at Lookingglass Hatchery (Table 2). Less than 1 percent of the water in the Upper Grande Ronde and Wallowa Rivers is temporarily diverted at the Upper Grande Acclimation Facility, Imnaha Satellite Facility, and Wallowa Hatchery (Table 2). Up to 12 percent of the Lostine River is temporarily diverted at the Lostine Acclimation Facility (Table 2). Up to 5 percent of the Tucannon River is temporarily diverted at the Tucannon Hatchery and Curl Lake Acclimation Pond. All thirteen hatchery facilities have current water rights.

The Northeast Oregon Hatchery (i.e., Lostine River Hatchery) is not currently in operation, so no water is being diverted to this hatchery. However, the Northeast Oregon Hatchery has a water right to divert up to 16.7 cfs from the Lostine River between the water intake and discharge structure (Table 2).

A water right permit is required for all groundwater withdrawal except those supporting single-family homes. All hatchery wells used by hatchery facilities supporting northeast Oregon and southeast Washington hatchery programs are permitted by the Washington Department of Ecology or the Oregon Water Resources Department (OWRD). No northeast Oregon or southeast Washington hatchery facilities are located in areas designated by Oregon as Critical Groundwater Areas (OWRD 2013). Critical Groundwater Areas are not designated in Washington State.

Table 2. Water source and use by hatchery facility.

Hatchery Facility	Maximum Surface Water Use (cfs)	Maximum Ground-water Use (cfs)	Proportion Used for Proposed Hatchery Programs (%)[1]	Surface Water Source	Minimum Mean Monthly Surface Water Flows during Facility Operation (cfs)	Maximum Percentage of Surface Water Diverted for Proposed Hatchery Programs (%)	Discharge Location
Catherine Creek Acclimation Facility[2]	5	0	100	Catherine Creek	240 (April)	2	Catherine Creek
Lookingglass Hatchery	50	5	100	Lookinglass Creek	53 (September)	94	Lookinglass Creek
Upper Grande Ronde Acclimation Facility	5	0	100	Upper Grande Ronde	3,030 (February)	0.2	Upper Grande Ronde River
Lostine Acclimation Facility	5.7	0	100	Lostine River	47 (February)	12	Lostine River
NE Oregon Hatchery (i.e., Lostine River Hatchery) [3]	16.7	3.2	100	Lostine River	47 (February)	36	Lostine River
Imnaha Satellite Facility (also referred to as Gumboot)	<15	0	100	Imnaha River	236 (February)	6	Imnaha River
Lyons Ferry Hatchery	0	150	50	N/A	N/A	N/A	Snake River
Tucannon Hatchery[4]	8.83	1.76	35	Tucannon River	61 (August)	5	Tucannon River
Curl Lake Acclimation Pond	6	0	100	Tucannon River	246 (February)	2	Tucannon River
Little Sheep Creek Acclimation Facility	8.9	0	100	Little Sheep Creek	Unavailable	Unavailable	Little Sheep Creek
Irrigon Hatchery	0	47	<15	N/A	N/A	N/A	Columbia River
Wallowa Hatchery (Captive Brood Program)	0.25	0.15	100	Wallowa River	89	0.2	Wallowa River
Oxbow Hatchery	40	0	<15	Oxbow Springs	Unavailable	Unavailable	Columbia River
Bonneville Hatchery	0.58[5]	1.25	100	Tanner Creek	59.40[6]	2	Tanner Creek

Source: CTUIR 2011; NPT 2011; ODFW 2011a; ODFW 2011b; ODFW 2011c; ODFW 2011d; WDFW 2011a; WDFW 2011b; United States Geological Survey data sets (http://waterdata.usgs.gov, accessed January 15, 2013); D. Green, pers. comm., ODFW, Upper Grande Ronde Captive Brood Hatchery Manager, Bonneville Hatchery. January 15, 2013.

[1] Estimation
[2] Acclimation facilities operate from approximately February through April.
[3] The NE Oregon Hatchery is not currently in operation.
[4] Approximately 30 percent of the spring water and 35 percent of the surface water at the Tucannon Hatchery is used for the steelhead program. The Tucannon Hatchery also propagates rainbow trout.
[5] Currently, the captive brood program at Bonneville Hatchery only used surface water for five months per year (June through October). After 2013, they expect to reduce their use of surface water from five months to two weeks per year.
[6] This is the lowest recorded flow during June through October, 2012 (D. Green, pers. comm., ODFW, Upper Grande Ronde Captive Brood Hatchery Manager, Bonneville Hatchery). January 15, 2013.
N/A: Not applicable.

3.3. Water Quality

Hatchery programs could affect several water quality parameters in the aquatic system. Concentrating large numbers of fish within hatcheries could produce effluent with ammonia, organic nitrogen, total phosphorus, biological oxygen demand, pH, and suspended solids (Sparrow 1981; Ecology 1989; Kendra 1991; Cripps 1995; Bergheim and Åsgård 1996; Michael 2003). Chemical use within hatcheries could result in the release of antibiotics, fungicides, and disinfectants into receiving waters (Boxall et al. 2004; Pouliquen et al. 2008; Martinez Bueno et al. 2009). Other chemicals and organisms that could potentially be released by hatchery operations are polychlorinated biphenyls (PCBs), dichlorodiphenyltrichloroethane (DDT) and its metabolites (Missildine 2005; HSRG 2009), fish disease pathogens (HSRG 2005; HSRG 2009), steroid hormones (Kolodziej et al. 2004), anesthetics, pesticides, and herbicides.

The direct discharge of hatchery facility effluent is regulated by the Environmental Protection Agency under the Clean Water Act through National Pollutant Discharge Elimination System (NPDES) permits. For discharges from hatcheries not located on federal or tribal lands within Washington and Oregon, the Environmental Protection Agency has delegated its regulatory oversight to the States. NPDES permits are not needed for hatchery facilities that release less than 20,000 pounds of fish per year or feed fish less than 5,000 pounds of fish feed per year. Additionally, Native American tribes may adopt their own water quality standards for permits on tribal lands (i.e., tribal wastewater plans). All hatchery facilities used by the northeast Oregon and southeast Washington hatchery programs are compliant with their NPDES permit or do not require a NPDES permit. All hatchery effluent is passed through pollution abatement ponds to settle out uneaten food and fish waste before being discharged into receiving waters.

Water quality in the Imnaha, Grande Ronde, and Tucannon River Basins varies considerably. In general, the headwater areas of these watersheds are relatively pristine. Water quality tends to degrade downstream, with the lowland areas near the mouth of each watershed typically being the most degraded.

A valuable index of water quality is the 303(d) list under the federal Clean Water Act. A listing of a river segment on the 303(d) list indicates that specific water quality parameters designated by the federal Clean Water Act have been violated. In the Imnaha River Basin, the mainstem river and larger tributaries are on the 303(d) list for elevated stream temperature during the summer (Figure 2) (NRCS 2006a). The primary cause for the elevated stream temperature is the loss of riparian habitat and the widening of stream channels. A variety of activities have caused this stream degradation, including livestock grazing, farming, forestry, and road building (Table 3).

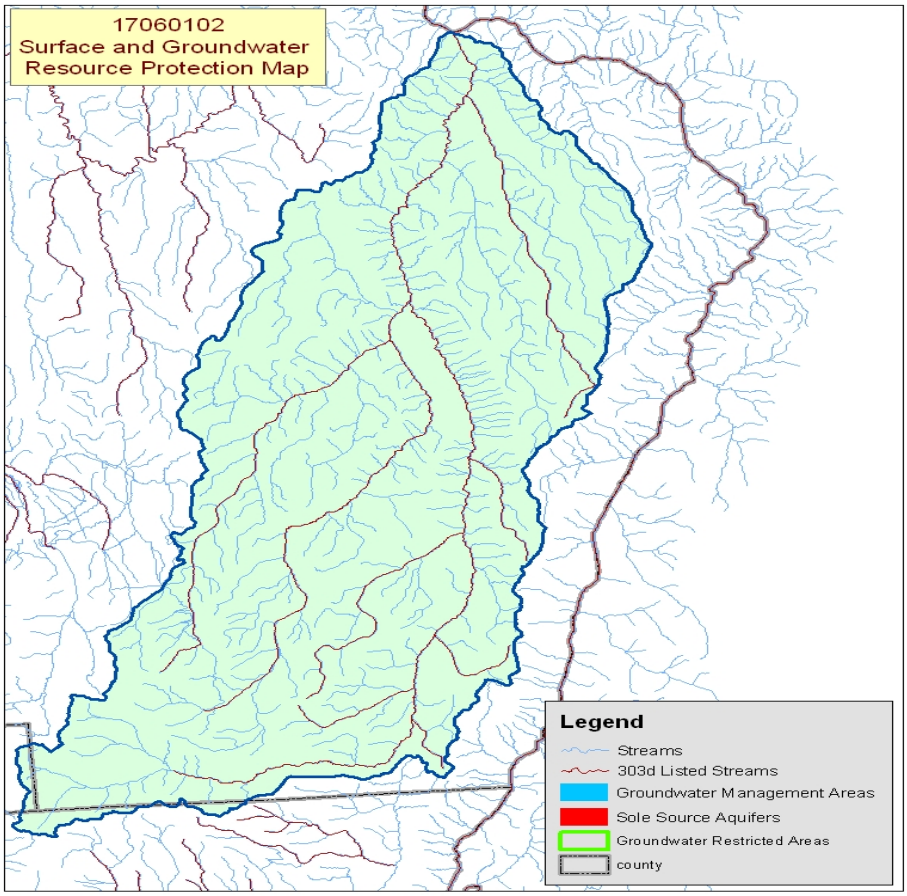

Figure 2. Map of the Imnaha watershed showing 303(d) listings of stream reaches.

In the Grande Ronde River Basin, the mainstem river and larger tributaries, such as the Wallowa River, are listed on the 303(d) list primarily for elevated stream temperature and excessive sediment input (Figure 3; Figure 4; Figure 5) (NRCS 2005a; NRCS 2005b; NRCS 2006b). The primary cause for the elevated stream temperature is the loss of riparian habitat and widening of stream channels; the primary cause of excessive sediment input is farmland erosion (Table 3).

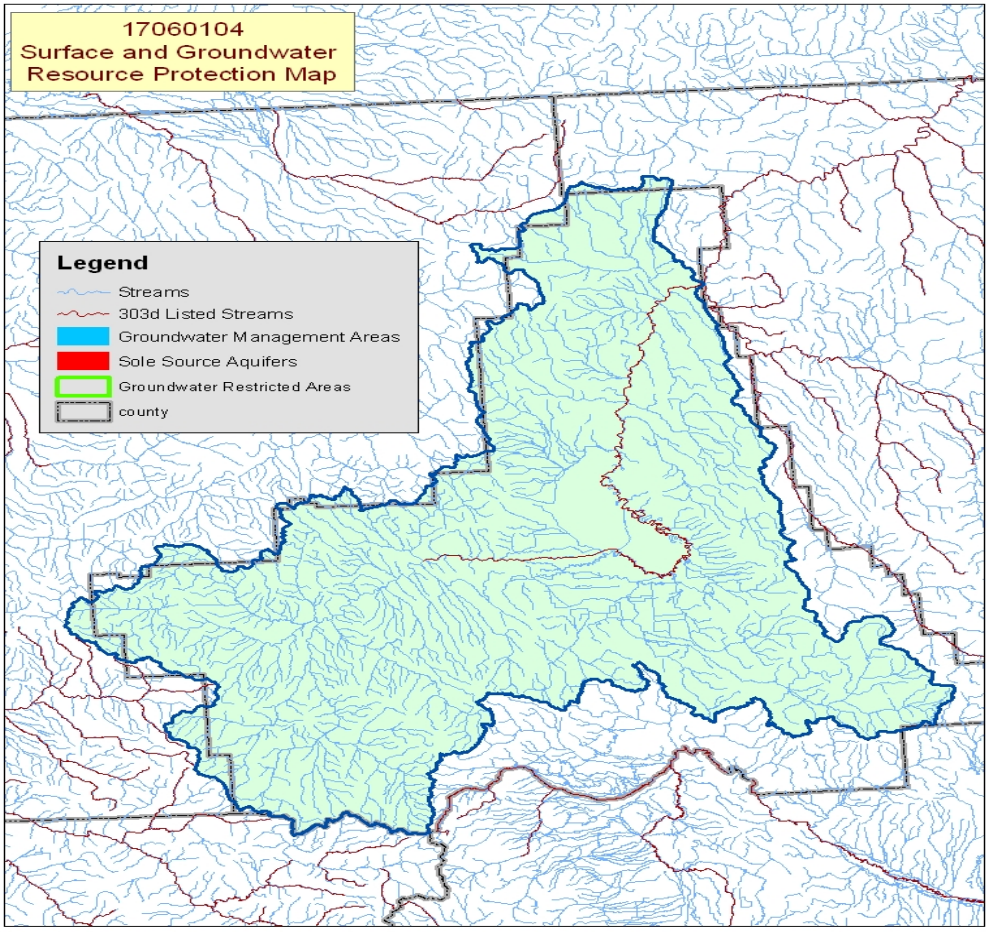

Figure 3. Map of the Upper Grande Ronde watershed showing 303(d) listings of stream reaches.

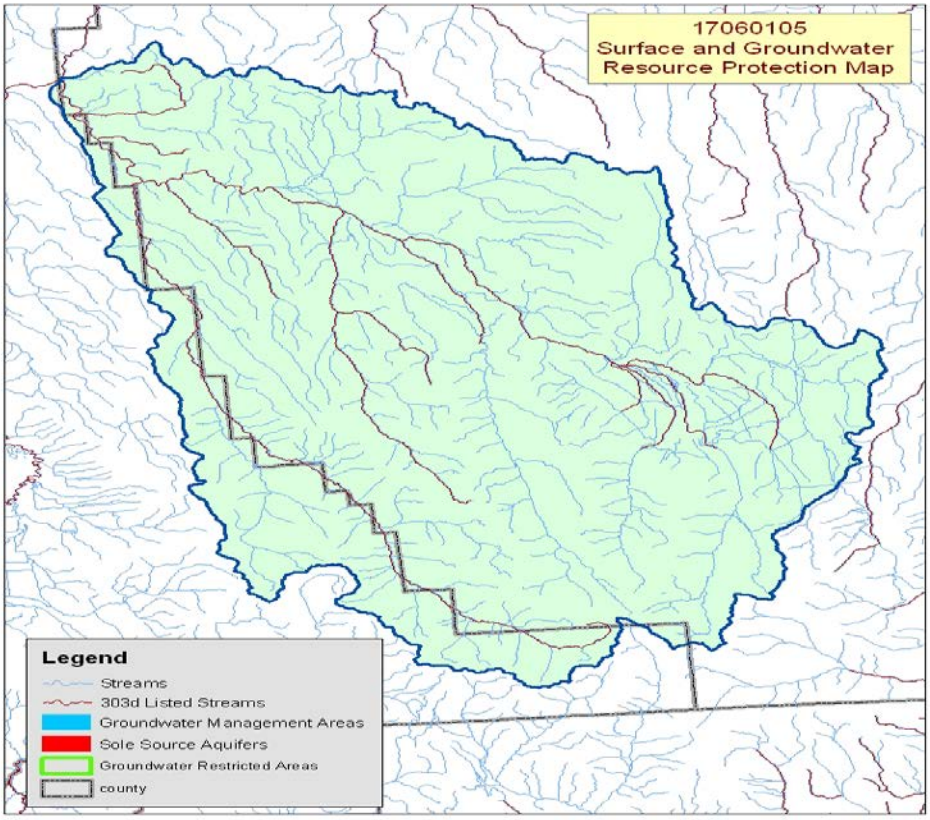

Figure 4. Map of the Wallowa (Grande Ronde) watershed showing 303(d) listings of stream reaches.

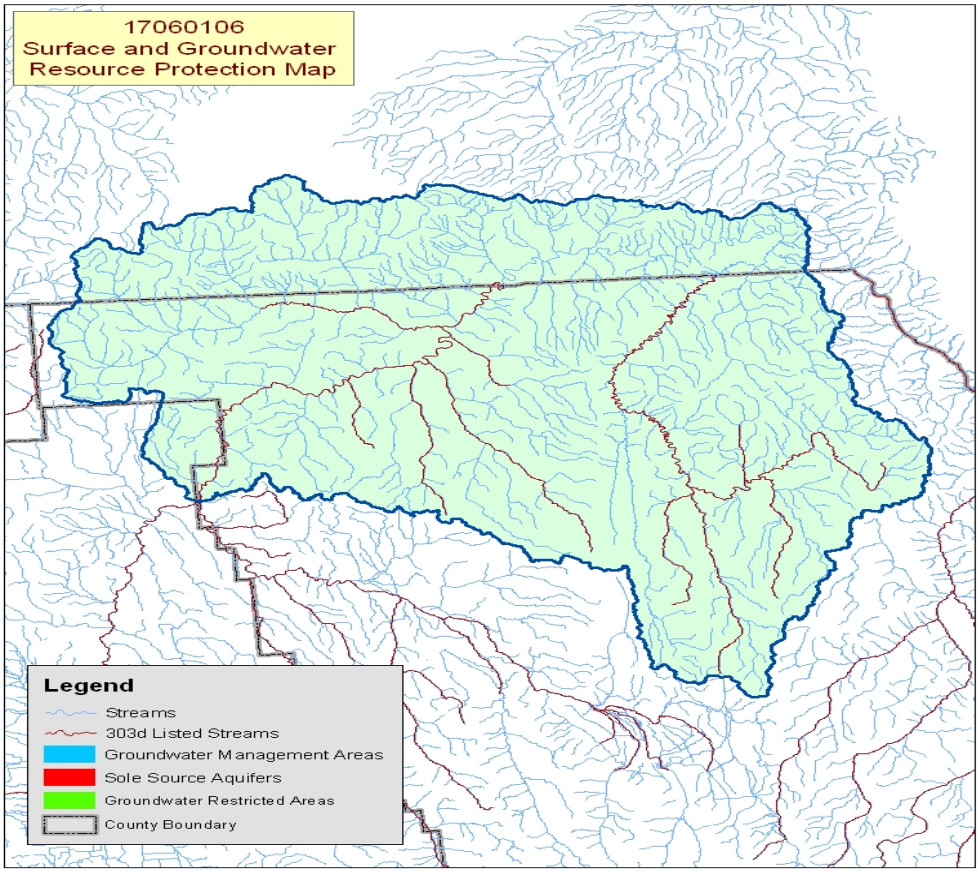

Figure 5. Map of the lower Grande Ronde watershed showing 303(d) listings of stream reaches.

In the Tucannon River Basin, specific reaches are listed on the 303(d) list for specific parameters including temperature, turbidity, dissolved oxygen, fecal coliform, and pH (Figure 6) (NRCS 2006c). The primary cause for the elevated stream temperature is the loss of riparian habitat and widening of stream channels (Table 3). The excessive turbidity is primary caused by farmland erosion. Fecal coliform, oxygen, and pH parameters are violated because of livestock in and near riparian areas of the streams.

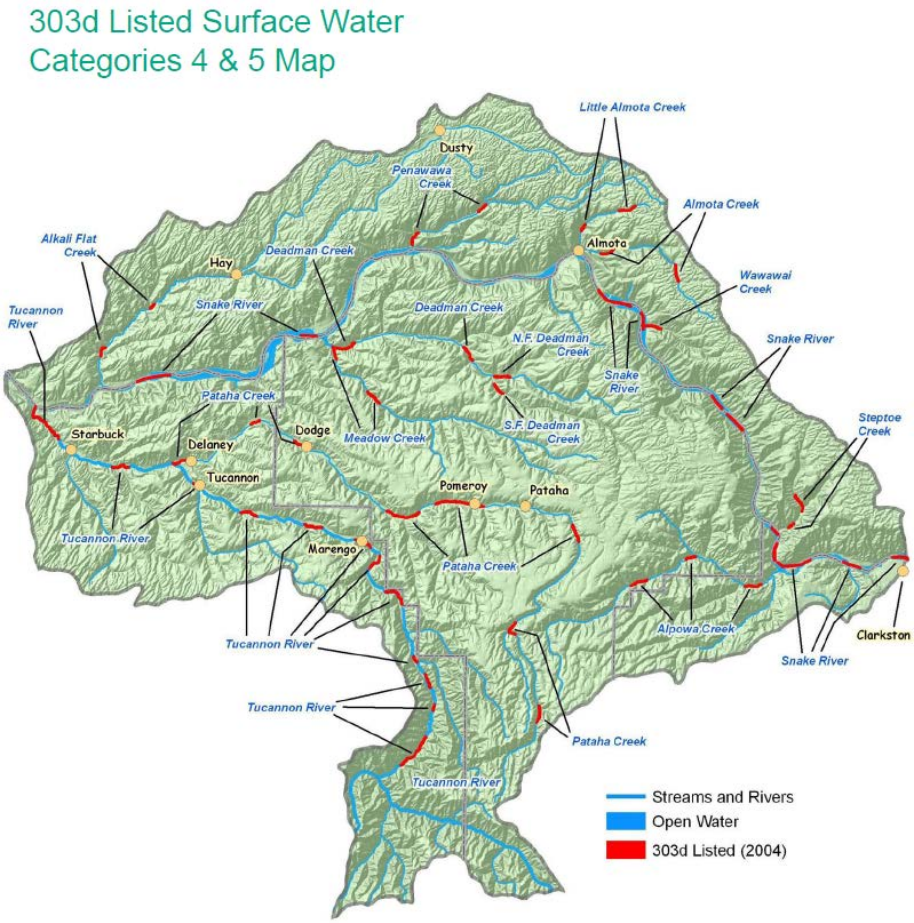

Figure 6. Map of the Tucannon watershed (within the larger lower Snake River area) showing 303(d) listings of stream reaches.

Thirteen hatchery facilities are currently used to support eight northeast Oregon and Southeast Washington hatchery programs (Subsection 1.4, Action Area). Of these 13 hatchery facilities, four are located in stream reaches included on the 303(d) list: Imnaha Satellite Facility, Curl Lake Acclimation Pond, Little Sheep Creek Acclimation Facility, and Wallowa Hatchery (Figure 1). All of the other facilities are located in areas not included on the 303(d) list.

Table 3. Water source and use by hatchery facility and applicable 303(d) listings.

Hatchery Facility	Compliant with NPDES Permit	Discharges Effluent into a 303(d) Listed Water Body[1]	Impaired Parameters	Cause of Impairment
Catherine Creek Acclimation Facility	N/A	No	None	None
Lookingglass Hatchery	Yes	No	None	None
Upper Grande Ronde Acclimation Facility	N/A	No	None	None
Lostine Acclimation Facility	N/A	No	None	None
NE Oregon Hatchery (i.e., Lostine River Hatchery)	N/A	No	None	None
Imnaha Satellite Facility (Gumboot)	N/A	Yes	Elevated stream temperature	Loss of riparian habitat and widening of stream channel
Lyons Ferry Hatchery	Yes	No[1]	None	None
Tucannon Hatchery	Yes	No	None	None
Curl Lake Acclimation Pond	N/A	Yes	Elevated temperature, turbidity, dissolved oxygen, fecal coliform, and pH	Loss of riparian habitat and widening of stream channel; farmland erosion, livestock
Little Sheep Creek Acclimation Facility	N/A	Yes	Elevated stream temperature	Loss of riparian habitat and widening of stream channel
Irrigon Hatchery	Yes	No	None[1]	None
Wallowa Hatchery	Yes	Yes	Elevated stream temperature and excessive sediment input	Loss of riparian habitat and widening of stream channel
Oxbow Hatchery	Yes	No	None[1]	None
Bonneville Hatchery	Yes	No	None	None

Source: NRCS 2005a; NRCS 2005b; NRCS 2006b; Ecology 2013; ODEQ 2006.
N/A = Not applicable because the facility is not yet operational or an NPDES permit is not required because the facility releases less than 20,000 pounds of fish per year or feeds fish less than 5,000 pounds of fish feed per year.
[1] Although the Snake and Columbia Rivers have 303(d) Category 5 assessed waters, the Lyons Ferry Hatchery, Irrigon, and Oxbow Hatcheries do not release effluent into Category 5 assessed areas of these rivers (Ecology 2013).

3.4. Fish Listed Under the ESA

Hatchery programs can adversely affect natural-origin salmon and steelhead and their habitat through genetic risks, competition and predation, facility effects, natural population status masking, incidental fishing effects, and disease transfer (Table 4). The extent of adverse effects depends on the design of hatchery programs, the condition of the habitat, and the current status of the species, among other factors. Hatchery programs can benefit natural-origin salmon and steelhead through marine-derived nutrient cycling effects, by preserving and increasing abundance and spatial structure, retaining genetic diversity, and potentially increasing productivity of a natural-origin population if natural-origin abundance is low enough that they are having difficulty finding mates.

Most of the empirical evidence of fitness depression due to hatchery-induced selection comes from studies of species that are reared in the hatchery environment for an extended period – 1 to 2 years – prior to release (Berejikian and Ford 2004). Two especially well-publicized steelhead studies showed dramatic fitness declines in the progeny of naturally spawning hatchery-origin steelhead in the Hood River (Araki et al. 2007; Araki et al. 2008). However, the data and theory are insufficient to predict the magnitude and duration of loss in any particular situation. Recently studies of hatchery supplementation have also documented demographic benefits to natural production from hatchery fish spawning in the wild (Anderson et al. 2012; Berejikian et al. 2008; Hess et al. 2012). On balance, the benefits of artificial propagation for reducing extinction risk and for rebuilding severely depressed fish populations may outweigh the risks of fitness loss. In general, populations with fewer than 500 individuals are at a higher risk for inbreeding depression and a variety of other genetic concerns (McElhaney et al. 2000; McClure et al. 2003). Fifty spawners per year is the minimum number of individuals (often female) below which a population is likely to be critically and immediately imperiled (i.e., an extinction vortex) (Morris and Doak 2002).

Hatchery supplementation also has the potential to increase competition with and predation on wild fish. However, hatchery programs may be designed to limit opportunities for co-occurrence and interaction between hatchery-origin fish and migrating natural-origin fish – for example, through acclimation of hatchery-produced fish prior to release – reducing potential adverse effects from competition and predation (Quinn 1993). Although poorly managed hatchery programs can increase disease and pathogen transfer risks, compliance with applicable protocols for fish health can effectively minimize this risk.

Snake River spring/summer Chinook salmon, steelhead, and fall-run Chinook salmon are captured, handled, weighed, measured, sampled, and adipose fin-clipped or tagged for monitoring and evaluation at relatively high rates. In general, however, handling mortalities are very low. Although some of the monitoring is conducted for the purpose of evaluating the hatchery program, salmon and steelhead are also handled for run reconstruction purposes, broodstock collection (fall Chinook salmon), and for stock status monitoring. Adults are handled at Lower Granite Dam. Monitoring and evaluation to determine impacts on listed fish from hatchery programs can themselves have potential adverse impacts on listed fish through injuries incurred during sampling and marking. Sampling can include direct mortalities (e.g., genetic analysis, disease pathology, smolt condition) and incidental take (e.g., capture, sorting, handling). Marking is used for several reasons: (1) to determine which fish to include as

broodstock (2) to determine hatchery stray rates, (3) to determine hatchery contributions to fisheries, and (4) to allow for the implementation of selective fisheries that target hatchery-origin fish.

Sampling methods can include the use of weirs, electro-fishing, hook and line, rotary screw traps, seines, hand nets, spawning ground surveys, snorkeling, radio tagging, and carcass recovery. Each sampling method can be used to collect a variety of information. Sample methods, like tagging methods, can adversely impact listed fish, both those targeted for data collection and those taken incidentally to the data collection.

A more detailed discussion of the general effects of hatchery programs on salmon, steelhead, and their habitat can be found in the draft Environmental Impact Statement to Inform Columbia River Basin Hatchery Operations and the Funding of the Mitchell Act Hatchery Programs (NMFS 2010b).

Since 1991, NMFS has identified two ESUs (Snake River spring/summer Chinook salmon and Snake River fall Chinook salmon) and one DPS (Snake River Basin steelhead) in the analysis area that require protection under the ESA (71 FR 834, January 5, 2006; 70 FR 37160, June 28, 2005). In addition, the USFWS has identified bull trout as requiring protection under the ESA (63 FR 31647, June 10, 1998). Although Snake River sockeye salmon and other ESA-listed salmon and steelhead in the Columbia River Basin may intermingle with Snake River spring/summer Chinook salmon and steelhead while in the mainstem Snake and Columbia Rivers and Columbia River estuary, effects on these species are low to negligible for the following reasons:

- Hatchery-origin spring/summer Chinook and steelhead do not rear in the mainstem Snake and Columbia Rivers, and would only be in these areas for a short time while actively outmigrating.
- Once in the estuary, steelhead and spring/summer Chinook salmon migrate quickly into marine waters and, therefore, would not compete for food or space.

Table 4. General mechanisms through which hatchery programs can affect natural-origin salmon and steelhead populations.

Effect Category	Description of Effect
Genetic risks	• Interbreeding with hatchery-origin fish can change the genetic character of the local salmon or steelhead populations. • Interbreeding with hatchery-origin fish may reduce the reproductive performance of the local salmon or steelhead populations.
Competition and predation	• Hatchery-origin fish can increase competition for food and space. • Hatchery-origin fish can increase predation on natural-origin salmon and steelhead.
Facility effects	• Hatchery facilities can reduce water quantity or quality in adjacent streams through water withdrawal and discharge.

Effect Category	Description of Effect
	• Weirs for broodstock collection or to control the number of hatchery-origin fish on the spawning grounds can have the following unintentional consequences: o Isolation of formerly connected populations o Limiting or slowing movement of migrating fish species, which may enable poaching or increase predation o Alteration of stream flow o Alteration of streambed and riparian habitat o Alteration of the distribution of spawning within a population o Increased mortality or stress due to capture and handling o Impingement of downstream migrating fish o Forced downstream spawning by fish that do not pass through the weir o Increased straying due to either trapping adults that were not intending to spawn above the weir, or displacing adults into other tributaries
Masking	• Hatchery-origin fish can increase the difficulty in determining the status of the natural-origin component of a salmon or steelhead population.
Incidental fishing effects	• Fisheries targeting hatchery-origin fish have incidental impacts on natural-origin fish.
Disease transfer	• Concentrating salmon and steelhead for rearing in a hatchery facility can lead to an increased risk of carrying fish disease pathogens. When hatchery-origin fish are released from the hatchery facilities, they may increase the disease risk to natural-origin salmon and steelhead.
Population viability benefits	• Abundance: Preservation of, and possible increases in, the abundance of a natural-origin fish population resulting from implementation of a hatchery program. • Spatial Structure: Preservation or expansion of the spatial structure of a natural-origin fish population resulting from implementation of a hatchery program. • Genetic diversity: Retention of within-population genetic diversity of a natural-origin fish population resulting from implementation of a hatchery program. • Productivity: Hatchery programs could increase the productivity of a natural-origin population if naturally spawning hatchery-origin fish match natural-origin fish in reproductive fitness and when the natural-origin population's abundance is low enough to limit natural-origin productivity (i.e., they are having difficulty finding mates).
Nutrient cycling	• Returning hatchery-origin adults can increase the amount of marine-derived nutrients in freshwater systems.

3.4.1. Snake River Spring/Summer Chinook Salmon ESU

Snake River spring/summer Chinook salmon were listed under the ESA as threatened in 1992 and reaffirmed in 2005 (70 FR 37160, June 28, 2005). The Snake River Spring/Summer Chinook Salmon ESU consists of 28 extant populations that spawn and rear in in the mainstem Snake River and the Tucannon River, Grande Ronde River, Imnaha River, and Salmon River subbasins, including spring/summer Chinook salmon raised in 15 hatchery programs. Within the analysis area there are seven spring/summer Chinook salmon populations (Table 5).

Abundance has been stable or increasing on average for populations in the analysis area over the last 20 years (NMFS 2008a). However, all seven populations are still considered at high risk for extinction (Table 5). The most recent status review cited continued low abundance and poor productivity of natural-origin fish as primary concerns for the populations within the action area (Ford 2011). The Upper Grande Ronde and Catherine Creek populations have a mean natural-origin abundance of around 19 and 80 fish, respectively, and the Lostine/Wallowa, Imnaha, and Tucannon populations have fewer than 300 natural-origin fish (Table 5). Consequently, supplementation hatchery programs have been established to increase abundance in these five populations. However, the most recent 5-year returns (through 2012) have generally shown increases over those reported here (G. Mendel, pers. comm., WDFW, District Fish Biologist, March 11, 2013).

Designated critical and essential fish habitat for Snake River spring/summer Chinook salmon includes all Columbia River estuarine areas and river reaches proceeding upstream to the confluence of the Columbia and Snake Rivers as well as specific stream reaches in a number of tributary subbasins, including the mainstem Snake River (64 FR 57399, October 25, 1999). Essential habitat for spring/summer Chinook and steelhead consists of (1) spawning and juvenile rearing areas; (2) juvenile migration corridors; (3) areas for growth and development to adulthood, and (4) adult migration corridors (58 FR 68543, December 28, 1993). Essential features of these habitats include adequate substrate (especially spawning gravel), water quality, water quantity, water temperature, water velocity, cover/shelter, food, riparian vegetation, space, and suitable migration conditions.

Table 5. Abundance thresholds, current abundance, and overall viability risk rating for seven populations of Snake River spring/summer Chinook salmon.

Population	ICTRT's Recommended Minimum Abundance Threshold for Natural-origin Spawners[1]	Natural-origin Spawners[2]	Total Spawners[2]	Abundance and Productivity Risk	Spatial Structure and Diversity Risk	Overall Viability Rating
Wenaha	750	325	364	High	Moderate	High risk
Lostine/ Wallowa	1000	267	812	High	Moderate	High risk
Minam	750	414	460	High	Moderate	High risk
Catherine	750	80	205	High	Moderate	High risk

Population	ICTRT's Recommended Minimum Abundance Threshold for Natural-origin Spawners[1]	Natural-origin Spawners[2]	Total Spawners[2]	Abundance and Productivity Risk	Spatial Structure and Diversity Risk	Overall Viability Rating
Creek						
Upper Grande Ronde	1000	19	109	High	High	High risk
Imnaha	750	196	1094	High	Moderate	High risk
Tucannon	750	276	469	High	Moderate	High risk

[1] ICTRT's recommended minimum abundances are based on a 10-year geometric mean.
[2] 5-year geometric mean 2005-2009
Source: Ford 2011

3.4.2. Snake River Basin Steelhead DPS

Snake River Basin steelhead were listed as threatened on August 18, 1997 (62 FR 43937). The listing was revised on January 5, 2006 (71 FR 834), after a review of the relationship between wild steelhead, hatchery steelhead, and resident *O. mykiss*. The revised Snake River Basin Steelhead DPS includes 24 natural-origin populations of steelhead in the Snake River Basin of southeast Washington, northeast Oregon, and Idaho, and steelhead produced in six hatchery programs. Within the analysis area, there are six steelhead populations (Table 6). Two of the six steelhead populations in the analysis area are supplemented by hatchery programs included under the Proposed Action: the Tucannon and Imnaha River steelhead populations.

Overall abundance of the DPS as a whole has been stable or increasing on average over the last 30 years (FPC 2012). However, estimates of population-specific spawning abundance are only available for two populations of Snake River steelhead (Joseph Creek and Upper Grande Ronde River). Therefore, NMFS used aggregate estimates of abundance at Lower Granite Dam, along with juvenile indices of abundance available for some areas, to infer abundance and productivity ratings for populations without specific adult abundance time series (Ford 2011). The overall viability ratings for steelhead populations in the analysis area range from highly viable to high risk, with a great level of uncertainty (Table 6). The most recent status review cited continued low abundance and poor productivity of natural-origin fish as primary concerns for these populations (Ford 2011).

Designated critical habitat for Snake River Basin steelhead includes all Columbia River estuarine areas and river reaches proceeding upstream to the confluence of the Columbia and Snake Rivers as well as specific stream reaches in a number of tributary subbasins, including the mainstem Snake River (70 FR 52630, September 2, 2005). Essential habitat features include the need for adequate substrate (especially spawning gravel), water quality, water quantity, water temperature, water velocity, cover/shelter, food, riparian vegetation, space, and suitable migration conditions.

Table 6. Abundance thresholds, current abundance, and viability risk ratings for six populations of Snake River steelhead.

Population	ICTRT's Recommended Minimum Abundance Threshold for Natural-origin Spawners[1]	Natural-origin Spawners[2]	Total Spawners[2]	Abundance/ Productivity Risk	Spatial Structure/ Diversity Risk	Overall Viability Rating
Tucannon River	1000	Insufficient data	Insufficient data	High? [4]	Moderate	High risk?
Asotin Creek	500	Insufficient data[3]	Insufficient data	Maintained (moderate)	Moderate	Maintained? (High risk?)
Lower Grande Ronde River	1000	Insufficient data	Insufficient data	Unknown	Moderate	Maintained?
Joseph Creek	1500	1925	1925	Very low	Low	Highly viable
Upper Grande Ronde	1500	1442	1425	Viable (moderate)	Moderate	Maintained
Wallowa	1000	Insufficient data	Insufficient data	High?	Low	High risk?

[1] ICTRT's recommended minimum abundances are based on a 10-year geometric mean.
[2] 5-year geometric mean 2003-2008
[3] WDFW now has 5 years of adult estimates in Asotin Creek, and the returns are well over the 500 natural-origin spawner goal identified by the ICTRT (G. Mendel, pers. comm., WDFW, District Fish Biologist, March 11, 2013).
[4] The question marks in this table are from the Ford (2011) status review documents, which is the source of the table's data.
Source: Ford (2011)

3.4.3. Snake River Fall-run Chinook Salmon

The Snake River Fall-run Chinook Salmon ESU includes fish spawning in the lower mainstem of the Snake River and the lower reaches of several of the associated major tributaries, including the Tucannon, Grande Ronde, and Imnaha Rivers. This ESU was originally listed under the ESA in 1992, and its listing status was reaffirmed in 2005 (70 FR 37160, June 28, 2005). The decline of this ESU was due to heavy fishing pressure beginning in the 1890s and loss of habitat with the construction of Swan Falls Dam in 1901 and the Hells Canyon Complex from 1958 to 1967, which extirpated two of the historical populations. The lower Snake River dams that were constructed in the 1960s and 1970s flooded spawning and rearing areas in over 130 miles of the river. Only 10 to 15 percent of the historical range of this ESU remains.

The most recent short-term trend in natural-origin spawners was strongly positive, increasing at an average rate of 16 percent per year (Ford 2011). This positive abundance trend has continued over the last 5 years (through 2012) (G. Mendel, pers. comm., WDFW, District Fish Biologist, March 11, 2013). However, abundance and productivity risk for this population is considered moderate by the ICTRT (Table 7).

Designated critical and essential habitat for Snake River Basin fall Chinook salmon includes the Columbia River from the Pacific Ocean to its confluence with the Snake River, the Snake River from its confluence with the Columbia River to the Hells Canyon Dam; as well as specific stream reaches in a number of tributary subbasins including the Imnaha, Clearwater, and Grande Ronde Rivers (58 FR 68543, December 28, 1993). Essential habitat features include the need for adequate substrate (especially spawning gravel), water quality, water quantity, water temperature, water velocity, cover/shelter, food, riparian vegetation, space, and suitable migration conditions.

Table 7. Abundance thresholds, current abundance, and viability risk ratings for Snake River fall Chinook salmon.

Population	ICTRT's Recommended Minimum Abundance Threshold for Natural-origin Spawners[1]	Natural-origin Spawners[2]	Total Spawners[2]	Abundance/ Productivity Risk	Spatial Structure/ Diversity Risk	Overall Viability Rating
Snake River	3000	2291	11321	Moderate	Moderate	Maintained

[1] ICTRT's recommended minimum abundances are based on a 10-year geometric mean.
[2] 5-year geometric mean 2003-2008
Source: Ford 2011

3.4.4. Columbia River Bull Trout

The USFWS issued a final rule listing the Columbia River and Klamath River populations of bull trout (*Salvelinus confluentus*) as a threatened species under the ESA on June 10, 1998 (63 FR 31647). Within the analysis area, three recovery units have been identified: the Snake River unit in Washington, the Grande Ronde unit, and the Imnaha unit (USFWS 2002). Based upon the latest status update, the Grande Ronde and Imnaha recovery units were classified as stable, with estimated population abundances of the core areas in the range of 50 to 1,000 bull trout (USFWS 2008). The Snake River Washington recovery unit was classified as unknown, in terms of recent status and trends, due to the lack of empirical data (USFWS 2008). The analysis area represents a small portion of the overall range of the ESA-listed bull trout DPS.

Bull trout feed primarily on fish (referred to as piscivorous) as subadults and adults, they can be a substantial predator of young salmon and steelhead. Juvenile bull trout feed on similar prey as salmon and steelhead, so they can also be a competitor of salmon and steelhead (USFWS 2002; USFWS 2008).

3.5. Fish Not Listed Under the ESA

This section includes Columbia River basin fish species that have a relationship with salmon and steelhead either as prey, predators, or competitors (Table 8). Generally, impacts would occur (1) through competition for space or food used by spring/summer Chinook salmon, steelhead, and

non-listed fish in the analysis area, or (2) if spring/summer Chinook salmon and steelhead are prey for non-listed species or vice-versa.

Spring/summer Chinook salmon and steelhead eat lamprey, sculpin, pygmy whitefish, trout, rockfish, and forage fish (**Table 8**). Spring/summer Chinook salmon and steelhead may become prey for lamprey, sculpin, northern pikeminnow, trout, and rockfish, but none of these species feed exclusively on salmon (**Table 8**). All non-listed fish species, except mountain sucker, compete with spring/summer Chinook salmon and steelhead for food or space at some life stage (Table 8). All fish species benefit from the addition of marine-derived nutrients from the decomposition of salmon and steelhead carcasses (Table 8).

There are no species within the analysis area that have been designated by the State of Oregon as threatened, endangered, or candidate fish species (except those that are federally listed and discussed in Subsection 3.4, Fish Listed under the Endangered Species Act) (ODFW 2013). There are several fish species as species of concern in the State of Washington, including leopard dace, margined sculpin, mountain sucker, Paiute sculpin, river lamprey, and Umatilla dace (G. Mendel, pers. comm., WDFW, District Fish Biologist, March 11, 2013). Pacific and river lamprey are also a species of concern as identified by the USFWS (USFWS 2013).

Table 8. Range and status of other fish species that may affected by Snake River spring/summer Chinook salmon and steelhead.

Species	Range in Columbia River Basin	Federal/State Listing Status	Type of Interaction with salmon and steelhead
Pacific, river, and brook lamprey	All accessible reaches in the Columbia River Basin	Not listed. Pacific lamprey and river lamprey are federal species of concern, river lamprey is a Washington State candidate species, Pacific lamprey is an Oregon State sensitive species and an Idaho State imperiled species	• Potential prey item for adult salmon and steelhead • May compete with salmon and steelhead for food and space • May be a parasite on salmon and steelhead while in marine waters • May benefit from additional marine-derived nutrients provided by hatchery-origin fish
White sturgeon	All accessible reaches in the Columbia River Basin	Not federally listed	• May compete with salmon and steelhead for food • May benefit from additional marine-derived nutrients provided by hatchery-origin fish
Margined sculpin	All accessible reaches in the Columbia River Basin	WDFW species of concern	• Predator on salmon and steelhead eggs and fry • Potential prey item for adult salmon and steelhead • May compete with salmon and steelhead for food and space • May benefit from additional marine-derived nutrients provided by hatchery-origin fish
Umatilla and leopard dace	Columbia River Basin	Not federally listed, Washington State candidate species	• May compete with salmon and steelhead for food • May benefit from additional marine-derived nutrients provided by hatchery-origin fish
Mountain sucker	Middle-Columbia and Upper Columbia River watersheds	Not federally listed, Washington State species of concern	• Occurs in similar freshwater habitats, but is a bottom feeder and has a different ecological niche • May benefit from additional marine-derived nutrients provided by hatchery-origin fish
Northern pikeminnow	Throughout the Columbia River Basin	Not listed	• Freshwater predator on salmon and steelhead eggs and juveniles • May compete with salmon and steelhead for food • May benefit from additional marine-derived nutrients
Inland redband trout	Throughout the Columbia River Basin	Not listed	• Predator of salmon and steelhead eggs and fry

Species	Range in Columbia River Basin	Federal/State Listing Status	Type of Interaction with salmon and steelhead
			• Potential prey item for adult salmon and steelhead • May compete with salmon and steelhead for food and space • May interbreed with steelhead • May benefit from additional marine-derived nutrients provided by hatchery-origin fish
Rockfish	Rocky reef habitats in marine waters	Several species are federally listed as threatened and/or have State Candidate listing status [1]	• Predators of juvenile salmon and steelhead • Juveniles are prey for juvenile and adult salmon • May compete with salmon and steelhead for food
Forage fish	Most marine waters	Pacific herring is a federal species of concern and a Washington State candidate species	• Prey for juvenile and adult salmon and steelhead • May compete with salmon and steelhead for food

Sources: Finger 1982; Horner 1978; Krohn 1968; Maret et al 1997; Polacek et al 2006; WDFW 2013b; Beamish 1980

[1] Georgia Basin bocaccio DPS (*Sebastes paucispinis*)- Federally listed as endangered and state candidate species; Georgia Basin yelloweye rockfish DPS (*S. ruberrimus*)- Federally listed as threatened and state candidate species; Georgia Basin canary rockfish DPS (*S. pinniger*) -Federally listed as threatened and state candidate species; Black, brown, China, copper, green-striped, quillback, red-stripe, tiger, and widow rockfish are state candidate species.

3.6. Instream Fish Habitat

Impacts on instream fish habitat from operating hatchery programs may occur from (1) reduction in available fish habitat from water withdrawals, (2) operation of instream structures (e.g., water intake structures, fish ladders, and weirs), or (3) maintenance of instream structures (e.g., protecting banks from erosion or clearing debris from water intake structures).

Water withdrawals may affect instream fish habitat if they reduce the amount of water in a river between the hatchery's water intake and discharge structures. A full discussion of the effects of water withdrawal can be found in Subsection 3.2, Water Quantity.

The northeast Oregon and southeast Washington hatchery programs use hatchery facilities that have several instream structures such as water intakes, fish ladders, and weirs. All hatchery intakes on salmon and steelhead streams are screened to prevent fish injury from impingement or permanent removal from streams. NMFS's screening criteria for water withdrawal devices set forth conservative standards that help minimize the biological risk of harming naturally produced salmonids and other aquatic fauna (NMFS 2011). NMFS periodically updates its screening criteria based on best available science and technology. Consequently, some hatcheries have water intake screens that do not meet NMFS's most current screening criteria, although they meet the screening criteria that were in place when the water intake was installed. Hatchery facilities upgrade their water intake screens as funding becomes available.

The northeast Oregon and southeast Washington hatchery programs use several weirs to collect broodstock and/or manage adult returns. Weirs are used in the Tucannon River, Imnaha River, Catherine Creek, Grande Ronde River, Wallowa River, Lookingglass Creek, and Little Sheep Creek. A weir is a barrier to fish movement. The biological risks associated with weirs include the following:

- Isolation of formerly connected populations
- Limiting or slowing movement of non-target fish species
- Alteration of stream flow
- Alteration of streambed and riparian habitat
- Alteration of the distribution of spawning within a population
- Increased mortality or stress due to capture and handling
- Impingement of downstream migrating fish
- Forced downstream spawning by fish that do not pass through the weir
- Increased straying due to either trapping adults that were not intending to spawn above the weir, or displacing adults into other tributaries

By blocking migration and concentrating salmon into a confined area, weirs may also increase predation efficiency of mammalian predators (RIST 2009).

Instream maintenance may include clearing of debris and bedload from hatchery intake screens and fish ladders or protecting banks from erosion. Instream maintenance such as clearing of debris and bedload from hatchery intake screens and fish ladders or protecting banks from erosion may increase stream sedimentation, but maintenance activities are usually small in scale and duration, and return conditions to what they were when structures were first constructed.

3.7. Wildlife and Marine Mammals

Within the analysis area, several species are listed under the ESA including Canada lynx, pygmy rabbit, northern spotted owl, grizzly bear, Steller sea lion, and southern resident killer whale (USFWS 2013; NMFS 2010b). Grizzly bear, Steller sea lion, and southern resident killer whale feed on adult salmon and steelhead or on decomposing carcasses of spawned adult salmon and steelhead. Fish are not the only component of the diets of these species, though salmon and steelhead may represent a somewhat larger proportion of the diet during the relatively short period of the year that adult salmon return to the analysis area to spawn.

Steller sea lions and California sea lions are known to feed on returning adult salmon in the Columbia River basin (USACE 2012). Sea lions feed on salmon downstream of Bonneville Dam, where Snake River spring/summer Chinook salmon and steelhead adults (both hatchery- and natural-origin) migrate. Snake River spring/summer Chinook salmon and steelhead migration coincides with the presence sea lions below Bonneville Dam (NMFS 2008b), and sea lions are likely eating hatchery-origin fish originating from the eight northeast Oregon and southeast Washington hatchery programs.

Southern resident killer whales' diet consists of a high percentage of Chinook salmon, with an overall average of 82 percent Chinook salmon (Hanson et al. 2010). Hanson et al. (2010) suggest that Chinook salmon stocks would be consumed at least roughly proportional to their local abundance. Southern resident killer whales reside predominantly in Puget Sound, and

would only rarely encounter Snake River spring/summer Chinook salmon either as Chinook salmon migrate north up the coast, or as killer whales migrate south down the coast. Snake River spring/summer Chinook salmon would have very limited time of interaction with southern resident killer whales, and few are likely to be eaten.

There are several species of birds that feed on juvenile salmon including Caspian terns and cormorants. During the spring when salmon and steelhead juvenile outmigrate to the Pacific Ocean, they may be major food source for these bird populations.

Finally, fishing in the analysis area has created fishery access points, roads, boat launches, and campsites that result in ongoing, but likely minor, habitat disruptions.

3.8. Socioeconomics

Socioeconomics is defined as the study of the relationship between economics and social interactions with affected regions, communities, and user groups. In addition to providing fish for harvest, hatchery programs directly affect socioeconomic conditions in the economic impact regions where the hatchery facilities operate. Hatchery facilities generate economic activity (personal income and jobs) by providing employment opportunities and through local procurement of goods and services for hatchery operations.

NMFS (2010b) found that Columbia River basin hatchery operations and associated harvest on average contributed over $10 million in personal income and 414 jobs to the lower Snake River regional economy between 2002 and 2006. The eight northeast Oregon and southeast Washington hatchery programs directly employ 49 full-time employees and 18 seasonal employees (CTUIR 2011; NPT 2011; ODFW 2011a; ODFW 2011b; ODFW 2011c; ODFW 2011d; WDFW 2011a; WDFW 2011b).

Fisheries contribute to local economies through the purchase of supplies such as fishing gear, camping equipment, consumables, and fuel at local businesses. All of these expenditures would be expected to support local businesses, but it is unknown how dependent these businesses are on fishing-related expenditures. Anglers would also be expected to contribute to the economy through outfitter/guide/charter fees.

Hatchery-origin fish produced in northeast Oregon and southeast Washington are caught in mixed-stock fisheries in the Columbia and Snake River mainstems. Hatchery-origin steelhead are targeted in non-tribal, recreational fisheries in the Tucannon, Imnaha, and Grande Ronde River Basins. Non-tribal, recreational fisheries also target hatchery-origin spring/summer Chinook salmon in the Imnaha River, Wallowa River, and Lookingglass Creek. Spring Chinook salmon fisheries that target hatchery-origin fish are anticipated in the Tucannon and lower Grande Ronde Rivers in the near future. Although data on the amount of money and the number of jobs currently supported through fishing-related expenditures in the northeast Oregon and southeast Washington are not available, fishing-related expenditures in the state of Washington

accounted for less than 0.2 percent ($534 million[3]) of the total state revenue in 2006, and salmon and steelhead angling only accounted for a portion of that total (USCB 2013). No similar study was found for Oregon, but fishing could be expected to contribute to a similar proportion of the total state economy based on similarities between industries found in the two states. Although, fishing represents a small percentage of the overall state revenue, fishing for salmon and steelhead can contribute substantially to local economies in Northeast Oregon and Southeast Washington (G. Mendel, pers. comm., WDFW, District Fish Biologist, March 11, 2013).

Hunting, fishing, and gathering have been important to tribes for thousands of years. These activities continue to be important today, both economically and for subsistence and ceremonial purposes. Natural resources continue to play a dominant role in tribal culture, and a primary factor in tribal economies.

The fish that escape the ocean and Columbia River fisheries are targeted in tribal fisheries in the analysis area. Tribal fisheries occur within the action area, using traditional fishing equipment created by local tribal craftsmen. It is difficult or impossible to monetize these purposes to the tribal people. The harvest of spring/summer Chinook salmon have a monetary benefit for tribal members and their families by providing a local, traditional food source as well as supporting local craftsmen who make traditional fishing gear for harvest. The sale of some harvested fish also brings in revenue for tribal members and their families. Additionally, the availability of local fish reduces tribal reliance on other consumer goods, or travel costs to participate in other fisheries.

3.9. Tourism and Recreation

Tourism and recreation in the analysis area are generally focused on outdoor activities such as camping, hiking, sightseeing, fishing, and hunting. Hatchery programs contribute to tourism and recreation in the analysis area by increasing fishing opportunity and providing tours of their hatchery facilities. Specific data are not available on the proportion of fishing trips taken in Oregon and Washington when compared to all tourism and recreational trips. However, data are available for Idaho (not in the analysis area), where fishing only accounts for about 3 percent of all tourism and recreation trips (Travel USA 2008; ASA 2008; Felder 2007). Slightly higher percentages are expected in Oregon and Washington because Oregon and Washington have freshwater and marine fisheries. However, the proportion of fishing trips relative to all tourism and recreations trips in Oregon and Washington would still be expected to be low because they provide similar outdoor recreational opportunities as in Idaho. The regions affected also have similar populations, industry, and access to outdoor activities through public land. Therefore, it is assumed that fishing would be similarly represented in these areas.

[3] Some studies put fishing-related expenditures much higher. For example, a USFWS study estimates that in 2011, over $1 billion was spent in fishing-related expenditures in Washington and over $640 million in Oregon (USFWS 2012).

3.10. Environmental Justice

This section was prepared in compliance with Presidential Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (EO 12898), dated February 11, 1994, and Title VI of the Civil Rights Act of 1964.

Executive Order 12898 (see 59 FR 7629, February 16, 1994) states that Federal agencies shall identify and address, as appropriate "…disproportionately high and adverse human health or environmental effects of [their] programs, policies and activities on minority populations and low-income populations…." While there are many economic, social, and cultural elements that influence the viability and location of such populations and their communities, certainly the development, implementation and enforcement of environmental laws, regulations and policies can have impacts. Therefore, federal agencies, including NMFS, must ensure fair treatment, equal protection, and meaningful involvement for minority populations and low-income populations as they develop and apply the laws under their jurisdiction.

Both EO 12898 and Title VI address persons belonging to the following target populations:

- Minority – all people of the following origins: Black, Asian, American Indian and Alaskan Native, Native Hawaiian or Other Pacific Islander, and Hispanic[4]
- Low income – persons whose household income is at or below the U.S. Department of Health and Human Services poverty guidelines.

Definitions of minority and low income areas were established on the basis of the Council on Environmental Quality's (CEQ's) *Environmental Justice Guidance under the National Environmental Policy Act* of December 10, 1997. CEQ's *Guidance* states that "minority populations should be identified where either (a) the minority population of the affected area exceeds 50 percent or (b) the population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographical analysis." The CEQ further adds that "[t]he selection of the appropriate unit of geographical analysis may be a governing body's jurisdiction, a neighborhood, a census tract, or other similar unit that is chosen so as not to artificially dilute or inflate the affected minority population."

The CEQ guidelines do not specifically state the percentage considered meaningful in the case of low-income populations. For this EA, the assumptions set forth in the CEQ guidelines for identifying and evaluating impacts on minority populations are used to identify and evaluate impacts on low-income populations. More specifically, potential environmental justice impacts are assumed to occur in an area if the percentage of minority, per capita income, and percentage below poverty level are meaningfully greater than the percentage of minority, per capita income, and percentage below poverty level in their state as a whole (i.e., Washington or Oregon).

The northeast Oregon and southeast Washington hatchery programs release fish spring/summer Chinook and steelhead into the Tucannon, Imnaha, and Grande Ronde Basins, which are located

[4] Hispanic is an ethnic and cultural identity and is not the same as race.

in Asotin (WA), Columbia (WA), Garfield (WA), Union (OR) and Wallowa (OR) Counties. Additionally, most of the hatchery facilities that support these hatchery programs are also found in these five counties (Catherine Creek Acclimation Facility, Lookingglass Hatchery, Upper Grande Ronde Acclimation Facility, Lostine Acclimation Facility, Northeast Oregon Hatchery, Imnaha Satellite Facility, Tucannon Hatchery, Curl Lake Acclimation Pond, Little Sheep Creek Acclimation Facility, and Wallowa Hatchery).

Four additional hatchery facilities support the northeast Oregon and southeast Washington hatchery programs but are found outside of the Tucannon, Imnaha, and Grande Ronde River Basins: the Lyons Ferry, Irrigon, Oxbow, and Bonneville Hatcheries. The Lyons Ferry Hatchery is located in Franklin County (WA), the Irrigon Hatchery is located in Morrow County (OR), the Oxbow Hatchery is located in Hood River County (OR), and the Bonneville Hatchery is located in Multnomah County (OR) (Subsection 1.4, Action Area). All nine counties in the analysis area are environmental justice counties of concern because they meaningfully exceed thresholds for low income or minority populations (Table 9).

Table 9. Demographic information regarding counties in the analysis area (USCB 2013).

County, State	Non-white (%)	Native American (%)	Hispanic (%)	Poverty Rate (%)	Per Capita Income ($)
Asotin, WA	5.2	1.5	3.1	14.6	23,875
Franklin, WA	8.7	1.4	50.5	20.9	18,878
Columbia, WA	4.9	1.5	6.2	15.4	26,120
Garfield, WA	4.2	0.4	4.4	12.9	25,181
Union, OR	6.1	1.2	4.2	16.6	22,359
Morrow, OR	6.1	1.8	32.1	16.4	26,561
Wallowa, OR	3.8	0.8	2.3	15.9	22,813
Hood River, OR	5.9	1.0	29.8	10.0	25,030
Multnomah, OR	18.8	1.5	11.1	16.5	29,544

Shading of cells represents values that meaningfully exceeded (greater than 10 percent) those of the reference population, making them an environmental justice community of concern.
Source: http://quickfacts.census.gov/qfd/states/53/53003.html

EPA guidance regarding environmental justice extends beyond statistical threshold analyses to consider explicit environmental justice effects on Native American tribes (EPA 1998). Federal duties under the Environmental Justice Executive Order, the presidential directive on government-to-government relations, and the trust responsibility to Indian tribes may merge when the action proposed by another federal agency or the EPA potentially affects the natural or physical environment of a tribe. The natural or physical environment of a tribe may include resources reserved by treaty or lands held in trust; sites of special cultural, religious, or archaeological importance, such as sites protected under the National Historic Preservation Act or the Native American Graves Protection and Repatriation Act; and other areas reserved for hunting, fishing, and gathering (usual and accustomed, which may include “ceded” lands that are not within reservation boundaries). Potential effects of concern may include ecological, cultural,

human health, economic, or social impacts when those impacts are interrelated to impacts on the natural or physical environment (EPA 1998).

Two Native American Tribes are operators of the proposed hatchery programs in the analysis area: the Confederated Tribes of the Umatilla Reservation and the Nez Perce Tribe. These Tribes have treaty-guaranteed rights to fish in northeast Oregon and southeast Washington. The rights of these Stevens' Treaty Tribes have been adjudicated in federal court. The Shoshone-Bannock Tribes have also indicated that they plan to develop fisheries in northeast Oregon and southeast Washington in the future consistent with their claims of treaty rights (NMFS 2010b). For analytical purposes, they have been considered here for environmental justice review.[5]

[5] NMFS's ESA review of Tribal Resource Management Plans does not itself permit the operation of any described or associated fishery. Regarding fishing rights, the Unites States' treaties with Indian tribes are the supreme law of the land, and thus, NMFS cannot make judicially binding determinations regarding the nature and extent of tribal treaty fishing rights. Such determinations are the province of Federal courts. NMFS's role is solely limited to making a determination as to whether the application for a §10 permit meets the applicable standard.

4. ENVIRONMENTAL CONSEQUENCES

4.1. Introduction

This section of the assessment evaluates the potential effects of the alternatives (including the Proposed Action) on the biological, physical, and human resources described in Subsection 3, Affected Environment. NMFS has defined the No-action Alternative as not issuing the necessary ESA permits for the hatchery programs, leading to a termination of the eight existing hatchery programs in northeast Oregon and southeast Washington. Nine of the hatchery facilities that support these hatchery programs would close, but four hatchery facilities (Irrigon Hatchery, Wallowa Hatchery, Oxbow Hatchery, and Bonneville Hatchery) would continue to operate since these facilities are used primarily to support hatchery programs that are not part of the Proposed Action. For the purposes of this assessment, this provides the broadest possible range of effects to evaluate and to compare before making an informed decision on the Proposed Action (Subsection 2.1, Alternative 1).

The effects of Alternative 1 are described relative to baseline conditions (Chapter 3, Affected Environment). The effects of Alternative 2 are described relative to Alternative 1 (No Action). Where applicable, the relative magnitude of impacts is described using the following terms:

Undetectable:	The impact would not be detectable.
Negligible:	The impact would be at the lower levels of detection and could be positive or negative.
Low:	The impact would be slight, but detectable, and could be positive or negative.
Medium:	The impact would be readily apparent and could be positive or negative.
High:	The impact would be severe or greatly beneficial.

4.2. Effects on Water Quantity

4.2.1. Alternative 1 (No Action) – Do Not Issue Section 10 Permits for the Continued Operation of the Eight Hatchery Programs

Under Alternative 1, eight northeast Oregon and southeast Washington hatchery programs would be terminated immediately (Subsection 2.1, Alternative 1). Seven of the hatchery facilities that support these hatchery programs would close, but six hatchery facilities (Irrigon Hatchery, Wallowa Hatchery, Oxbow Hatchery, Bonneville Hatchery, Tucannon Hatchery, and Lyons Ferry Hatchery) would continue to operate since these facilities are also used to support hatchery programs that are not part of the Proposed Action. Consequently, short- and long-term water use would be less under Alternative 1 relative to baseline conditions. There would be no change in compliance with water permits or water rights at any of the hatchery facilities under Alternative 1 because less water would be used at the hatchery facilities relative to baseline conditions or the permits or water rights would no longer be necessary or applicable (Subsection 3.2, Water Quantity). An analysis of the site-specific effects of Alternative 1 is provided below. All effects of the alternatives are localized, short- and long-term effects.

Lyons Ferry and Irrigon Hatcheries

The Lyons Ferry and Irrigon Hatcheries use groundwater exclusively except in the case of emergencies (Subsection 3.3, Water Quality). Under Alternative 1, 75 and 7.05 cubic feet per second (cfs) less groundwater would be used at the Lyons Ferry and Irrigon Hatcheries, respectively, than under baseline conditions (Table 10). These reductions in water use would be slight but detectable to groundwater levels, and may increase the amount of water available for other users of the aquifer. Therefore, Alternative 1 would have a low and beneficial effect on groundwater relative to baseline conditions.

Catherine Creek Acclimation Facility, Upper Grande Ronde Acclimation Facility, Lostine Acclimation Facility, Imnaha Satellite Facility, Curl Lake Acclimation Pond, Little Sheep Creek Acclimation Facility and Oxbow Hatchery

Catherine Creek Acclimation Facility, Upper Grande Ronde Acclimation Facility, Lostine Acclimation Facility, Imnaha Satellite Facility, Curl Lake Acclimation Pond, Little Sheep Creek Acclimation Facility, and Oxbow Hatchery use surface water exclusively. All water diverted from rivers (minus evaporation) is returned after it circulates through the facility, so the only segment of the river that may be impacted by a hatchery facility would be the area between the water intake and discharge structures (Subsection 3.2, Water Quantity).

Under Alternative 1, all of the acclimation and satellite facilities would be closed, and between 5 and 15 cfs less water would be diverted from rivers and creeks between the water intake and discharge structures relative to baseline conditions (Table 10). Under baseline conditions, Catherine Creek Acclimation Facility, Upper Grande Ronde Acclimation Facility, Imnaha Satellite Facility, and Curl Lake Acclimation Pond divert less than 6 percent of surface water during low-flow conditions (Table 2), so closing these hatchery facilities would be expected to have a low, beneficial effect on surface water between the water intake and discharge structures during low-flow conditions in Catherine Creek, Upper Grande Ronde River, Lostine River, Imnaha River, Tucannon River, Little Sheep Creek, and Columbia River relative to baseline conditions (Table 2).

It is unknown what percentage of surface water is diverted to Little Sheep Creek Acclimation Facility because flow information is not available for Little Sheep Creek. Under Alternative 1, the Little Sheep Acclimation Facility would close, though, and up to 8.9 cfs more water would remain in Little Sheep Creek between the intake and discharge structures relative to baseline conditions.

Under Alternative 1, hatchery production at Oxbow Hatchery would be reduced since approximately 15 percent of the facility is used to support the northeast Oregon and southeast Washington hatchery programs. Consequently, approximately 15 cfs less water would be diverted from Oxbow Springs. This would be expected to have a low, beneficial effect on surface water between the intake and discharge structures relative to baseline conditions because the impact would be slight but detectable.

Lookingglass Hatchery, Northeast Oregon Hatchery, Tucannon Hatchery, Wallowa Hatchery, and Bonneville Hatchery

Lookingglass Hatchery, Northeast Oregon Hatchery, Tucannon Hatchery, Wallowa Hatchery, and Bonneville Hatchery use both groundwater and surface water (Table 10). All surface water diverted (minus evaporation) is returned after it circulates through the facility. The only segment of the rivers and creeks that may be impacted by the hatchery facilities would be the area between the water intake and discharge structures (Subsection 3.2, Water Quantity).

Under Alternative 1, the Wallowa, Tucannon, and Lookingglass Hatcheries would be closed. The Wallowa Hatchery diverts up to 0.2 percent of surface water (0.25 cfs) during low-flow conditions (Table 2), so although 0.25 cfs more water would be in the Wallowa River between the water intake and discharge structures, Alternative 1 would be expected to have a negligible effect on flow in the Wallowa River relative to baseline conditions because the change would be at the lower levels of detection. Under Alternative 1, the Wallowa Hatchery would use 0.15 cfs less groundwater relative to baseline conditions (Table 10), which would be expected to have a negligible effect on groundwater levels because the impact would be at the lower level of detection.

The Tucannon Hatchery diverts up to 5 percent of surface water available between the water intake and discharge structures during low-flow conditions to support the steelhead hatchery program (Table 2), so the effects of Alternative 1 would be medium and beneficial relative to baseline conditions and may reduce the long-term potential for impacts on fish and wildlife as a result of stream dewatering. Under Alternative 1, the Tucannon Hatchery would use 0.53 cfs less groundwater than under baseline conditions (Table 10), which would be expected to have a negligible effect on groundwater levels because the impact would be at the lower level of detection.

The Lookingglass Hatchery diverts up to 94 percent of the water in Lookingglass Creek between the water intake and discharge structures during low-flow conditions (Table 2). Alternative 1 would have a medium and beneficial effect on surface flow between the water intake and discharge structure relative to baseline conditions because the effect would be readily apparent, and it would be expected to reduce the long-term potential for impacts on fish and wildlife as a result of stream dewatering in Lookingglass Creek. Under Alternative 1, the Lookingglass Hatchery would use 5 cfs less groundwater than under baseline conditions (Table 10). These reductions in water use would be slight but detectable to groundwater levels, and may increase the amount of water available for other users of the aquifer. Therefore, Alternative 1 would have a low and beneficial effect on groundwater relative to baseline conditions.

Under Alternative 1, the Upper Grande Ronde captive brood hatchery program would be terminated, which would reduce the amount of water used at Bonneville Hatchery relative to baseline conditions (Table 10). Under baseline conditions, the captive brood program diverts less than 1 percent of the water in Tanner Creek during low-flow conditions (Table 10), so Alternative 1 would increase the amount of water in Tanner Creek relative to baseline conditions, but the effects would be at the lower levels of detection. Therefore, Alternative 1 would be expected to have a negligible effect on flow in Tanner Creek relative to baseline

conditions. Under Alternative 1, the Bonneville Hatchery would use 1.25 cfs less groundwater relative to baseline conditions (Table 2), which would be expected to have a negligible effect on groundwater levels because the impact would be at the lower level of detection.

The Northeast Oregon Hatchery is not currently in operation (Subsection 3.2, Water Quantity), so Alternative 1 would not lead to any changes in the amount of surface water or groundwater diverted to the hatchery relative to baseline conditions (Table 10).

Table 10. Water use by hatchery facility and alternative (water usage in cubic feet per second).

Hatchery Facility	Baseline Conditions		Alternative 1 (No Action)		Alternative 2 (Proposed Action)	
	Surface	Ground	Surface	Ground	Surface	Ground
Catherine Creek Acclimation Facility[1]	5	0	0	0	5	0
Lookingglass Hatchery	50	5	0	0	50	5
Upper Grande Ronde Acclimation Facility	5	0	0	0	5	0
Lostine Acclimation Facility	5.7	0	0	0	5.7	0
NE Oregon Hatchery (i.e., Lostine River Hatchery)[2]	0	0	0	0	16.7	3.2
Imnaha Satellite Facility (Gumboot)	<15	0	0	0	<15	0
Lyons Ferry Hatchery	0	150	0	75	0	150
Tucannon Hatchery	8.83	1.76	5.74	1.23	8.83	1.76
Curl Lake Acclimation Pond	6	0	0	0	6	0
Little Sheep Creek Acclimation Facility	8.9	0	0	0	8.9	0
Irrigon Hatchery	0	47	0	39.95	0	47
Wallowa Hatchery (Captive Brood Component)	0.25	0.15	0	0	0.25	0.15
Oxbow Hatchery	40	0	6	0	40	0
Bonneville Hatchery	0.58[3]	1.25	0	0	0.58[3]	1.25

[1] Acclimation facilities operate from approximately February through April.
[2] The NE Oregon Hatchery is not currently in operation. The values in Table 3 (Subsection 3.2, Water Quantity) represent forecasted water use.
[3] Currently, the captive brood program at Bonneville Hatchery only used surface water for five months per year (June through October). After 2013, they expect to reduce their use of surface water from five months to two weeks per year.

4.2.2. Alternative 2 (Proposed Action) – Issue Section 10 Permits for the Continued Operation of the Eight Hatchery Programs

Under Alternative 2, eight northeast Oregon and southeast Washington hatchery programs would operate as proposed in submitted HGMPs (Subsection 2.2, Alternative 2). Consequently, short- and long-term water use would be greater under Alternative 2 relative to Alternative 1. There would be no change in compliance with water permits or water rights at any of the hatchery facilities under Alternative 2 because the hatchery programs have existing permits and water rights to divert water as proposed in the submitted HGMPs. An analysis of the site-specific effects of Alternative 2 is provided below.

Lyons Ferry and Irrigon Hatcheries

The Lyons Ferry and Irrigon Hatcheries use groundwater exclusively except in the case of emergencies (Subsection 3.3, Water Quality). Under Alternative 2, the Lyons Ferry and Irrigon Hatcheries would use 75 and 7.05 cfs more groundwater, respectively, than under Alternative 1 (Table 10). The increase in water use would be expected to cause slight but detectable impacts on groundwater levels relative to Alternative 1. Therefore, Alternative 2 would have a low, adverse effect on groundwater relative to baseline conditions.

Catherine Creek Acclimation Facility, Upper Grande Ronde Acclimation Facility, Lostine Acclimation Facility, Imnaha Satellite Facility, Curl Lake Acclimation Pond, Little Sheep Creek Acclimation Facility, and Oxbow Hatchery

Catherine Creek Acclimation Facility, Upper Grande Ronde Acclimation Facility, Lostine Acclimation Facility, Imnaha Satellite Facility, Curl Lake Acclimation Pond, Little Sheep Creek Acclimation Facility, and Oxbow Hatchery use surface water exclusively. All water diverted from rivers (minus evaporation) is returned after it circulates through the facility, so the only segment of the river that may be impacted by the hatchery facility would be the area between the water intake and discharge structures (Subsection 3.2, Water Quantity).

Under Alternative 2, all of the acclimation and satellite facilities would operate, and between 5 and 15 cfs more water would be diverted from rivers and creeks between the water intake and discharge structures than under Alternative 1 (Table 10). Catherine Creek Acclimation Facility, Upper Grande Ronde Acclimation Facility, Imnaha Satellite Facility, and Curl Lake Acclimation Pond would divert less than 6 percent of surface water (Table 2), and the impact would be slight, but detectable. Therefore, Alternative 2 would be expected to have a low, adverse effect on surface water between the water intake and discharge structures during low-flow conditions relative to Alternative 1.

It is unknown what percentage of surface water is diverted to Little Sheep Creek Acclimation Facility because flow information is not available for Little Sheep Creek. Under Alternative 2, the Little Sheep Acclimation Facility would operate, and up to 8.9 cfs less water would remain in Little Sheep Creek between the intake and discharge structures relative to Alternative 1.

Under Alternative 2, roughly 15 cfs more water would be diverted from Oxbow Springs to the Oxbow Hatchery relative to Alternative 1. This would be expected to have a low, adverse effect on surface water between the intake and discharge structures relative to Alternative 1 because the impact would be slight but detectable.

Lookingglass Hatchery, Northeast Oregon Hatchery, Tucannon Hatchery, Wallowa Hatchery, and Bonneville Hatchery

Lookingglass Hatchery, Northeast Oregon Hatchery, Tucannon Hatchery, Wallowa Hatchery, and Bonneville Hatchery use both groundwater and surface water (Table 10). All surface water diverted (minus evaporation) is returned after it circulates through the facility. The only segment

of the rivers and creeks that may be impacted by the hatchery facilities would be the area between the water intake and discharge structures (Subsection 3.2, Water Quantity).

Under Alternative 2, the Wallowa, Tucannon, and Lookingglass Hatcheries would continue to operate. The Wallowa Hatchery would divert up to 0.2 percent of surface water during low-flow conditions (Table 2). Because the amount of water diverted is very low relative to the total amount of water in the Wallowa River, Alternative 2 would be expected to have a negligible effect on flow in the Wallowa River relative to Alternative 1. Under Alternative 2, the Wallowa Hatchery would use 0.15 cfs of groundwater (Table 10). Although the capacity of the aquifer has not been calculated, effects on groundwater levels would likely be at the lower level of detection. Therefore, Alternative 2 would be expected to have a negligible effect on groundwater levels relative to Alternative 1.

The Tucannon Hatchery diverts up to 5 percent of surface water available between the water intake and discharge structures during low-flow conditions to support the proposed hatchery programs (Table 2), so the effects of Alternative 2 would be medium and adverse relative to baseline Alternative 1 and may increase the long-term potential for impacts on fish and wildlife as a result of stream dewatering. Under Alternative 2, the Tucannon Hatchery would use 0.57 cfs more groundwater than under baseline conditions (Table 10). Although the capacity of the aquifer has not been calculated, effects on groundwater levels would likely be at the lower level of detection. Therefore, Alternative 2 would be expected to have a negligible effect on groundwater levels relative to Alternative 1.

The Lookingglass Hatchery diverts up to 94 percent of the water in Lookingglass Creek between the water intake and discharge structures during low-flow conditions (Table 2). Because the impact would be readily apparent, Alternative 2 would have a moderate, adverse effect on surface flow between the water intake and discharge structure relative to Alternative 1. Under Alternative 2, the Lookingglass Hatchery would use 5 cfs more groundwater than under Alternative 1 (Table 10). This increase in water use would be slight but detectable to groundwater levels. Therefore, Alternative 2 would have a low, adverse effect on groundwater relative to Alternative 1.

Under Alternative 2, Bonneville Hatchery would divert 0.58 cfs more surface water from Tanner Creek than under Alternative 1 to support the Upper Grande Ronde captive brood hatchery program (Table 10). The captive brood program would divert less than 1 percent of surface water during low-flow conditions (Table 2), which would be at the lower levels of detection, so Alternative 2 would be expected to have a negligible effect on flow in Tanner Creek relative to Alternative 1. Under Alternative 2, the Bonneville Hatchery would use 1.25 cfs more groundwater than under Alternative 1 (Table 2), which would be expected to have a negligible effect on groundwater levels.

Under Alternative 2, the Northeast Oregon Hatchery would use 16.7 cfs more surface water and 3.2 cfs more groundwater than under Alternative 1 (Table 10). Because the Northeast Oregon Hatchery would divert up to 36 percent of surface water between the intake and discharge structures during low-flow conditions (Table 2), the impact would be readily apparent. Therefore, Alternative 2 would have a moderate, adverse impact on surface water relative to

Alternative 1, which may increase impacts on fish and wildlife as a result of stream dewatering. Under Alternative 2, the Bonneville Hatchery would use 1.25 cfs less groundwater relative to baseline conditions (Table 2), which would be expected to have a negligible effect on groundwater levels because the change would be at the lower level of detection.

4.3. Effects on Water Quality

4.3.1. Alternative 1 (No Action) – Do Not Issue Section 10 Permits for the Continued Operation of the Eight Hatchery Programs

Under Alternative 1, eight northeast Oregon and southeast Washington hatchery programs would be terminated immediately (Subsection 2.1, Alternative 1). Consequently, there would be a short and long-term reduction in the discharge of ammonia, nutrients (e.g., nitrogen), biological oxygen demand, pH, suspended solids levels, antibiotics, fungicides, disinfectants, steroid hormones, pathogens, anesthetics, pesticides, and herbicides into Catherine Creek, Lookingglass Creek, Upper Grand Ronde River, Lostine River, Imnaha River, Snake River, Tucannon River, Little Sheep Creek, Columbia River, Wallowa River, and Tanner Creek relative to baseline conditions (Subsection 3.3, Water Quality). The effects of a reduction in the discharge of these substances would be slight because hatchery effluent is passed through pollution abatement ponds to settle out uneaten food and waste before being discharged into receiving waters (Subsection 3.3, Water Quality). However, because changes would be detectable in the immediate vicinity of the hatchery discharge structures, Alternative 1 would provide low, localized benefits to water quality relative to baseline conditions.

Alternative 1 would not be expected to change any of the 303(d) lists because the contribution of substances from these programs is very small relative to the contribution of these substances within the analysis area from activities such as livestock grazing, farming, forestry, and road building (Subsection 3.3, Water Quality). Relatively pristine conditions in the Imnaha, Grande Ronde, and Tucannon River basin headwater areas would remain unchanged under Alternative 1, as would ongoing lowland degradation to riparian areas and stream channels.

Because water quality would be expected to improve in both the short and long term, there would be no change in compliance with applicable NPDES permits or tribal wastewater plans at the hatchery facilities relative to baseline conditions at the Lyons Ferry, Irrigon, Oxbow, and Bonneville Hatcheries relative to baseline conditions. These facilities use between 15 and 50 percent of their capacity to raise fish for the eight northeast Oregon and southeast Washington hatchery programs and would continue to operate under Alternative 1 (Table 2). Because the remaining facilities that support these hatchery programs raise fish for the eight northeast Oregon and southeast Washington hatchery programs exclusively (Table 2), they would close under Alternative 1, and NPDES or tribal wastewater plans would no longer be necessary or applicable.

4.3.2. Alternative 2 (Proposed Action) – Issue Section 10 Permits for the Continued Operation of the Eight Hatchery Programs

Under Alternative 2, eight northeast Oregon and southeast Washington hatchery programs would operate as proposed in submitted HGMPs (Subsection 2.2, Alternative 2). Consequently, there would be a short and long-term increase in the discharge of ammonia, nutrients (e.g., nitrogen),

biological oxygen demand, pH, suspended solids levels, antibiotics, fungicides, disinfectants, steroid hormones, pathogens, anesthetics, pesticides, and herbicides into Catherine Creek, Lookingglass Creek, Upper Grand Ronde River, Lostine River, Imnaha River, Snake River, Tucannon River, Little Sheep Creek, Columbia River, Wallowa River, and Tanner Creek relative to Alternative 1. The effects of an increase in the discharge of these substances would be slight because hatchery effluent would be passed through pollution abatement ponds to settle out uneaten food and waste before being discharged into receiving waters (Subsection 3.3, Water Quality). However, because changes would be detectable in the immediate vicinity of the hatchery discharge structures, Alternative 2 would provide low, localized adverse impacts on water quality relative to Alternative 1.

Alternative 2 would not be expected to change any of the 303(d) lists relative to Alternative 1 because the contribution of substances from these hatchery programs would be very small relative to the contribution of substances from activities such as livestock grazing, farming, forestry, and road building (Subsection 3.3, Water Quality). Relatively pristine conditions in the Imnaha, Grande Ronde, and Tucannon River basin headwater areas would remain unchanged under Alternative 2 relative to Alternative 1, as would ongoing lowland degradation to riparian areas and stream channels.

Although there would be low, localized adverse impacts on water quality relative to Alternative 1, there would be no change in compliance with applicable NPDES permits or tribal wastewater plans at the hatchery facilities relative to Alternative 1 because production levels would fall within the limits of existing permits or plans (Subsection 3.3, Water Quality).

4.4. Effects on Fish Listed Under the ESA

4.4.1. Alternative 1 (No Action) – Do Not Issue Section 10 Permits for the Continued Operation of the Eight Hatchery Programs

Under Alternative 1, eight northeast Oregon and southeast Washington hatchery programs would be terminated immediately (Subsection 2.1, Alternative 1). Consequently, Alternative 1 would eliminate short- and long-term risks associated with genetic effects, competition and predation, facility effects, natural population status masking, incidental fishing effects, or disease transfer from the hatchery programs. These risks would, therefore, be lower than under baseline conditions and benefit Snake River spring/summer Chinook salmon, steelhead, and fall Chinook salmon relative to baseline conditions. However, Alternative 1 would also eliminate the benefits from the hatchery programs on population viability and nutrient cycling, which would adversely affect Snake River spring/summer Chinook salmon, steelhead, and fall Chinook salmon relative to baseline conditions (Table 4) (Subsection 3.4, Fish Listed under the ESA). Any effects in the mainstem migration corridor and estuary would be reduced because there would be slightly fewer fish outmigrating relative to baseline conditions. Under baseline conditions, adverse effects associated with monitoring and evaluation activities would be low for the following reasons: (1) the mortality rate for capture, tagging, and release is low (less than 1 percent) (B. Farman, pers. comm., April 22, 2013) and (2) a small proportion of the total number of smolts are intercepted during monitoring and evaluation activities. Any adverse effects associated with monitoring and evaluation (e.g., handling mortalities) would be reduced relative to baseline conditions because all monitoring and evaluation activities specifically tied to hatchery programs

would be terminated. Monitoring and evaluation activities to monitor status of the natural-origin population would likely continue but at a reduced level. Species-specific effects of Alternative 1 are discussed below. Effects of Alternative 1 on critical and essential fish habitat of listed fish species are discussed in Subsection 4.6, Effects on Instream Fish Habitat.

Snake River Spring/Summer Chinook Salmon

Because all seven of the spring/summer Chinook populations in the analysis area are at high risk of extinction because of very low abundance and productivity, terminating the hatchery programs that supplement these populations would be expected to increase the extinction risk of the Lostine/Wallowa, Catherine Creek, Upper Grande Ronde, Imnaha, and Tucannon spring/summer Chinook salmon populations relative to baseline conditions. Because there are less than 80 natural-origin fish in Catherine Creek and the Upper Grande Ronde River under baseline conditions (Table 5), closing the hatchery programs that supplement these populations would increase their extinction risk (Subsection 3.4, Fish Listed under the ESA).

Snake River Basin Steelhead

The overall viability ratings for steelhead populations in the analysis area range from highly viable to high risk, with a great level of uncertainty (Table 6). Alternative 1 would terminate the Tucannon River and Little Sheep Creek hatchery programs, which would reduce the total number of steelhead spawners in the Tucannon and Imnaha River populations relative to baseline conditions. It is unclear whether reducing the number of steelhead spawners in these two populations would impact abundance/productivity risk or the overall viability rating of the Tucannon and Imnaha River populations because their current status is uncertain. However, because Alternative 1 would only reduce the supplementation of two of the 24 populations in the DPS, the overall abundance trend for the DPS would not likely change relative to baseline conditions (Subsection 3.4.2, Snake River Basin Steelhead DPS).

Snake River Fall-run Chinook Salmon

The Snake River fall Chinook salmon population has a moderate level of risk associated with its abundance, productivity, spatial structure, diversity (Subsection 3.4.3, Snake River Fall-run Chinook Salmon). Alternative 1 would not change the percent of historical range remaining in this ESU or the number of hatchery-origin fall Chinook salmon relative to baseline conditions, but it would reduce the total number of salmon and steelhead in the analysis area, which may reduce competition for food and space and increase survival rates for Snake River fall Chinook salmon. However, because Alternative 1 would only reduce the total number of Columbia River salmon and steelhead by less than 1 percent, Alternative 1 would not be expected to change risk levels or the recent short-term trend in natural-origin spawners relative to baseline conditions.

Columbia River Bull Trout

Bull trout are a substantial predator of juvenile salmon and steelhead (Subsection 3.4.4, Columbia River Bull Trout). Alternative 1 would reduce the total number of juvenile salmon and steelhead in the analysis area, which would reduce the availability of food for adult bull trout relative to baseline conditions. However, because juvenile bull trout compete with juvenile

salmon and steelhead (Subsection 3.4.4, Columbia River Bull Trout), juvenile bull trout may benefit under Alternative 1 relative to baseline conditions. However, because (1) Alternative 1 would reduce the number of Columbia River salmon and steelhead by less than 1 percent, and (2) the three bull trout recovery units within the analysis area represent~~s~~ a small portion of the overall range of the ESA-listed bull trout DPS, Alternative 1 would not be expected to impact the overall distribution or status of the species.

THE FOLLOWING IS NEW TEXT FROM THE DRAFT ENVIRONMENTAL ASSESSMENT

4.4.2. Alternative 2 (Proposed Action) – Issue Section 10 Permits for the Continued Operation of the Eight Hatchery Programs

Under Alternative 2, eight northeast Oregon and southeast Washington hatchery programs would operate as proposed in submitted HGMPs (Subsection 2.2, Alternative 2).

- Genetic risks associated with the proposed hatchery programs would increase under Alternative 2 relative to Alternative 1 since the hatchery programs would not operate under Alternative 1. However, under Alternative 2, impacts would be low for the following reasons: (1) hatchery managers would use native fish stocks, (2) hatchery managers would manage the proportion of both hatchery- and natural-origin fish in broodstock and in the wild according to annual abundance of the natural-origin population, (3) hatchery managers would collect adults in a manner that maintains population structure and run timing, and (4) hatchery managers would select broodstock and use mating protocols intended to mimic natural mating proportions, (5) hatchery managers would acclimate fish prior to release would reduce the potential for interaction of these fish with other fish of the same species (Rosenberger et al. 2013; Quinn 1997). Population monitoring would be used to adjust program management if genetic risks increase over time.

- Competition and predation risks associated with the proposed hatchery programs would increase under Alternative 2 relative to Alternative 1 since the hatchery programs would not operate under Alternative 1. However, under Alternative 2, competition and predation risks would be low ~~minimized~~ because hatchery managers reduce overlap between species by (1) release fish volitionally (rather than forced releases) so that the majority of fish are fully smolted and thus actively outmigrating from the system, and (2) releasing fish in areas predominantly used by the same species, with the intent to minimize species overlap that could lead to interspecies competition and predation.

- Facility effects associated with the proposed hatchery programs would increase under Alternative 2 relative to Alternative 1 since the hatchery programs would not operate under Alternative 1. However, under Alternative 2, facility effects would be low because (1) water intakes would be properly screened, (2) water would be used non-consumptively by returning surface water to the source from which it was removed, (3) each hatchery programs would comply with National Pollutant Discharge Elimination System criteria under the Clean Water Act for any discharge into surface waters, and (4) weirs would be adequately staffed so that fish would not remain in the

traps for extended periods of time, minimizing stress on the fish and the potential for incidental mortality. Hatchery managers would monitor the weirs to ensure they did not lead to any changes in spawning distribution.

- Like under Alternative 1, there would be no masking effects under Alternative 2 because 100 percent of the hatchery-origin releases would be marked or tagged such that they are identifiable as hatchery-produced.

- Disease risks associated with the proposed hatchery programs would increase under Alternative 2 relative to Alternative 1 since the hatchery programs would not operate under Alternative 1. However, under Alternative 2, disease transfer risks would be low because: (1) adults used in broodstock would be screened for disease and diseased eggs would be culled to minimize vertical transfer of disease from parent to offspring, (2) regular health exams would be performed on all juveniles in the hatchery, (3) juveniles would be reared in densities and flows designed to reduce stress and disease susceptibility, (4) protocols would be used to minimize transfer of disease between raceways, and (5) hatchery managers would adhere to disease protocols if disease was detected.

- Nutrient cycling benefits associated with the proposed hatchery programs would increase under Alternative 2 relative to Alternative 1 since the hatchery programs would not operate under Alternative 1. Nutrient cycling benefits would be low and result from increasing the abundance of adult returns that deliver marine-derived nutrients into interior freshwater systems.

Any adverse effects associated with monitoring (e.g., handling mortalities) and evaluation of the hatchery programs would increase under Alternative 2 relative to Alternative 1 since these monitoring and evaluation activities would not occur under Alternative 1 (i.e., there would be no adverse effects associated with monitoring and evaluation of the proposed hatchery programs under Alternative 1). Impacts from proposed monitoring and evaluation activities would be low under Alternative 2 for the following reasons:

1. The mortality rate for capture, tagging, and release is low (less than 1 percent) (B. Farman, pers. comm. April 22, 2013).

2. A small proportion of the total number of smolts are intercepted during monitoring and evaluation activities.

Best management practices used in the proposed hatchery programs would minimize impacts on salmon, steelhead, and bull trout in the analysis area. Because the proposed programs are only supplementing spring/summer Chinook salmon and steelhead, genetic risks would only be a concern for these species. That is, the proposed program could not affect the genetics of fall-run Chinook salmon or bull trout because steelhead and spring/summer Chinook salmon do not interbreed with these species. Species-specific summaries of the effects of Alternative 2 on population viability are discussed below. Effects of Alternative 2 on critical and essential fish habitat of listed fish species are discussed in Subsection 4.6, Effects on Instream Fish Habitat.

END OF NEW TEXT

~~Under Alternative 2, eight northeast Oregon and southeast Washington hatchery programs would operate as proposed in submitted HGMPs (Subsection 2.2, Alternative 2). Table 4 lists the various effects through which the hatchery programs could affect natural-origin salmon and steelhead populations. The proposed hatchery programs would use best management practices to minimize all potentially adverse effects:~~

- ~~Genetic risks would be minimized by using native fish stocks, managing proportions of both hatchery- and natural-origin fish in broodstock and in the wild according to annual abundance of the natural-origin population, by collecting adults in a manner that maintain population structure and run timing, and selecting broodstock and mating protocols intended to mimic natural mating proportions. Additionally, population monitoring would be used to adjust program management if genetic risks increase over time.~~

- ~~Competition and predation risks would be minimized by acclimating hatchery-origin fish prior to release, and releasing fish volitionally (rather than forced releases) so that the majority of fish are fully smolted and thus actively outmigrating from the system. Hatchery-origin fish would also be released in areas predominantly used by the same species, with the intent to minimize species overlap that could increase interspecies competition and predation.~~

- ~~Facility effects would be minimized by properly screening water intakes, using water non-consumptively by returning surface water to the source from which it was removed, complying with National Pollutant Discharge Elimination System criteria under the Clean Water Act for any discharge into surface waters, and maintaining weirs used for broodstock collection, including adequate staffing of the weirs.~~

- ~~Masking effects would be minimized by marking or tagging 100 percent of the hatchery-origin releases such that they are identifiable as hatchery-produced.~~

- ~~Disease transfer risks would be minimized by screening adults used in broodstock for disease and culling diseased eggs to minimize vertical transfer of disease from parent to offspring, performing regular health exams of juveniles in the hatchery, rearing juveniles in densities and flows designed to reduce stress and disease susceptibility, using protocols that minimize transfer of disease between raceways, and using treatment protocols if disease is detected.~~

- ~~Nutrient cycling benefits would occur from increasing the abundance of adult returns that deliver marine-derived nutrients into interior freshwater systems.~~

~~Any adverse effects associated with monitoring (e.g., handling mortalities) and evaluation of the hatchery programs would increase under Alternative 2 relative to Alternative 1 since these monitoring and evaluation activities would not occur under Alternative 1. However, impacts would be low for the following reasons:~~

1. ~~The mortality rate for capture, tagging, and release is low (less than 1 percent) (B. Farman, pers. comm. April 22, 2013).~~

2. ~~A small proportion of the total number of smolts are intercepted during monitoring and evaluation activities.~~

3. ~~Only a small proportion of the smolts intercepted during monitoring and evaluation activities would be tagged.~~

~~Best management practices used in the proposed hatchery programs would minimize impacts on salmon, steelhead, and bull trout in the analysis area. Because the proposed programs are only supplementing spring/summer Chinook salmon and steelhead, genetic risks would only be a concern for these species. That is, the proposed program could not affect the genetics of fall-run Chinook salmon or bull trout because steelhead and spring/summer Chinook salmon do not interbreed with these species. Species-specific summaries of the effects of Alternative 2 on population viability are discussed below. Effects of Alternative 2 on critical and essential fish habitat of listed fish species are discussed in Subsection 4.5, Effects on Instream Fish Habitat.~~

Snake River Spring/Summer Chinook Salmon

Population performance can be measured using parameters described in Viable Salmonid Populations and the recovery of Evolutionarily Significant Units (VSP criteria) (McElhany et al. 2000), which include abundance, productivity, spatial structure, and diversity. Because all seven of the spring/summer Chinook populations in the analysis area are at high risk of extinction because of very low abundance and productivity, operating hatchery programs that supplement these populations would be expected to increase abundance, and thus decrease the extinction risk of the Lostine/Wallowa, Catherine Creek, Upper Grande Ronde, Imnaha, and Tucannon spring/summer Chinook salmon populations relative to Alternative 1. Because there are fewer than 80 natural-origin fish in the Catherine Creek and Upper Grande Ronde River populations under baseline conditions (Table 5), operating the hatchery programs would substantially reduce the extinction risk of these particular populations in the short term. Benefits to population viability would, therefore, be greater under Alternative 2 than under Alternative 1. Productivity of each population may increase under Alternative 2 within the hatchery because of within-hatchery survival advantages, though productivity of the natural population may either increase or decrease based on the availability of habitat and the abundance of hatchery-origin fish allowed to contribute to the natural population. Sliding-scale management and population trend monitoring would minimize the impact, either positive or negative, of the hatchery programs on productivity. Spatial structure would be maintained by capture of adults and release of juveniles within areas where natural production would occur. Diversity would be maintained by the programs through collection of broodstock across the run, integration of natural-origin adults into the broodstock, and selection of mating pairs in a manner that mimics natural spawning. Abundance would likely increase under Alternative 2, as compared to Alternative 1; however,

impacts on VSP criteria from implementation of Alternative 2 would be small, generally positive, and with low potential for minor negative impacts.

Snake River Basin Steelhead

As with spring/summer Chinook salmon, steelhead population performance can be measured using parameters described in Viable Salmonid Populations and the recovery of Evolutionarily Significant Units (VSP criteria) (McElhany et al. 2000), which include abundance, productivity, spatial structure, and diversity. The overall viability ratings for steelhead populations in the analysis area range from highly viable to high risk, with a great level of uncertainty (Table 6). Under Alternative 2, the Tucannon River and Little Sheep Creek hatchery programs would operate as described in their submitted HGMPs, which would increase the total abundance of steelhead, and thus decrease the extinction risk of the Tucannon and Imnaha River populations relative to Alternative 1. ~~Productivity of each population might increase under Alternative 2 within the hatchery because of within-hatchery survival advantages, though productivity of the natural population may either increase or decrease based on the availability of habitat and the abundance of hatchery-origin fish allowed to contribute to the natural population.~~ Adult collection protocols at the weir and population trend monitoring would help minimize the impact, either positive or negative, of the hatchery programs on productivity. Spatial structure would be maintained by capture of adults and release of juveniles within areas where natural production would occur. Diversity would be maintained by the programs through collection of broodstock across the run, integration of natural-origin adults into the broodstock, and selection of mating pairs in a manner that mimics natural spawning. Overall, impacts on VSP criteria from implementation of Alternative 2 would be small, generally positive, and with low potential for minor negative impacts. It is unclear whether increasing the number of steelhead spawners in these two populations would impact abundance/productivity risk or the overall viability rating of the Tucannon and Imnaha River populations because their current status is uncertain. However, because Alternative 2 would only increase the supplementation of two of the 24 populations in the DPS relative to Alternative 1, the overall abundance trend for the DPS would not likely change relative to Alternative 1.

Snake River Fall-run Chinook Salmon

Currently, the Snake River fall Chinook salmon population has a moderate level of risk associated with its abundance, productivity, spatial structure, and diversity (Subsection 3.4.3, Snake River Fall-run Chinook Salmon). There is limited overlap of spawning habitat between spring/summer and fall Chinook salmon in the action area, and broodstock collection under Alternative 2 would not be expected to impact fall Chinook salmon. Alternative 2 would not change the percent of historical range remaining in this ESU or number of hatchery-origin fall Chinook salmon relative to Alternative 1. Alternative 2 would increase the total number of salmon and steelhead in the analysis area by almost 2 million juvenile fish relative to Alternative 1, which may increase competition for food and space relative to Alternative 1 and reduce survival rates for Snake River fall Chinook salmon. However, Alternative 2 would not change production levels relative to baseline conditions, so competition would be similar as under baseline conditions and there would be no expected change in survival rates compared to baseline conditions. ~~because Alternative 1 would only reduce the total number of Columbia River salmon and steelhead by less than 1 percent, Alternative 1 would not be expected to~~

~~change risk levels or the recent short-term trend in natural-origin spawners relative to Alternative 1.~~ Overall, impacts on VSP criteria from implementation of Alternative 2 would be too small to measure.

Columbia River Bull Trout

Bull trout are a substantial predator of juvenile salmon and steelhead (Subsection 3.4.4, Columbia River Bull Trout). Alternative 2 would increase the total number of juvenile salmon and steelhead in the analysis area, which would increase the availability of food for adult bull trout relative to Alternative 1. However, because juvenile bull trout compete with juvenile salmon and steelhead (Subsection 3.4.4, Columbia River Bull Trout), juvenile bull trout may be adversely affected under Alternative 2 relative to Alternative 1. However, as under Alternative 1, because (1) Alternative 2 would increase the number of Columbia River salmon and steelhead by less than 1 percent, and (2) the three bull trout recovery units within the analysis area represent a small portion of the overall range of the ESA-listed bull trout DPS, Alternative 2 would not be expected to impact the overall distribution or status of the species.

4.5. Effects on Fish Not Listed Under the ESA

4.5.1. Alternative 1 (No Action) – Do Not Issue Section 10 Permits for the Continued Operation of the Eight Hatchery Programs

Under Alternative 1, eight northeast Oregon and southeast Washington hatchery programs would be terminated immediately (Subsection 2.1, Alternative 1). Consequently, Alternative 1 would reduce the number of juvenile and salmon and steelhead in the Tucannon, Grande Ronde, and Imnaha River Basins relative to baseline conditions, which would reduce competition for space and food among freshwater species relative to baseline conditions (Subsection 3.5, Fish Not Listed Under the ESA). Similarly, reducing the number of adult salmon and steelhead in the Tucannon, Grande Ronde, and Imnaha River Basins would reduce the number of predators (i.e., salmon and steelhead) on lamprey, margined sculpin, trout, rockfish, and forage fish relative to baseline conditions (Subsection 3.5, Fish Not Listed under the ESA). Additionally, Alternative 1 would reduce the number of carcasses in the Tucannon, Grande Ronde, and Imnaha River Basins relative to baseline conditions, which would reduce the amount of marine-derived nutrients and have a low, adverse impact on all freshwater fish species.

Lamprey, margined sculpin, northern pikeminnow, trout, and rockfish are known to feed on salmon species (Subsection 3.5, Fish Not Listed under the ESA). However, because Alternative 1 would reduce the number of salmon and steelhead produced in the Columbia River Basin by less than 1 percent, and because none of these species feed exclusively on salmon, Alternative 1 would be expected to have an undetectable effect on lamprey, margined sculpin, northern pikeminnow, trout, and rockfish distribution or survival.

Alternative 1 would not be expected to change any state or federal species designations relative to baseline conditions because (1) the analysis area is only a small portion of each species range (Subsection 3.5, Fish Not Listed under the ESA), (2) Alternative 1 would reduce the number of hatchery-origin salmon and steelhead in the Columbia River Basin by less than 1 percent, and (3) Salmon and steelhead are not exclusive predators or prey for any of the fish species.

Effects of Alternative 1 on the habitat of non-listed fish species are discussed in Subsection 4.6, Effects on Instream Fish Habitat.

4.5.2. Alternative 2 (Proposed Action) – Issue Section 10 Permits for the Continued Operation of the Eight Hatchery Programs

Under Alternative 2, eight northeast Oregon and southeast Washington hatchery programs would operate as proposed in submitted HGMPs (Subsection 2.2, Alternative 2). Consequently, Alternative 2 would increase the number of juvenile and salmon and steelhead in the Tucannon, Grande Ronde, and Imnaha River Basins, which would increase competition for space and food among freshwater species relative to Alternative 1 (Subsection 3.5, Fish Not Listed under the ESA). Similarly, increasing the number of adult salmon and steelhead in the Tucannon, Grande Ronde, and Imnaha River Basins would increase the number of predators on lamprey, margined sculpin, trout, rockfish, and forage fish relative to baseline conditions (Subsection 3.5, Fish Not Listed under the ESA). Additionally, Alternative 2 would increase the number of carcasses in the Tucannon, Grande Ronde, and Imnaha River Basins relative to Alternative 1, which would increase the amount of marine-derived nutrients and have a low, beneficial impact on all freshwater fish species relative to Alternative 1.

Lamprey, margined sculpin, northern pikeminnow, trout, and rockfish are known to feed on salmon species (Subsection 3.5, Fish Not Listed under the ESA). However, because Alternative 2 would increase the number of salmon and steelhead produced in the Columbia River Basin by less than 1 percent relative to Alternative 1, and because none of these species feed exclusively on salmon, Alternative 2 would be expected to have an undetectable effect on lamprey, margined sculpin, northern pikeminnow, trout, and rockfish distribution or survival.

Alternative 2 would not be expected to change any state or federal species designations relative to Alternative 1 because (1) the analysis area is only a small portion of each species range (Subsection 3.5, Fish Not Listed under the ESA), (2) Alternative 2 would increase the number of hatchery-origin salmon and steelhead in the Columbia River Basin by less than 1 percent, and (3) Salmon and steelhead are not exclusive predators or prey for any of the fish species.

The proposed hatchery programs would not result in the introduction or spread of a non-indigenous species because the action considered in this environmental assessment is limited to production of salmon and steelhead, which are indigenous to the Grande Ronde and Imnaha River basins. Though some non-indigenous fish species may benefit from the additional prey available from the hatchery-production, the programs would not introduce new species or expand their current range. Any additional effects of Alternative 2 on the habitat of non-listed fish species are discussed in Subsection 4.6, Effects on Instream Fish Habitat.

4.6. Effects on Instream Fish Habitat

Water quantity and water quality effects associated with Alternative 1 and Alternative 2 are analyzed under Subsection 4.2 (Effects on Water Quantity) and Subsection 4.3 (Effects on Water Quality), respectively.

4.6.1. Alternative 1 (No Action) – Do Not Issue Section 10 Permits for the Continued Operation of the Eight Hatchery Programs

Under Alternative 1, eight northeast Oregon and southeast Washington hatchery programs would be terminated immediately (Subsection 2.1, Alternative 1). Seven of the hatchery facilities that support these hatchery programs would close, but six hatchery facilities (Irrigon Hatchery, Wallowa Hatchery, Oxbow Hatchery, Tucannon Hatchery, Lyons Ferry Hatchery, and Bonneville Hatchery) would continue to operate since these facilities are also used to support hatchery programs that are not part of the Proposed Action. Therefore, there would be no need to withdrawal water, operate instream structures (e.g., fish ladders), or maintain instream structures at these facilities. As a result, relative to baseline conditions, Alternative 1 would (1) increase the amount of water in 10 streams and rivers between the water intake and discharge structures[6], which would increase fish habitat and reduce any fish displacement, (2) reduce biological risks associated with weirs or water intake structures, and (3) reduce sedimentation that may result from protecting banks from erosions or clearing debris from the water intake structures (Subsection 3.6, Instream Fish Habitat).

As described in Subsection 3.5, Fish Listed under the ESA, critical and essential fish habitat for Snake River salmon and steelhead includes stream reaches where the hatchery facilities are located. Essential features of their habitat include adequate substrate (especially spawning gravel), water quality, water quantity, water temperature, water velocity, cover/shelter, food, riparian vegetation, space, and suitable migration conditions. Alternative 1 would provide some benefits to water quality and water quantity relative to baseline conditions (Subsection 4.3, Effects on Water Quality; Subsection 4.2, Effects on Water Quantity). Alternative 1 would also reduce competition for space and food relative to baseline conditions (Subsection 4.4, Effects on Fish Listed under the ESA). No other habitat features would be affected by Alternative 1.

4.6.2. Alternative 2 (Proposed Action) – Issue Section 10 Permits for the Continued Operation of the Eight Hatchery Programs

Under Alternative 2, eight northeast Oregon and southeast Washington hatchery programs would operate as proposed in submitted HGMPs (Subsection 2.2, Alternative 2). Consequently, there would be an increase in water withdrawal, the use of instream structures (e.g., fish ladders), and the maintenance of instream structures relative to Alternative 1. As a result, relative to Alternative 1, Alternative 2 would (1) decrease the amount of water in 10 streams and rivers

[6] Alternative 1 would increase the amount of water between that water intake and discharge structures at facilities located on Catherine Creek, Lookingglass Creek, Upper Grande Ronde River, Lostine River, Imnaha River, Tucannon River, Little Sheep Creek, Wallowa River, Columbia River, and Tanner Creek (Subsection 4.2, Effects on Water Quantity) (Table 2).

between the water intake and discharge structures[7], which would reduce fish habitat for rearing and may increase fish displacement; (2) increase biological risks associated with weirs or water intake structures; and (3) increase sedimentation that may result from protecting banks from erosions or clearing debris from the water intake structures (Subsection 3.6, Instream Fish Habitat).

As described in Subsection 3.4, Fish Listed under the ESA, critical and essential fish habitat for Snake River salmon and steelhead includes stream reaches where the hatchery facilities are located. Essential features of their habitat include adequate substrate (especially spawning gravel), water quality, water quantity, water temperature, water velocity, cover/shelter, food, riparian vegetation, space, and suitable migration conditions. Alternative 2 would have some adverse effects on water quantity and water quality relative to Alternative 1 (Subsection 4.2, Effects on Water Quantity; Subsection 4.3, Effects on Water Quality). Alternative 2 would also increase competition for space and food relative to Alternative 1 (Subsection 4.4, Effects on Fish Listed under the ESA). As under Alternative 1, no other habitat features would be affected by Alternative 2.

4.7. Effects on Wildlife and Marine Mammals

4.7.1. Alternative 1 (No Action) – Do Not Issue Section 10 Permits for the Continued Operation of the Eight Hatchery Programs

Under Alternative 1, eight northeast Oregon and southeast Washington hatchery programs would be terminated immediately (Subsection 2.1, Alternative 1). Consequently, relative to baseline conditions, fewer spring/summer Chinook salmon and steelhead (juvenile and adult) would be available as a food source for predators and scavengers that use salmon as a food source, including federally listed grizzly bear, Steller sea lion, and southern resident killer whale (Subsection 3.7, Wildlife and Marine Mammals).

Steller sea lions and California sea lions are known to feed on returning adult salmon in the Columbia River Basin downstream of Bonneville Dam and are likely eating hatchery-origin fish from the eight northeast Oregon and southeast Washington hatchery programs. (Subsection 3.7, Wildlife and Marine Mammals). Consequently, Alternative 1 would reduce the number of salmon and steelhead available to Steller sea lions and California sea lions in the vicinity downstream of Bonneville Dam. However, because Alternative 1 would only lead to a small reduction in the total number of salmon and steelhead migrating past Bonneville Dam while the sea lions present, Alternative 1 is not expected to change sea lion diet, survival, or distribution relative to baseline conditions.

Southern resident killer whales also feed on adult salmon, and prefer Chinook salmon. However, because southern resident killer whales have limited spatial overlap with Snake River spring/summer Chinook salmon, few Snake River Chinook salmon are likely to be eaten by

[7] Alternative 2 would reduce the amount of water between that water intake and discharge structures at facilities located on Catherine Creek, Lookingglass Creek, Upper Grande Ronde River, Lostine River, Imnaha River, Tucannon River, Little Sheep Creek, Wallowa River, Columbia River, and Tanner Creek (Subsection 4.2, Effects on Water Quantity)(Table 3).

southern resident killer whales (Subsection 3.7, Wildlife and Marine Mammals). Consequently, Alternative 1 would not be expected to change the diet, survival, or distribution of southern resident killer whales relative to baseline conditions.

Alternative 1 would reduce the number of juvenile salmon and steelhead available as a food source for Caspian terns, cormorants, and other bird populations in the analysis area that traditionally feed on juvenile salmon (Subsection 3.7, Wildlife and Marine Mammals). However, because Alternative 1 would reduce the total number juvenile hatchery-origin salmon and steelhead by less than 1 percent, it would not be expected to change the diet, survival, or distribution of Caspian terns, cormorants, or other bird populations relative to baseline conditions.

Habitat disruption may occur from physical damage or disruption by anglers targeting hatchery-origin spring/summer Chinook salmon and steelhead. There is some potential for these activities to displace wildlife that may be in the area. Habitat impacts from fishing activities are usually localized and short-lived and are currently occurring related to ongoing fisheries in the analysis area. Additionally, fishery access points, roads, boat launches, and campsites are already present in the analysis area.

Alternative 1 would reduce the number of summer/spring Chinook salmon and steelhead available for harvest in northeast Oregon and southeast Washington relative to baseline conditions. However, fishing for other fish species would still occur in the analysis area (e.g., trout), and there would be no change in fishery access points, roads, boat launches, and campsites in the analysis area relative to baseline conditions. Therefore, Alternative 1 would not be expected to change impacts on wildlife from fishing activities relative to baseline conditions.

4.7.2. Alternative 2 (Proposed Action) – Issue Section 10 Permits for the Continued Operation of the Eight Hatchery Programs

Under Alternative 2, eight northeast Oregon and southeast Washington hatchery programs would operate as proposed in submitted HGMPs (Subsection 2.2, Alternative 2). Consequently, relative to Alternative 1, more spring/summer Chinook salmon and steelhead (juvenile and adult) would be available as a food source for predators and scavengers that use salmon as a food source, including federally listed grizzly bear, Steller sea lion, and southern resident killer whale (Subsection 3.7, Wildlife and Marine Mammals).

Steller sea lions and California sea lions are known to feed on returning adult salmon in the Columbia River Basin downstream of Bonneville Dam and are likely eating hatchery-origin fish from the eight northeast Oregon and southeast Washington hatchery programs. (Subsection 3.7, Wildlife and Marine Mammals). Consequently, Alternative 2 would increase the number of salmon and steelhead available to Steller sea lions and California sea lions in the vicinity downstream of Bonneville Dam. However, because Alternative 2 would only lead to a small increase in the total number of salmon and steelhead migrating past Bonneville Dam while the sea lions present, Alternative 2 is not expected to change sea lion diet, survival, or distribution relative to Alternative 1.

Southern resident killer whales also feed on adult salmon, and prefer Chinook salmon. However, because southern resident killer whales have limited spatial overlap with Snake River spring/summer Chinook salmon, few Snake River Chinook salmon are likely to be eaten by southern resident killer whales (Subsection 3.7, Wildlife and Marine Mammals). Consequently, Alternative 2 would not be expected to change the diet, survival, or distribution of southern resident killer whales relative to Alternative 1.

Unlike Alternative 1, Alternative 2 would increase the number of juvenile salmon and steelhead available as a food source for bird populations. However, because Alternative 2 would increase the total number of juvenile hatchery-origin salmon and steelhead by less than 1 percent, it would not be expected to change the diet, survival, or distribution of Caspian terns, cormorants, or other bird populations relative to Alternative 1.

As under Alternative 1, habitat disruption may occur from physical damage or disruption by anglers targeting hatchery-origin spring/summer Chinook salmon and steelhead. There is some potential for these activities to displace wildlife that may be in the area. Habitat impacts from fishing activities are usually localized and short-lived and are currently occurring related to ongoing fisheries in the analysis area. Additionally, fishery access points, roads, boat launches, and campsites are already present in the analysis area.

Alternative 2 would increase the number of summer/spring Chinook salmon and steelhead available for harvest in northeast Oregon and southeast Washington relative to Alternative 1. However, fishing for other fish species would still occur in the analysis area (e.g., trout), and there would be no change in fishery access points, roads, boat launches, and campsites in the analysis area relative to Alternative 1. Therefore, Alternative 2 would not be expected to change impacts on wildlife from fishing activities relative to Alternative 1.

4.8. Effects on Socioeconomics

4.8.1. Alternative 1 (No Action) – Do Not Issue Section 10 Permits for the Continued Operation of the Eight Hatchery Programs

Under Alternative 1, eight northeast Oregon and southeast Washington hatchery programs would be terminated immediately (Subsection 2.1, Alternative 1). Seven of the hatchery facilities that support these hatchery programs would close, but six hatchery facilities (Irrigon Hatchery, Wallowa Hatchery, Oxbow Hatchery, Tucannon Hatchery, Lyons Ferry Hatchery, and Bonneville Hatchery) would continue to operate since these facilities are used primarily to support hatchery programs that are not part of the Proposed Action. These programs directly employ 49 full-time employees and 18 seasonal employees (Subsection 3.8, Socioeconomics), and these jobs would be lost under Alternative 1. Additionally, the hatchery programs would no longer procure local goods and services, which contribute to personal income or jobs in the lower Snake River regional economy. NMFS (2010b) found that Columbia River Basin hatchery operations and associated harvest on average contributed over $10 million in personal income and 414 jobs to the lower Snake River regional economy between 2002 and 2006 (Subsection 3.8, Socioeconomics).

Alternative 1 would reduce the number of summer/spring Chinook salmon and steelhead available for non-tribal, recreational harvest in northeast Oregon and southeast Washington relative to baseline conditions. No new fisheries targeting hatchery-origin spring Chinook salmon would be initiated in the Tucannon or lower Grande Ronde Rivers. A loss of fishing opportunities under Alternative 1 would reduce the local purchase of supplies such as fishing gear, camping equipment, consumables, and fuel at local businesses, which would adversely impact local businesses, although it is unknown how dependent these businesses are on fishing-related expenditures (Subsection 3.8, Socioeconomics). Additionally, fewer anglers would contribute to the economy through outfitter/guide/charter fees relative to baseline conditions.

Because fishing-related expenditures are a very small percentage of total state revenue (less than 1 percent), Alternative 1 would not be expected to affect total state revenue relative to baseline conditions (Subsection 3.8, Socioeconomics). However, because fishing for salmon and steelhead can contribute substantially to local economies in Northeast Oregon and Southeast Washington (Subsection 3.8, Socioeconomics). Alternative 1 may have medium adverse effects on local economies in northeast Oregon and southwest Washington relative to baseline conditions.

Tribal fisheries would also be adversely impacted by Alternative 1 relative to baseline conditions since natural resources have been the mainstay of the economies of the Native Americans in the Columbia River Basin (Subsection 3.8, Socioeconomics). Alternative 1 would reduce the number of salmon and steelhead available to tribal members as a food source from fish that escape the ocean and Columbia River fisheries (Subsection 3.8, Socioeconomics). Further, Alternative 1would reduce the amount of revenue that could be generated through the sale of fish, and would reduce the demand for traditional fishing equipment created by local tribal craftsmen. Lack of spring/summer Chinook salmon fishery opportunities would preclude Native Americans from engaging in practices that are culturally, economically, and symbolically important to the tribes. Additionally, Alternative 1 may increase tribal reliance on other consumer goods or increase travel costs to participate in other fisheries (Subsection 3.8, Socioeconomics). Finally, Alternative 1 would result in lost educational opportunities for tribal youth to learn fishing and religious traditions from their tribal elders.

4.8.2. Alternative 2 (Proposed Action) – Issue Section 10 Permits for the Continued Operation of the Eight Hatchery Programs

Under Alternative 2, eight northeast Oregon and southeast Washington hatchery programs would operate as proposed in submitted HGMPs (Subsection 2.2, Alternative 2). Unlike Alternative 1, there would be 49 more full-time and 18 more seasonal jobs than under Alternative 1 (Subsection 3.8, Socioeconomics). Additionally, unlike under Alternative 1, these hatchery programs would procure local goods and services, which would contribute to personal income or jobs in the lower Snake River regional economy. NMFS (2010b) found that Columbia River Basin hatchery operations and associated harvest on average contributed over $10 million in personal income and 414 jobs to the lower Snake River regional economy between 2002 and 2006 (Subsection 3.8, Socioeconomics).

Alternative 2 would increase the number of summer/spring Chinook salmon and steelhead available for non-tribal, recreational harvest in northeast Oregon and southeast Washington

relative to Alternative 1. New fisheries targeting hatchery-origin spring Chinook salmon would likely be initiated in the Tucannon and lower Grande Ronde Rivers. An increase in fishing opportunities under Alternative 1 would increase the local purchase of supplies such as fishing gear, camping equipment, consumables, and fuel at local businesses, which would benefit local businesses, although it is unknown how dependent these businesses are on fishing-related expenditures (Subsection 3.8, Socioeconomics). Additionally, more anglers would contribute to the economy through outfitter/guide/charter fees relative to Alternative 1.

Because fishing-related expenditures are a very small percentage of total state revenue (less than 1 percent), Alternative 2 would not be expected to affect total state revenue relative to Alternative 1 (Subsection 3.8, Socioeconomics). However, because fishing for salmon and steelhead can contribute substantially to local economies in Northeast Oregon and Southeast Washington (Subsection 3.8, Socioeconomics). Alternative 2 may have medium beneficial effects on local economies in northeast Oregon and southwest Washington relative to Alternative 1.

Tribal fisheries would also benefit under Alternative 2 relative to Alternative 1. Alternative 2 would increase the number of salmon and steelhead available to tribal members as a food source would increase the amount of revenue that could be generated through the sale of fish, and would increase the demand for traditional fishing equipment created by local tribal craftsmen. Such benefits would be realized by ensuring fishing opportunities for Native Americans so that tribal members can engage in practices that are culturally, economically, and symbolically important to the tribes. Compared to Alternative 1, tribal fishing would continue to occur inside the analysis area, thereby eliminating an increase in travel costs to tribal members to fish elsewhere. Additionally, Alternative 2 may reduce tribal reliance on other consumer goods as a substitute for salmon, which would result in less economic cost to the tribes relative to Alternative 1 (Subsection 3.8, Socioeconomics). Finally, Alternative 2 would increase educational opportunities for tribal youth to learn fishing and religious traditions from their tribal elders relative to Alternative 1.

4.9. Effects on Tourism and Recreation

4.9.1. Alternative 1 (No Action) – Do Not Issue Section 10 Permits for the Continued Operation of the Eight Hatchery Programs

Hatchery programs contribute to tourism and recreation in the analysis area by increasing fishing opportunity or providing tours of their hatchery facilities (Subsection 3.9, Tourism and Recreation). Under Alternative 1, eight northeast Oregon and southeast Washington hatchery programs would be terminated immediately (Subsection 2.1, Alternative 1). Alternative 1 would reduce the number of fishing trips taken in northeast Oregon and southeast Washington relative to baseline conditions because recreational fisheries for salmon and steelhead would close in portions of northeast Oregon and southwest Washington. However, this change would likely be negligible to the overall number of tourism and recreational trips taken within the Washington and Oregon because a small percentage of the total tourism and recreational trips taken in those states are fishing-only trips (Travel USA 2008), (Subsection 3.9, Tourism and Recreation). However, because fishing for salmon and steelhead can contribute substantially to local economies in Northeast Oregon and Southeast Washington (Subsection 3.8, Socioeconomics).

Alternative 1 may have medium adverse effects on local tourism and recreation in northeast Oregon and southwest Washington relative to baseline conditions.

Under Alternative 1, the Lookingglass Creek Hatcheries would close, which may reduce the total number of hatchery tours relative to baseline conditions. Access to public lands for other, non-fishery-related activities such as camping, hiking, sightseeing, and hunting would remain available under Alternative 1.

4.9.2. Alternative 2 (Proposed Action) – Issue Section 10 Permits for the Continued Operation of the Eight Hatchery Programs

Under Alternative 2, eight northeast Oregon and southeast Washington hatchery programs would operate as proposed in submitted HGMPs (Subsection 2.2, Alternative 2). Alternative 2 would increase the number of fishing trips taken in northeast Oregon and southeast Washington relative to Alternative 1 because recreational fisheries for salmon and steelhead would be open in northeast Oregon and southeast Washington. However, this change would likely be negligible to the overall number of tourism and recreational trips taken within the Washington and Oregon because only a small percentage of the total tourism and recreational trips taken in those states are fishing-only trips (Travel USA 2008)(Subsection 3.9, Tourism and Recreation). However, because fishing for salmon and steelhead can contribute substantially to local economies in Northeast Oregon and Southeast Washington (Subsection 3.8, Socioeconomics). Alternative 1 may have medium beneficial effects on local tourism and recreation in northeast Oregon and southwest Washington relative to Alternative 1.

Under Alternative 2, the Lookingglass Creek Hatcheries would be open, which may increase the total number of hatchery tours relative to Alternative 1. As under Alternative 1, access to public lands for other, non-fishery-related activities such as camping, hiking, sightseeing, and hunting would remain available under Alternative 2.

4.10. Effects on Environmental Justice

4.10.1. Alternative 1 (No Action) – Do Not Issue Section 10 Permits for the Continued Operation of the Eight Hatchery Programs

All nine counties in the analysis area are environmental justice communities of concern because they meaningfully exceed thresholds for low income or minority populations (Table 9). Additionally, solely for purposes of environmental justice review, three Native American Tribes (Confederated Tribes of the Umatilla Reservation, Nez Perce Tribe, and Shoshone-Bannock Tribes) have been identified as environmental justice communities of concern within the analysis area (Subsection 3.10, Environmental Justice). There are no other counties or Native American tribal communities in the analysis area, so all effects under Alternative 1 as described in Subsections 4.2 (Effects on Water Quantity) through Subsection 4.9 (Effects on Tourism and Recreation) would disproportionately impact environmental justice counties or Native American tribal communities.

Under Alternative 1, the following ecological, cultural, economic, and social effects on environmental justice communities would be expected in both the short- and long-term:

- A small increase in the amount of surface and ground water that would be available to environmental justice communities relative to baseline conditions (Subsection 4.2, Effects on Water Quantity)
- A small increase in water quality relative to baseline conditions (Subsection 4.3, Effects on Water Quality)
- Loss of the local procurement of goods and services to support hatchery facilities (Subsection 4.8, Effects on Socioeconomics)
- Loss of 49 full-time jobs and 18 seasonal jobs in environmental justice communities relative to baseline conditions (Subsection 4.8, Effects on Socioeconomics)
- A loss of fishing opportunities would reduce the local purchase of supplies such as fishing gear, camping equipment, consumables, and fuel at local businesses, which would adversely impact local businesses, although it is unknown how dependent these businesses are on fishing-related expenditures (Subsection 4.8, Effects on Socioeconomics)
- Fewer anglers would contribute to the economy through outfitter/guide/charter fees relative to baseline conditions (Subsection 4.7, Effects on Socioeconomics)
- Tribal members may have less opportunity to engage in practices that are culturally, economically, and symbolically important to the tribes (Subsection 4.8, Effects on Socioeconomics)
- A loss in educational opportunities for tribal youth to learn fishing and religious traditions from their tribal elders (Subsection 4.8, Effects on Socioeconomics)
- A reduction in the number of Chinook salmon and steelhead available to tribal members as a food source and a reduction in the amount of revenue that could be generated through the sale of fish (Subsection 4.8, Effects on Socioeconomics)
- An increased tribal reliance on other consumer goods or an increase in travel costs to participate in other fisheries (Subsection 4.8, Effects on Socioeconomics)

4.10.2. Alternative 2 (Proposed Action) – Issue Section 10 Permits for the Continued Operation of the Eight Hatchery Programs

All nine counties in the analysis area are environmental justice communities of concern because they meaningfully exceed thresholds for low income or minority populations (Table 9). Additionally, solely for purposes of environmental justice review, three Native American Tribes (Confederated Tribes of the Umatilla Reservation, Nez Perce Tribe, and Shoshone-Bannock Tribes) have been identifies as environmental justice communities of concern (Subsection 3.10, Environmental Justice). There are no other communities in the analysis area, so all effects under Alternative 2 described in Subsections 4.2 (Effects on Water Quantity) through Subsection 4.9 (Effects on Tourism and Recreation) would disproportionately impact environmental justice counties or Native American tribal communities.

Under Alternative 2, the following ecological, cultural, economic, and social effects on environmental justice communities would be expected in both the short and long term:

- A small reduction in the amount of surface and ground water that would be available to environmental justice communities relative to Alternative 1 (Subsection 4.2, Effects on Water Quantity)

- A small reduction in water quality relative to Alternative 1 (Subsection 4.3, Effects on Water Quality)
- A gain of the local procurement of goods and services to support hatchery facilities relative to Alternative 1 (Subsection 4.8, Effects on Socioeconomics)
- A gain of 49 full-time jobs and 18 seasonal jobs in environmental justice communities relative to Alternative 1 (Subsection 4.8, Effects on Socioeconomics)
- An increase in fishing opportunities would increase the local purchase of supplies such as fishing gear, camping equipment, consumables, and fuel at local businesses relative to Alternative 1, which would benefit local businesses, although it is unknown how dependent these businesses are on fishing-related expenditures (Subsection 4.8, Effects on Socioeconomics)
- More anglers would contribute to the economy through outfitter/guide/charter fees relative to Alternative 1 (Subsection 4.8, Effects on Socioeconomics)
- Tribal members may have more opportunity to engage in practices that are culturally, economically, and symbolically important to the tribes (Subsection 4.8, Effects on Socioeconomics)
- An increase in educational opportunities for tribal youth to learn fishing and religious traditions from their tribal elders (Subsection 4.8, Effects on Socioeconomics)
- An increase in the number of Chinook salmon and steelhead available to tribal members as a food source and an increase in the amount of revenue that could be generated through the sale of fish relative to Alternative 1 (Subsection 4.8, Effects on Socioeconomics)
- A reduction in tribal reliance on other consumer goods or an increase in travel costs to participate in other fisheries relative to Alternative 1 (Subsection 4.8, Effects on Socioeconomics)

5. CUMULATIVE IMPACTS

This section discusses the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. The purpose of this assessment is to describe the additional impact of the hatchery programs in light of all the other impacts on listed fish and their habitats.

Chapter 3, Affected Environment, describes baseline conditions, which reflect the effects of past and existing actions (including hydropower, habitat loss, harvest, and hatchery production). Chapter 4, Environmental Consequences, evaluates the direct and indirect effects of the Proposed Action on baseline conditions. Chapter 5, Cumulative Effects, now considers any additional, incremental, cumulative impacts that may result from past, present, and reasonably foreseeable future actions and conditions within the analysis area.

5.1. Other Agency Programs, Plans, and Policies

Other actions are expected to occur within the analysis area that would affect the fish populations considered under the Proposed Action. These include fishing activities that may incidentally intercept Snake River Chinook salmon and steelhead in the Pacific Ocean and habitat restoration actions (Subsection 1.5, Relationship to Other Plans and Policies).

All future actions would be managed based on the impacts on ESA-listed salmon and steelhead. These fish are subjected to the cumulative effects of other hatchery programs, fisheries, and ocean conditions. Conservation efforts are in place to assist in salmon and steelhead recovery while providing for the operation of the proposed hatchery programs and to support treaty and non-treaty fisheries. Adjustments to fisheries and to the hatchery production levels and management actions would be done according to the abundance-based hatchery and harvest management frameworks that are, or likely will be, in place for these programs.

If the cumulative effects of salmon management efforts fail to provide for recovery of listed species, then any adverse impacts due to the hatchery programs and any fishing in the analysis area may be substantially diminished. Management of the hatchery programs and of fishing opportunity is only one element of a large suite of regulations and environmental factors that may influence the overall health of listed salmon and steelhead populations and their habitat. The proposed hatchery programs are coordinated with monitoring so that hatchery managers can respond to changes in the status of affected listed species. Monitoring and adaptive management would help ensure that the affected ESA-listed species are adequately protected and would help mitigate potential for adverse cumulative impacts.

5.2. Climate Change

The analysis area, which includes the Tucannon, Grande Ronde, and Imnaha River Basins – is located in the Pacific Northwest. The climate is changing in the Pacific Northwest due to human activities, and this is affecting hydrologic patterns and water temperatures. Regionally averaged

air temperature rose about 1.5°F over the past century (with some areas experiencing increases up to 4°F) and is projected to increase another 3°F to 10°F during this century. Increases in winter precipitation and decreases in summer precipitation are projected by many climate models, although these projections are less certain than those for temperature (USGCRP 2009).

Higher temperatures in the cool season (October through March) are likely to increase the percentage of precipitation falling as rain rather than snow, and to contribute to earlier snowmelt. The amount of snowpack measured on April 1, a key indicator of natural water storage available for the warm season, has already declined substantially throughout the region. The average decline in the Cascade Mountains, for example, was about 25 percent over the past 40 to 70 years, with most of this due to the 2.5°F increase in cool season temperatures over that period. Further declines in Northwest snowpack are likely due to additional warming this century, varying with latitude, elevation, and proximity to the coast. April 1 snowpack is likely to decline as much as 40 percent in the Cascades by the 2040s (USGCRP 2009).

High and base stream flows are likely to change with warming. Increasing winter rainfall is likely to increase winter flooding in relatively warm watersheds on the west side of the Cascade Mountains. Earlier snowmelt, and increased evaporation and water loss from vegetation, will increase stream flows during the warm season (April through September). On the western slopes of the Cascade Mountains, reductions in warm season runoff of 30 percent or more are likely by mid-century. In some sensitive watersheds, both increased flood risk in winter and increased drought risk in summer are likely due to warming of the climate (USGCRP 2009).

In areas where it snows, a warmer climate means major changes in the timing of runoff: increased stream flows during winter and early spring, and decreases in late spring, summer, and fall. Flow timing has shifted over the past 50 years, with the peak of spring runoff shifting from a few days earlier in some places to as much as 25 to 30 days earlier in others. This trend is likely to continue, with runoff shifting 20 to 40 days earlier within this century. Major shifts in the timing of runoff are not likely in areas dominated by rain rather than snow (ISAB 2007; USGCRP 2009).

Fish habitat changes due to climate change are likely to create a variety of challenges for ESA-listed species of fish. Higher winter stream flows can scour streambeds, damaging spawning redds and washing away incubating eggs (USGCRP 2009). Earlier peak stream flows could flush young salmon and steelhead from rivers to estuaries before they are physically mature enough for the transition, increasing a variety of stresses and the risk of predation (USGCRP 2009). Lower summer stream flows and warmer water temperatures will degrade summer rearing conditions in many parts of the Pacific Northwest for a variety of salmon and steelhead species (USGCRP 2009), and are likely to reduce the survival of steelhead fry in streams with incubation in early summer. Other likely effects include alterations to migration patterns, accelerated embryo development, premature emergence of fry, and increased competition and predation risk from warm-water, non-native species (ISAB 2007). The increased prevalence and virulence of diseases and parasites that tend to tend to flourish in warmer water will further stress salmon and steelhead (USGCRP 2009). Overall, about one-third of the current habitat for the Pacific Northwest's coldwater fish may well no longer be suitable for them by the end of this century as key temperature thresholds are exceeded (USGCRP 2009).

Climate change is also likely to affect conditions in the Pacific Ocean. Historically, warm periods in the coastal Pacific Ocean have coincided with relatively low abundances of salmon and steelhead, while cooler ocean periods have coincided with relatively high abundances (USGCRP 2009). It is likely that, as ocean conditions change, abundances of salmon and steelhead will continue to change accordingly, resulting in changes in abundance of adults returning to freshwater to spawn.

While climate change may well have impacts on the abundance and/or distribution of ESA-listed salmonids that are considered under the Proposed Action, the hatchery programs are directly responsive to observed fish abundance, and so, as abundances change, the hatchery programs (e.g. broodstock take) would be adjusted accordingly. It is possible that, over a relatively long period, the hatchery programs could moderate the effects of climate change – particularly those effects resulting in redd scouring, earlier flushing of juveniles, and increased water temperatures – because of the protective nature of fish held in the hatchery.

6. AGENCIES CONSULTED

Confederated Tribes of the Umatilla Indian Reservation
Nez Perce Tribe
Oregon Department of Fish and Wildlife
Shoshone-Bannock Tribes
Washington Department of Fish and Wildlife

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8. FINDING OF NO SIGNIFICANT IMPACT FOR NMFS'S ISSUANCE OF SECTION 10 PERMITS FOR THE CONTINUED OPERATION OF EIGHT HATCHERY PROGRAMS WITHIN THE TUCANNON, GRANDE RONDE, AND IMNAHA RIVER BASINS

National Oceanic and Atmospheric Administration Administrative Order 216-6 (NAO 216-6) (May 20, 1999) contains criteria for determining the significance of the impacts of a Proposed Action. In addition, the Council on Environmental Quality regulations at 40 C.F.R. 1508.27 state that the significance of an action should be analyzed both in terms of "context" and "intensity." Each criterion listed below is relevant in making a finding of no significant impact and has been considered individually, as well as in combination with the others.

The Federal action is to issue ESA section 10 permits to the appropriate tribes and state agencies for the continued operation of summer steelhead and Chinook salmon hatchery programs in the northeast Oregon and southeast Washington portion of the ESA-listed Snake River Spring/Summer-run Chinook Salmon ESU and Snake River Basin Steelhead DPS[8]. The programs are proposed by the Bureau of Indian Affairs, ODFW, and WDFW. The programs will be operated by the Nez Perce Tribe, the Confederated Tribes of the Umatilla Indian Reservation, ODFW, and WDFW. The Lower Snake River Compensation Plan and BPA fund and assist in administration of the hatchery programs. The Proposed Action would be expected to result in the implementation of hatchery programs as described in the following eight submitted HGMPs:

- Catherine Creek Spring/Summer Chinook Salmon Hatchery Program (ODFW 2011a).
- Upper Grande Ronde Spring Chinook Salmon Hatchery Program (CTUIR 2011).
- Wallowa/Lostine Spring Chinook Salmon Hatchery Program (NPT 2011).
- Lookingglass Spring/Summer Chinook Salmon Hatchery Program (ODFW 2011b).
- Imnaha Spring/Summer Chinook Salmon Hatchery Program (ODFW 2011c).
- Little Sheep Creek Summer Steelhead Hatchery Program (ODFW 2011d).
- Tucannon River Endemic-Stock Spring Chinook Salmon Supplementation Hatchery Program (WDFW 2011a).
- Tucannon River Summer Steelhead Endemic-Stock Hatchery Program (WDFW 2011b).

Can the Proposed Action reasonably be expected to jeopardize the sustainability of any target species?

The proposed hatchery programs intend to produce hatchery-origin spring/summer Chinook salmon and steelhead. These are the target species. Adverse impacts on these species are expected to be negligible to low, as described below:

- All surface water diverted (minus evaporation) is returned after it circulates through the facility. The only segment of the rivers and creeks that may be impacted by the hatchery facilities would be the area between the water intake and discharge structures, and the water intake and discharge structures are placed at close together as possible to minimize impacts to fish and other aquatic species.

[8] An "evolutionarily significant unit" (ESU) of Pacific salmon (Waples 1991) and a "distinct population segment" (DPS) of steelhead (71 FR 834, January 5, 2006) are considered to be "species," as defined in section 3 of the ESA. Unless otherwise stated, this document uses the term "species" to refer to both ESUs and DPSs.

- Impacts to water quality from the proposed hatchery programs would be small and localized and would not change relative to baseline conditions. Although some of the hatchery facilities discharge water into rivers segments included on the 303(d) list, the water quality impairment is not caused by the operation of the hatcheries. All hatcheries would operate in compliance with applicable NPDES permits or tribal wastewater plans.
- Genetic risks would be minimized by using native fish stocks, managing proportions of both hatchery- and natural-origin fish in broodstock and in the wild according to annual abundance of the natural-origin population, by collecting adults in a manner that maintain population structure and run timing, and by selecting broodstock and mating protocols in a manner intended to mimic natural mating proportions. Additionally, population monitoring would be used to adjust program management if genetic risks increase over time.
- Competition and predation risks would be minimized by acclimating hatchery-origin fish prior to release, and releasing fish volitionally (rather than forced releases) so that the majority of fish are fully smolted and thus actively outmigrating from the system. Hatchery-origin fish would also be released in areas predominantly used by the same species, with the intent to minimize species overlap that could increase interspecies competition and predation.
- Masking effects would be minimized by marking or tagging 100 percent of the hatchery-origin releases such that they are identifiable as hatchery-produced.
- Disease transfer risks would be minimized by screening adults used in broodstock for disease and culling diseased eggs to minimize vertical transfer of disease from parent to offspring, performing regular health exams of juveniles in the hatchery, rearing juveniles in densities and flows designed to reduce stress and disease susceptibility, using protocols that minimize transfer of disease between raceways, and using treatment protocols if disease is detected.
- Any adverse effects associated with monitoring (e.g., handling mortalities) would be low for the following reasons:
    - The mortality rate for capture, tagging, and release is low (less than 1 percent) (B. Farman, pers. comm. April 22, 2013).
    - A small proportion of the total number of smolts would be intercepted during monitoring and evaluation activities.

Can the Proposed Action reasonably be expected to jeopardize the sustainability of any non-target species?

Fish: The Proposed Action is to issue permits for the continued operation of eight Northeast Oregon and Southeast Washington hatchery programs. Therefore, there would be no change in the number of juvenile salmon and steelhead in the Tucannon, Grande Ronde, and Imnaha River Basins relative to baseline conditions, and there would be no effect on non-target species as a result of changes in levels of competition or predation.

Because the proposed programs are only supplementing spring/summer Chinook salmon and steelhead, genetic risks would only be a concern for these species. That is, the proposed program could not affect the genetics of non-target species because steelhead and spring/summer Chinook salmon do not interbreed with these species.

Avian and Terrestrial Wildlife: Relative to baseline conditions, there would be no change in the number of salmon and steelhead available as a food source for bird populations and terrestrial wildlife species. Therefore, there would be no expected change in the diet, survival, or distribution of avian or terrestrial wildlife populations. The proposed hatchery programs would continue to support fisheries, and anglers participating in these fisheries may disrupt avian and terrestrial wildlife. However, these impacts would be localized and short-lived. Additionally, fishery access points, roads, boat launches, and campsites are already present in the affected area, and the need for additional infrastructure is not expected.

Can the Proposed Action reasonably be expected to cause substantial damage to ocean and coastal habitats and/or essential fish habitat as defined under the Magnuson-Stevens Act and identified in Fisheries Management Plans?

The proposed hatchery programs would have no effect on ocean or coastal habitats because the hatchery facilities that support the proposed hatchery programs are not on the coast, and there are no fisheries on the coast that exist because of these hatchery programs.

There would be little or no effect on essential fish habitat for any fish species. Essential fish habitat for Chinook and coho salmon includes stream reaches where the hatchery facilities are located. Essential features of their habitat include adequate substrate (especially spawning gravel), water quality, water quantity, water temperature, water velocity, cover/shelter, food, riparian vegetation, space, and suitable migration conditions. Effects on essential fish habitat would be minimized by properly screening water intakes, using water non-consumptively by returning surface water to the source from which it was removed, complying with NPDES criteria under the Clean Water Act for any discharge into surface waters, and maintaining weirs used for broodstock collection, including adequate staffing of the weirs to minimize the amount of time fish are in the fish traps, which minimizes stress and unintended mortality. Additionally, competition and predation risks would be minimized by acclimating hatchery-origin fish prior to release, and releasing fish volitionally (rather than forced releases) so that the majority of fish are fully smolted and thus actively outmigrating from the system. Hatchery-origin fish would also be released in areas predominantly used by the same species, with the intent to minimize species overlap that could increase interspecies competition and predation.

Can the Proposed Action be reasonably expected to have a substantial adverse impact on public health or safety?

Under the proposed action, hatchery facility employees would follow Occupational Safety and Health Administration regulations and all safety precautions, including the use of personal protective equipment to protect themselves from chemicals and disease. Effluent monitoring would occur on a regularly scheduled basis to verify compliance with applicable water quality standards. Therefore, negligible adverse effects to human health would be expected from the proposed hatchery program.

Can the Proposed Action reasonably be expected to adversely affect endangered or threatened species, marine mammals, or critical habitat of the species?

The proposed hatchery programs intend to produce hatchery-origin spring/summer Chinook salmon and steelhead listed as threatened. The hatchery programs are designed as "integrated," which means the hatchery-origin fish produced by the program interbreed with listed natural-origin fish on both the spawning grounds and in the hatchery. The proposed hatchery programs would result in minimal risks to ESA-listed spring/summer Chinook salmon and steelhead as a result of genetic effects, competition and predation, facility effects, natural population status masking, incidental fishing effects, or disease transfer. The hatchery programs would continue to benefit population viability and nutrient cycling.

Critical habitat for Snake River salmon, steelhead, and bull trout includes stream reaches where the hatchery facilities are located. Essential features of their habitat include adequate substrate (especially spawning gravel), water quality, water quantity, water temperature, water velocity, cover/shelter, food, riparian vegetation, space, and suitable migration conditions. Effects on critical habitat would be minimized by properly screening water intakes, using water non-consumptively by returning surface water to the source from which it was removed, complying with NPDES criteria under the Clean Water Act for any discharge into surface waters, and maintaining weirs used for broodstock collection, including adequate staffing of the weirs. Additionally, competition and predation risks would be minimized by acclimating hatchery-origin fish prior to release, and releasing fish volitionally (rather than forced releases) so that the majority of fish are fully smolted and thus actively outmigrating from the system. Hatchery-origin fish would also be released in areas predominantly used by the same species, with the intent to minimize species overlap that could increase interspecies competition and predation.

No marine mammals (either listed or non-listed) would be adversely affected by the proposed hatchery program. Steller sea lions and California sea lions are known to feed on returning adult salmon in the Columbia River Basin downstream of Bonneville Dam and are likely eating hatchery-origin fish from the proposed hatchery programs. Consequently, the proposed hatchery programs would increase the number of salmon and steelhead available to Steller sea lions and California sea lions in the vicinity downstream of Bonneville Dam. However, because the proposed hatchery programs would only lead to a small increase in the total number of salmon and steelhead migrating past Bonneville Dam while the sea lions are present, the proposed hatchery programs would not be expected to change sea lion diet, survival, or distribution. The Proposed Action would not impact critical habitat for sea lions.

Southern resident killer whales also feed on adult salmon, and prefer Chinook salmon. However, because southern resident killer whales have limited spatial overlap with Snake River spring/summer Chinook salmon, few Snake River Chinook salmon are likely to be eaten by southern resident killer whales. Consequently, the proposed hatchery programs would not be expected to change the diet, survival, or distribution of southern resident killer whales. The Proposed Action would not impact critical habitat for southern resident killer whales.

Can the Proposed Action be expected to have a substantial impact on biodiversity and/or ecosystem function within the affected area (e.g., benthic productivity, predator-prey relationships)?

The proposed hatchery programs would not be expected to have a substantial impact on biodiversity within the affected area. Although spring/summer Chinook salmon and steelhead produced in the proposed hatchery programs would interact with other species through predator/prey interactions, they would not be expected to affect biodiversity because the number of hatchery-origin salmon produced in the proposed hatchery programs would only represent a small portion of the total number of predator or prey species within the affected area.

Because the proposed hatchery programs would contribute marine-derived nutrients to the Tucannon, Grande Ronde, and Imnaha River Basins, the proposed hatchery programs would be expected to improve ecosystem function within these basins.

Are significant social or economic impacts interrelated with natural or physical environmental effects?

There are no significant social or economic impacts interrelated with the natural or physical environmental effects of the Proposed Action. The proposed hatchery programs would provide the following economic benefits:

- The hatchery programs would directly employ 49 full-time employees and 18 seasonal employees.
- The hatchery programs would procure local goods and services, which would contribute to personal income or jobs in the lower Snake River regional economy.
- The hatchery programs would increase the number of summer/spring Chinook salmon and steelhead available for non-tribal, recreational harvest in northeast Oregon and southeast Washington, which may increase the local purchase of supplies such as fishing gear, camping equipment, consumables, and fuel at local businesses. Additionally, more anglers would contribute to the economy through outfitter/guide/charter fees.
- The hatchery programs would increase the number of salmon and steelhead available to tribal members as a food source and would increase the amount of revenue that could be generated through the sale of fish.
- The hatchery programs would increase the demand for traditional fishing equipment created by local tribal craftsmen. Such benefits would be realized by ensuring fishing opportunities for Native Americans so that tribal members can engage in practices that are culturally, economically, and symbolically important to the tribes.
- The hatchery programs would allow tribal fishing to continue, thereby reducing or eliminating an increase in travel costs to tribal members to fish elsewhere.
- The hatchery programs may reduce tribal reliance on other consumer goods as a substitute for salmon, which would result in less economic cost to the tribes.
- The hatchery programs would increase educational opportunities for tribal youth to learn fishing and religious traditions from their tribal elders.

Are the effects on the quality of the human environment likely to be highly controversial?

The use of hatcheries can be controversial, and NMFS must carefully consider potential adverse effects of a hatchery program on listed fish. However, there is no known controversy surrounding the proposed hatchery programs. No comment letters were received on the draft EA during the public comment period. NMFS takes this as an indication that the methodology and best available information used to analyze effects are not "highly controversial" to the public.

Can the Proposed Action reasonably be expected to result in substantial impacts on unique areas, such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas?

The proposed hatchery programs are not expected to result in substantial impacts on unique areas, such as historical or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas, because none of the proposed activities would occur in such areas. Designated critical habitat for Snake River salmon, steelhead, and bull trout is within the affected area; however, all habitat impacts would be small under the proposed hatchery programs and are not considered significant.

Are the effects on the human environment likely to be highly uncertain or involve unique or unknown risks?

The effects on the human environment are not highly uncertain and do not involve unique or unknown risks. Although there are some uncertainties involved in the on-going operation of hatchery programs, the risks are understood, and the proposed hatchery programs include explicit steps to monitor and evaluate these uncertainties in a manner that allows timely adjustments to minimize or avoid adverse impacts. The proposed operation of the hatchery programs is similar to other recent hatchery operations in many areas of the Pacific Northwest, and the procedures and effects are well known.

Is the Proposed Action related to other actions with individually insignificant, but cumulatively significant, impacts?

The cumulative impacts of the proposed hatchery programs have been considered in the EA. The take of ESA-listed species will be limited to avoid jeopardizing any listed species when considering all existing conditions, all other permits, and other actions in the area affecting these conditions and permits. The proposed hatchery programs are coordinated with monitoring so that fish managers can respond to changes in the status of affected listed species. If the cumulative effects of salmon management efforts fail to provide for recovery of listed species, adjustments to fisheries and to the hatchery production levels would likely be proposed.

The action is related to other hatchery production programs, many of which are guided by the same legal agreements, mitigation responsibilities, and managed by the same agencies. Though the action is related to those other activities, the affected environment analyzed includes many of the ongoing impacts associated with other programs such as water withdrawals and release numbers throughout the basin. Any cumulative impacts are not expected to rise to the level of significance.

Is the Proposed Action likely to adversely affect districts, sites, highways, structures, or objects listed or eligible for listing in the National Register of Historic Places or to cause loss or destruction of significant scientific, cultural, or historical resources?

The proposed hatchery programs do not include any new construction, and are therefore unlikely to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places. The proposed hatchery programs would not destroy or modify any scientific, cultural, or historical resources.

Can the Proposed Action reasonably be expected to result in the introduction or spread of non-indigenous species?

The proposed hatchery programs would not result in the introduction or spread of a non-indigenous species because the action considered in this environmental assessment is limited to production of salmon and steelhead, which are indigenous to the Tucannon, Grande Ronde, and Imnaha River Basins. Though some non-indigenous fish species may benefit from the additional prey available from the hatchery-production, the programs would not introduce new species or expand their current range.

Is the Proposed Action likely to establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration?

The proposed hatchery programs would not likely to establish a precedent for future actions with significant effects or to represent a decision in principle about a future consideration because the proposed hatchery programs are similar in nature and scope to similar hatchery actions over the past several years. Other HGMPs involving captive breeding or supplementation in the Pacific Northwest (e.g., Snake River fall Chinook salmon and Hood Canal Summer Chum salmon hatchery programs) have been analyzed through similar ESA determinations and NEPA reviews.

Like other similar hatchery programs already reviewed, implementation monitoring is a key element of the proposed hatchery programs, which would inform co-managers of the effects of the programs. The proposed hatchery programs would support precedence already set for monitoring and adaptive management, which reduces any risk of significant effects occurring now or in the future.

Can the Proposed Action reasonably be expected to threaten a violation of Federal, state, or local law or requirements imposed for the protection of the environment?

The proposed hatchery programs are not expected to threaten a violation of Federal, state, or local law or requirements imposed for the protection of the environment because the proposed hatchery programs were developed in the broader context of recovery planning and implementation of the ESA. The proposed hatchery programs would comply with other applicable local, state, and Federal laws. NPDES permits related to this action have been issued under Federal laws implemented by the states that are consistent with Federal and local laws related to environmental protection.

Can the Proposed Action reasonably be expected to result in cumulative adverse effects that could have a substantial effect on the target species or non-target species?

The proposed hatchery programs would not result in substantial cumulative adverse effects on target or non-target species because the take of ESA-listed species would be limited to a maximum level considered to result in a no-jeopardy ESA determination when considering all existing fishery conditions, all other permits, and other actions in the area affecting these conditions and permits. The cumulative impacts of the proposed hatchery programs have been considered in the EA.

8.1. List of Reviewers

- Kate Hawe, NWR NEPA Coordinator
- Robert Bayley, Salmon Management Division QA/QC Coordinator
- Christopher Fontecchio, General Counsel

8.2. Finding of No Significant Impact References

Boxall, A.B., L.A. Fogg, P.A. Blackwell, P. Kay, E.J. Pemberton, and A. Croxford. 2004. Veterinary medicines in the environment. Rev Environ Contam Toxicol. 2004: 1-91.

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ODFW. 2011c. Hatchery and Genetics Management Plan. Lower Snake River Compensation Plan (LSRCP). Imnaha Spring/Summer Chinook Program. Spring/summer Chinook (Stock # 029). Imnaha / Snake River / Columbia Basin Oregon. Draft May 2011.

ODFW. 2011d. Hatchery and Genetics Management Plan. Lower Snake River Compensation Plan (LSRCP). Little Sheep Creek Summer Steelhead Hatchery Program. Summer Steelhead (Stock # 029). Imnaha / Snake River / Columbia Basin. Draft May 2011.

NPT (Nez Perce Tribe). 2011. Hatchery and Genetics Management Plan. Grande Ronde Endemic Spring Chinook Salmon Supplementation Program (GRESCSP). Snake River Spring/Summer Chinook Salmon – Wallowa/Lostine population. Lostine River / Wallowa River / Grande Ronde River Basin. Draft May 31, 2011.

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WDFW. 2011b. Hatchery and Genetics Management Plan. Snake River Summer Steelhead. Tucannon River Stock: Lyons Ferry Complex. Tucannon River Summer Steelhead. Tucannon River / Snake River / Columbia Basin, Washington State. Draft January 24, 2011.

8.3. Determination

In view of the information presented in the environmental assessment and analysis prepared for the proposed hatchery programs, it is hereby determined that issuance of an ESA Section 10 permits for the proposed hatchery programs will not significantly impact the quality of the human environment. In addition, all beneficial and adverse impacts of the proposed hatchery programs have been considered in reaching a finding of no significant impact. Accordingly, preparation of an Environmental Impact Statement is not necessary to further analyze the potential for significant impacts resulting from issuance of Section 10 permits by NMFS for the proposed hatchery programs.

_____ _____

Barry Thom, Deputy Regional Administrator Date
West Coast Region, NMFS