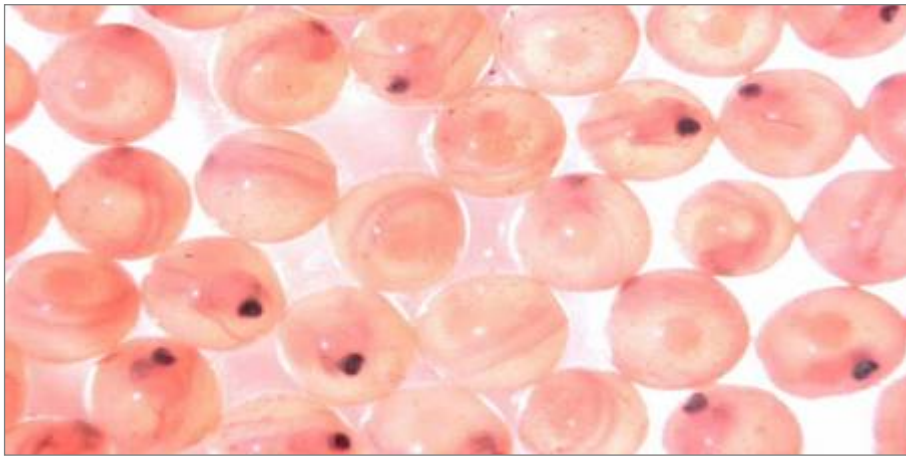


FINAL DRAFT ENVIRONMENTAL ASSESSMENT

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

December 2013

Cover Sheet December 2013

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

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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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1 **EXECUTIVE SUMMARY**

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

5
6 A draft Environmental Assessment (EA) to analyze impacts of NOAA’s National Marine
7 Fisheries Service (NMFS) issuance of an Endangered Species Act section 10(a)(1)(A)
8 research/enhancement permits for the continued operation of eight hatchery programs
9 within the Tucannon, Grande Ronde, and Imnaha River Basins was released by the
10 National Marine Fisheries Service (NMFS) for a 30-day public comment period on May
11 24, 2013 (78 FR 31518). The comment period for review of the EA on this action expired
12 on June 24, 2013. NMFS did not receive any comments.

13
14 The final EA includes changes from the draft EA where clarification of existing
15 information was needed. All new text is in the redline/strikeout format.

1 **1. PURPOSE OF AND NEED FOR THE PROPOSED ACTION**

2 **1.1. Background**

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

15
16 Hatchery operators have expressed a need to receive take coverage for the existing hatchery
17 programs. The hatchery operators have developed HGMPs and submitted them to NMFS for
18 review. Section 2.2, Alternative 2, Proposed Action, below, has further information on the scope
19 of the programs from the HGMPs. NMFS intends to process and evaluate the HGMPs and issue
20 the appropriate section 10 permits to the operators, if the actions meet the requirements of the
21 ESA.

22
23 When reviewing applications for section 10 permits, NMFS must consider whether the submitted
24 materials, including HGMPs, satisfactorily address the criteria contained in section 10(a)(1)(A)
25 of the ESA. If NMFS determines that the HGMPs “...are not likely to appreciably reduce the
26 likelihood of survival and recovery...” and otherwise satisfy criteria necessary for a section 10
27 permit, then NMFS can approve the HGMPs by issuing the appropriate section 10 permit to the
28 operators. NMFS’ issuance of section 10 permits for the activities described in the HGMPs
29 constitutes the Federal action that is subject to analysis as required by the National
30 Environmental Policy Act (NEPA). NMFS seeks to consider, through NEPA analysis, how its
31 pending action may affect the natural and physical environment and the relationship of people
32 with that environment. NMFS is also required to review compliance of ESA actions with other
33 applicable laws and regulations. The NEPA analysis provides an opportunity to consider, for
34 example, how the action may affect conservation of non-listed species, and socioeconomic
35 objectives that seek to balance conservation with wise use of affected resources and other legal
36 and policy mandates.

37
38 **1.2. Description of the Proposed Action**

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

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

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

19
 20 The following activities would occur as part of the proposed HGMPs:

- 21 • Broodstock collection, spawning, incubation, and rearing
- 22 • Volitional and direct release of juvenile hatchery-origin salmon and steelhead
- 23 • Monitoring and evaluation activities including fish tagging, and spawning ground and
 24 juvenile surveys through electrofishing, rotary trap, screw trap, dip net, hook and line,
 25 cast netting, snorkel, stream walking, and seining
- 26 • Management of adult hatchery-origin returns²

27
 28 **1.3. Purpose of and Need for the Proposed Action**

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

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

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

- 34 • 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.

- 1 • Continue operation of existing hatchery programs to preserve and assist in the rebuilding
- 2 of salmon and steelhead populations in northeast Oregon and southeast Washington;
- 3 • Continue operation of existing hatchery programs to support harvest in tribal,
- 4 recreational, and commercial fisheries.

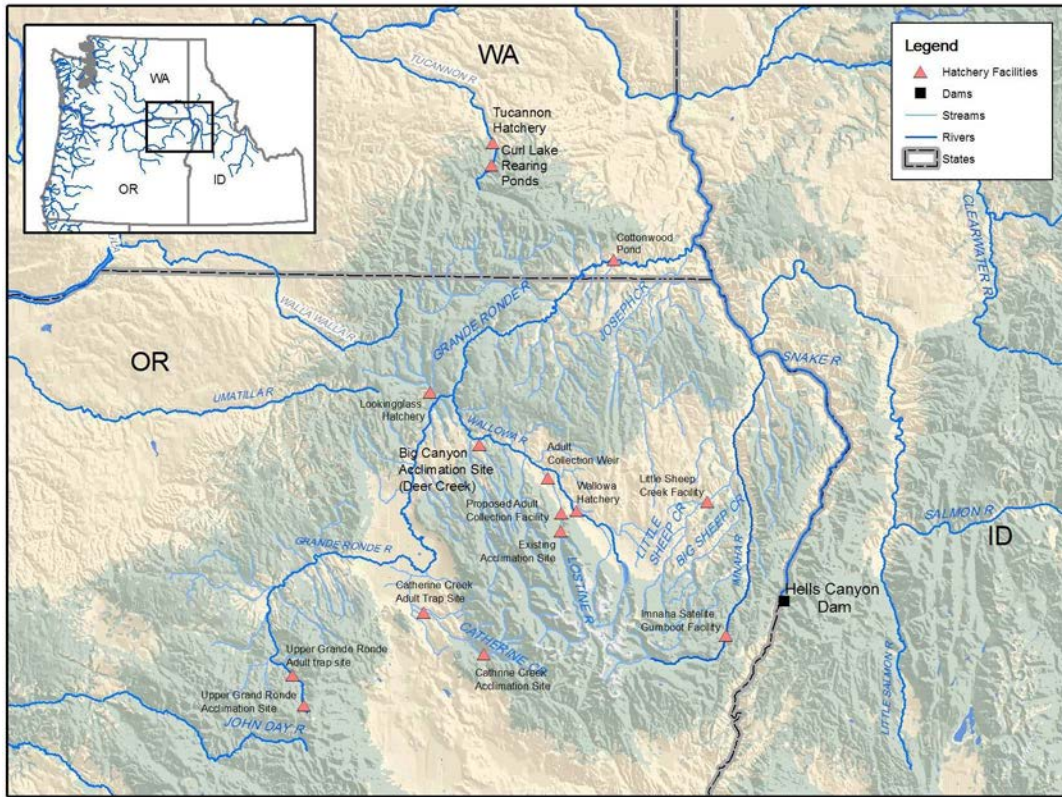
5 **1.4. Action Area**

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

- 13 • Catherine Creek Acclimation Facility (located on Catherine Creek, a tributary to the
- 14 Grande Ronde)
- 15 • Lookingglass Hatchery (located on Lookingglass Creek, a tributary to the Grande Ronde
- 16 River)
- 17 • Upper Grande Ronde Acclimation Facility (located on the Grande Ronde River)
- 18 • Lostine Acclimation Facility (located on the Lostine River, a tributary to the Wallowa
- 19 River; the Wallowa River is a tributary to the Grande Ronde River)
- 20 • Northeast Oregon Hatchery (i.e., the Lostine River Hatchery)
- 21 • Imnaha Satellite Facility (also referred to as Gumboot Facility; located on the Imnaha
- 22 River)
- 23 • Lyons Ferry Hatchery (located on the Snake River, directly below the confluence with
- 24 Palouse River)
- 25 • Tucannon Hatchery (located on the Tucannon River)
- 26 • Curl Lake Acclimation Pond (located on the Tucannon River)
- 27 • Little Sheep Creek Acclimation Facility (located on Little Sheep Creek, a tributary to the
- 28 Imnaha)
- 29 • Irrigon Hatchery (located on the Columbia River, near Irrigon, Oregon)
- 30 • Wallowa Hatchery (located on the Wallowa River, a tributary to the Grande Ronde
- 31 River)
- 32 • Oxbow Hatchery (located on Columbia River in Oregon)
- 33 • Bonneville Hatchery (located on Columbia River in Oregon)

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

39



1
 2 **Figure 1. Hatchery facilities and satellite facilities in northeast Oregon and**
 3 **southeast Washington, and the river systems in the action area of the**
 4 **proposed hatchery programs. Note that Cottonwood Pond and Big Canyon**
 5 **Acclimation Site are on this map but not used by the proposed hatchery**
 6 **programs (Subsection 1.2, Description of Proposed Action). Also note that**
 7 **Lyons Ferry Hatchery is in the action area but not on this map. It is located**
 8 **on the Snake River, directly below the confluence with Palouse River.**
 9

10 **1.5. Relationship to Other Plans and Policies**

11 In addition to NEPA and ESA, other plans, regulations, agreements, treaties, laws, and
 12 Secretarial and Executive Orders also affect hatchery operations in the Tucannon, Imnaha and
 13 Grande Ronde River Basins. They are summarized below to provide additional context for the
 14 proposed hatchery programs.
 15

16 **1.5.1. Northeast Oregon Hatchery Program EIS**

17 A final Environmental Impact Statement (EIS) was issued in July 2004 for the Northeast Oregon
 18 Hatchery Program, Grande Ronde - Imnaha Spring Chinook Hatchery Project (BPA 2004). The
 19 EIS includes an analysis of the effects of construction of a new hatchery facility on the Lostine
 20 River that will be operated by the Nez Perce Tribe. The EIS also evaluated effects of upgrading
 21 the Imnaha River weir. The final EIS (BPA 2004) is hereby incorporated by reference for its
 22 information related to hatchery construction and Imnaha River weir upgrades.
 23

1 **1.5.2. Marine Mammal Protection Act**

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

8
9 The Marine Mammal Protection Act prohibits, with certain exceptions, the take of marine
10 mammals in United States waters and by United States citizens on the high seas, and the
11 importation of marine mammals and marine mammal products into the United States. The term
12 “take,” as defined by the Marine Mammal Protection Act, means to “harass, hunt, capture, or
13 kill, or attempt to harass, hunt, capture, or kill any marine mammal.” The Marine Mammal
14 Protection Act further defines harassment as “any act of pursuit, torment, or annoyance which (i)
15 has the potential to injure a marine mammal or marine mammal stock in the wild; or (ii) has the
16 potential to disturb a marine mammal or marine mammal stock in the wild by causing a
17 disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing,
18 breeding, feeding, or sheltering but which does not have the potential to injure a marine mammal
19 or marine mammal stock in the wild.”

20
21 NMFS is responsible for reviewing federal actions for compliance with the Marine Mammal
22 Protection Act. Changes in fish production can indirectly affect marine mammals by altering the
23 number of available prey (salmon and steelhead).

24 **1.5.3. Executive Order 12898**

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

32 **1.5.4. *U.S. v. Oregon***

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

1 **1.5.5. Secretarial Order 3206**

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

15
 16 More specifically, the Services shall, among other things, do the following:

- 17
- 18 • Work directly with Indian tribes on a government-to-government basis to promote
- 19 healthy ecosystems (Sec. 5, Principle 1)
- 20 • Recognize that Indian lands are not subject to the same controls as federal public lands
- 21 (Sect. 5, Principle 2)
- 22 • Assist Indian tribes in developing and expanding tribal programs so that healthy
- 23 ecosystems are promoted and conservation restrictions are unnecessary (Sec. 5,
- 24 Principle 3)
- 25 • Be sensitive to Indian culture, religion, and spirituality (Sec. 5, Principle 4)
- 26

27 **1.5.6. The Federal Trust Responsibility**

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

1 **1.5.7. Treaty with the Walla Walla, Cayuse, and Umatilla Tribes and Bands of**
 2 **Indians**

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

11 **1.5.8. Treaty with the Nez Perce Indians**

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

18 **1.5.9. Clean Water Act**

19 The Clean Water Act (33 USC 1251, 1977, as amended in 1987), administered by the U.S.
 20 Environmental Protection Agency and state water quality agencies, is the principal federal
 21 legislation directed at protecting water quality. Each state implements and carries forth federal
 22 provisions, as well as approves and reviews National Pollutant Discharge Elimination System
 23 applications, and establishes total maximum daily loads for rivers, lakes, and streams. The states
 24 are responsible for setting the water quality standards needed to support all beneficial uses,
 25 including protection of public health, recreational activities, aquatic life, and water supplies.
 26 27

28 The Washington State Water Pollution Control Act, codified as Revised Code of Washington
 29 Chapter 90.48, designates the Washington Department of Ecology (Ecology) as the agency
 30 responsible for carrying out the provisions of the federal Clean Water Act within Washington
 31 State. The agency is responsible for establishing water quality standards, making and enforcing
 32 water quality rules, and operating waste discharge permit programs. These regulations are
 33 described in Washington Administrative Code (WAC) 173. Hatchery operations are required to
 34 comply with the Clean Water Act.
 35

36 **1.5.10. Bald Eagle and Golden Eagle Protection Act**

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

1 substantially interfering with normal breeding, feeding, or sheltering behavior.” Changes in
 2 hatchery production have the potential to affect eagle productivity through changes in its prey
 3 source (salmon and steelhead).
 4

5 **1.5.11. State Endangered, Threatened, and Sensitive Species Act**

6 This EA will consider the effects of hatchery programs and harvest actions on state endangered,
 7 threatened, and sensitive species. The State of Washington has species of concern listings
 8 (Washington Administrative Code Chapters 232-12-014 and 232-12-011) that include all state
 9 endangered, threatened, sensitive, and candidate species. These species are managed by WDFW,
 10 as needed, to prevent them from becoming endangered, threatened, or sensitive. The state-listed
 11 species are identified on WDFW’s website (<http://wdfw.wa.gov/conservation/endangered/>); the
 12 most recent update occurred in June 2008. The criteria for listing and de-listing, and the
 13 requirements for recovery and management plans for these species are provided in Washington
 14 Administrative Code Chapter 232-12-297. The state list is separate from the federal ESA list;
 15 the state list includes species status relative to Washington state jurisdiction only. Critical
 16 wildlife habitats associated with state or federally listed species are identified in Washington
 17 Administrative Code Chapter 222-16-080.
 18

19 Oregon also has a state ESA (Oregon Administrative Rules 635-100-0001-0180). ODFW is
 20 responsible for fish and wildlife under the Oregon ESA, and the Oregon Department of
 21 Agriculture is responsible for plants. The Oregon ESA generally affects only the actions of state
 22 agencies on state-owned or leased lands. Species listed under the state endangered, threatened,
 23 and sensitive species list are reviewed in this EA if the Proposed Action or its alternatives may
 24 affect these species.
 25

26 **1.5.12. Washington Hatchery and Fishery Reform Policy**

27 WDFW’s Hatchery and Fishery Reform Policy (Policy C-3619) was adopted by the Washington
 28 Fish and Wildlife Commission in 2009 (WFWC 2009). Its purpose is to advance the
 29 conservation and recovery of wild salmon and steelhead by promoting and guiding the
 30 implementation of hatchery reform. The policy applies to state hatcheries and its intent is to
 31 improve hatchery effectiveness, ensure compatibility between hatchery production and salmon
 32 recovery plans and rebuilding programs, and support sustainable fisheries.
 33

34 **1.5.13. Recovery Plans for Snake River Spring/Summer Chinook Salmon and** 35 **Steelhead**

36 Broad partnerships of federal, state, local, and tribal governments and community organizations
 37 collaborated in the development of the three draft management unit plans (one for each state) for
 38 Snake River spring/summer Chinook salmon and steelhead (NMFS 2010a; SRSRB 2011; NMFS
 39 2012). The management unit plans include conservation goals and proposed habitat, hatchery,
 40 and harvest actions needed to achieve conservation goals for each watershed within the
 41 geographic boundaries of the listed ESU and DPS. In addition, NMFS has developed a draft
 42 Snake River Harvest Module and a draft Snake River Hydro Module. After review and
 43 finalization of these management unit plans and modules, they will be consolidated into a

1 DPS/ESU-wide Snake River Recovery Plan. Snake River fall Chinook salmon will be addressed
2 in a separate recovery plan that is in development.
3

4 **1.5.14. Oregon Native Fish Conservation Policy**

5 The purpose of Oregon’s Native Fish Conservation Policy (Oregon Administrative Rules
6 635-007-0502 through -0509) is to ensure the conservation and recovery of native fish in Oregon
7 and to focus on natural-origin, native fish. The policy is based on the premise that “...locally
8 adapted populations provide the best foundation for maintaining and restoring sustainable
9 naturally produced native fish.” (Oregon Administrative Rule 635-007-0505(2)). The intent of
10 this policy is to provide a basis for managing hatchery programs, fisheries, habitat, predators,
11 competitors, and pathogens in balance with sustainable production of natural-origin fish.
12

13 **1.5.15. Oregon Fish Hatchery Management Policy**

14 The Oregon Fish Hatchery Management Policy (Oregon Administrative Rules 635-007-0542
15 through -0548) describes best management practices that are intended to help ensure the
16 conservation of both hatchery-origin and natural-origin fish in Oregon through the responsible
17 use of hatchery programs. The Hatchery Management Policy complements and supports the
18 Native Fish Conservation Policy (Oregon Administrative Rules 635-007-0502 through -0509)
19 and is implemented through the development of conservation plans.
20

21 **1.5.16. Oregon Fish Health Management Policy**

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

25 **1.5.17. Federal Columbia River Power System (FCRPS) Biological Opinion**

26 The 2008 FCRPS Reasonable and Prudent Alternative (RPA) proposed new and expanded
27 hatchery facilities for conservation hatchery programs that promote salmon and steelhead
28 recovery. In addition, the RPA directed the action agencies to 1) ensure that hatchery programs
29 funded by the FCRPS are not impeding recovery of ESA-listed salmon ESUs or steelhead DPSs,
30 and 2) preserve and rebuild genetic resources through safety-net and conservation actions to
31 reduced short-term extinction risk and promote recovery. Several of the hatchery programs
32 included in the Proposed Action considered in this EA are specifically identified as projects to
33 implement under the RPA:
34

- 35 • Catherine Creek Spring/Summer Chinook Salmon Hatchery Program
- 36 • Upper Grande Ronde Spring Chinook Salmon Hatchery Program
- 37 • Wallowa/Lostine Spring Chinook Salmon Hatchery Program (Nez Perce 2011).
- 38 • Imnaha Spring/Summer Chinook Salmon Hatchery Program (ODFW 2011c).
- 39 • Tucannon River Endemic-Stock Spring Chinook Salmon Supplementation Hatchery
40 Program (WDFW 2011a).
- 41 • 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.

1 **2. ALTERNATIVES INCLUDING THE PROPOSED ACTION**

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

7
8 **2.1. Alternative 1 (No-action) – Do Not Issue Section 10 Permits for the Continued**
9 **Operation of the Eight Hatchery Programs**

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

- 15
16
 - **The applicants could pursue authorization of the existing hatchery programs under**
17 **the 4(d) Rule.**
 - **The applicants could also choose to continue to operate the existing hatchery**
18 **programs without ESA authorization and be subjected to ESA take violations.**
 - **The applicants could choose to terminate all of the hatchery programs because they**
19 **would not have ESA authorization.**

20
21
22
23 **For analysis purposes, NMFS has defined the No-action Alternative as the termination of**
24 **existing hatchery programs. All of the activities associated with the hatchery programs**
25 **would be terminated: no hatchery fish would be released, no hatchery broodstock would**
26 **be collected, the hatchery facilities would not use water for operation, and the hatcheries**
27 **would not release hatchery water effluent.** This formulation of the No-action Alternative
28 as termination of hatchery operations is considered a reasonable alternative approach for
29 the purposes of analysis because it represents one end of the spectrum of potential effects.
30 This definition of the No-action Alternative also provides a reasonable low end on the
31 range of effects to evaluate and to compare to the Proposed Action.

32
33 **2.2. Alternative 2 (Proposed Action) – Issue Section 10 Permits for the Continued**
34 **Operation of the Eight Hatchery Programs**

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

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

5

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

9

1
2 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	225,000 yearling 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

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

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

6 ³ The full production target is 330,000 yearling smolts to meet the 2,000 hatchery-adult return goal; however, surplus
7 adult returns in recent years have resulted in lowering the smolt production to 215,000 yearling smolts.
8

9 **2.3. Alternatives Considered But Not Analyzed in Detail**

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

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

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

- 5
- 6 • **Status quo operation of the hatchery program – Under this alternative, the hatchery**
 7 **operators would continue to operate the program as under baseline conditions.**
 8 **This alternative was not evaluated in detail because it is not measurably different**
 9 **from the Proposed Action; no additional information about potential effects on the**
 10 **environment would be revealed from an analysis of status quo conditions.**
 - 11
 - 12 • Best Management Practices (BMPs) – Under this alternative, NMFS would
 13 approve the proposed hatchery programs by issuing section 10 permits, and the
 14 hatchery programs would be implemented as described in the HGMPs. However,
 15 under this alternative, additional BMPs would be applied to reduce adverse
 16 impacts of the hatchery programs on natural-origin Snake River populations. The
 17 proposed HGMPs have already implemented reforms that include BMPs
 18 considered necessary and appropriate for the proposed hatchery programs.
 19 Additional BMPs are unlikely to provide measurable benefit beyond the proposed
 20 BMPs included under Alternative 2 as the Proposed Action. Therefore, this
 21 alternative is not measurably different than the Proposed Action.
 - 22
 - 23 • Greater levels of hatchery production than those proposed – The operators could
 24 have proposed hatchery production levels greater than currently in the HGMPs
 25 submitted to NMFS. However, higher production levels would exceed the
 26 capacity of the production facilities in some cases and could potentially reduce the
 27 survival of the artificially propagated fish and, thus, would not meet the purpose
 28 and need, which includes meeting protection- and conservation-
 29 related requirements of the ESA.
 - 30
 - 31 • Lower levels of hatchery production than those proposed – The operators could
 32 have proposed production levels lower than proposed in the HGMPs. However,
 33 because the No-action Alternative will serve as a bookend with production being
 34 zero, any incrementally different level of production between zero and the
 35 proposed levels would not provide a large enough range to allow meaningful
 36 evaluation; it is also unlikely that a lower production level would meet the purpose
 37 and need, which includes meeting NMFS’s tribal treaty rights trust and fiduciary
 38 obligations.
 - 39
 - 40 • ~~Continue to operate the hatchery programs as they were operated in the past – The~~
 41 ~~operators could have proposed to operate the hatchery programs as operated prior~~
 42 ~~to 2011. The existing hatchery programs in northeast Oregon and southeast~~
 43 ~~Washington have undergone reform over the last decade. Hatchery programs were~~
 44 ~~substantially different prior to ESA listings in the 1990s. Because hatchery~~
 45 ~~reforms were directed at reducing effects of hatchery production that was harmful~~
 46 ~~to natural production, consideration of past hatchery practices as an alternative~~

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

1 **3. AFFECTED ENVIRONMENT**

2 **3.1. Introduction**

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

- 5 • Water quantity (Subsection 3.2)
- 6 • Water quality (Subsection 3.3)
- 7 • Fish listed under the ESA (Subsection 3.4)
- 8 • Fish not listed under the ESA (Subsection 3.5)
- 9 • Instream fish habitat (Subsection 3.6)
- 10 • Wildlife and marine mammals (Subsection 3.7)
- 11 • Socioeconomics (Subsection 3.8)
- 12 • Tourism and recreation (Subsection 3.9)
- 13 • Environmental justice (Subsection 3.10)

14

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

18

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

26

27 **3.2. Water Quantity**

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

40

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

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

7
8 Up to 2 percent of the water in Catherine Creek and Tanner Creek is temporarily diverted
9 at the Catherine Creek Acclimation Facility and Bonneville Hatchery for lower Snake
10 River hatchery programs (Table 2). Up to 6 percent of the water in the Imnaha River is
11 temporarily diverted to the Imnaha Satellite Facility (Table 2). Up to 94 percent of the
12 water in Lookingglass Creek is temporarily diverted at Lookingglass Hatchery (Table 2).
13 Less than 1 percent of the water in the Upper Grande Ronde and Wallowa Rivers is
14 temporarily diverted at the Upper Grande Acclimation Facility, Imnaha Satellite Facility,
15 and Wallowa Hatchery (Table 2). Up to 12 percent of the Lostine River is temporarily
16 diverted at the Lostine Acclimation Facility (Table 2). Up to 5 percent of the Tucannon
17 River is temporarily diverted at the Tucannon Hatchery and Curl Lake Acclimation Pond.
18 All thirteen hatchery facilities have current water rights.

19
20 The Northeast Oregon Hatchery (i.e., Lostine River Hatchery) is not currently in
21 operation, so no water is being diverted to this hatchery. However, the Northeast Oregon
22 Hatchery has a water right to divert up to 16.7 cfs from the Lostine River between the
23 water intake and discharge structure (Table 2).

24
25 A water right permit is required for all groundwater withdrawal except those supporting
26 single-family homes. All hatchery wells used by hatchery facilities supporting northeast
27 Oregon and southeast Washington hatchery programs are permitted by the Washington
28 Department of Ecology or the Oregon Water Resources Department (OWRD). No
29 northeast Oregon or southeast Washington hatchery facilities are located in areas
30 designated by Oregon as Critical Groundwater Areas (OWRD 2013). Critical
31 Groundwater Areas are not designated in Washington State.

1 **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	Lookingglass Creek	53 (September)	94	Lookingglass 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

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

5 ¹ Estimation

6 ² Acclimation facilities operate from approximately February through April.

7 ³ The NE Oregon Hatchery is not currently in operation.

8 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
9 propagates rainbow trout.

10 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
11 use of surface water from five months to two weeks per year.

12 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
13 Hatchery). January 15, 2013.

14 N/A: Not applicable.

1 3.3. Water Quality

2 Hatchery programs could affect several water quality parameters in the aquatic system.
3 Concentrating large numbers of fish within hatcheries could produce effluent with ammonia,
4 organic nitrogen, total phosphorus, biological oxygen demand, pH, and suspended solids
5 (Sparrow 1981; Ecology 1989; Kendra 1991; Cripps 1995; Bergheim and Åsgård 1996; Michael
6 2003). Chemical use within hatcheries could result in the release of antibiotics, fungicides, and
7 disinfectants into receiving waters (Boxall et al. 2004; Pouliquen et al. 2008; Martinez Bueno et
8 al. 2009). Other chemicals and organisms that could potentially be released by hatchery
9 operations are polychlorinated biphenyls (PCBs), dichlorodiphenyltrichloroethane (DDT) and its
10 metabolites (Missildine 2005; HSRG 2009), fish disease pathogens (HSRG 2005; HSRG 2009),
11 steroid hormones (Kolodziej et al. 2004), anesthetics, pesticides, and herbicides.
12

13 The direct discharge of hatchery facility effluent is regulated by the Environmental Protection
14 Agency under the Clean Water Act through National Pollutant Discharge Elimination System
15 (NPDES) permits. For discharges from hatcheries not located on federal or tribal lands within
16 Washington and Oregon, the Environmental Protection Agency has delegated its regulatory
17 oversight to the States. NPDES permits are not needed for hatchery facilities that release less
18 than 20,000 pounds of fish per year or feed fish less than 5,000 pounds of fish feed per year.
19 Additionally, Native American tribes may adopt their own water quality standards for permits on
20 tribal lands (i.e., tribal wastewater plans). All hatchery facilities used by the northeast Oregon
21 and southeast Washington hatchery programs are compliant with their NPDES permit or do not
22 require a NPDES permit. All hatchery effluent is passed through pollution abatement ponds to
23 settle out uneaten food and fish waste before being discharged into receiving waters.
24

25 Water quality in the Imnaha, Grande Ronde, and Tucannon River Basins varies considerably. In
26 general, the headwater areas of these watersheds are relatively pristine. Water quality tends to
27 degrade downstream, with the lowland areas near the mouth of each watershed typically being
28 the most degraded.
29

30 A valuable index of water quality is the 303(d) list under the federal Clean Water Act. A listing
31 of a river segment on the 303(d) list indicates that specific water quality parameters designated
32 by the federal Clean Water Act have been violated. In the Imnaha River Basin, the mainstem
33 river and larger tributaries are on the 303(d) list for elevated stream temperature during the
34 summer (Figure 2) (NRCS 2006a). The primary cause for the elevated stream temperature is the
35 loss of riparian habitat and the widening of stream channels. A variety of activities have caused
36 this stream degradation, including livestock grazing, farming, forestry, and road building (Table
37 3).

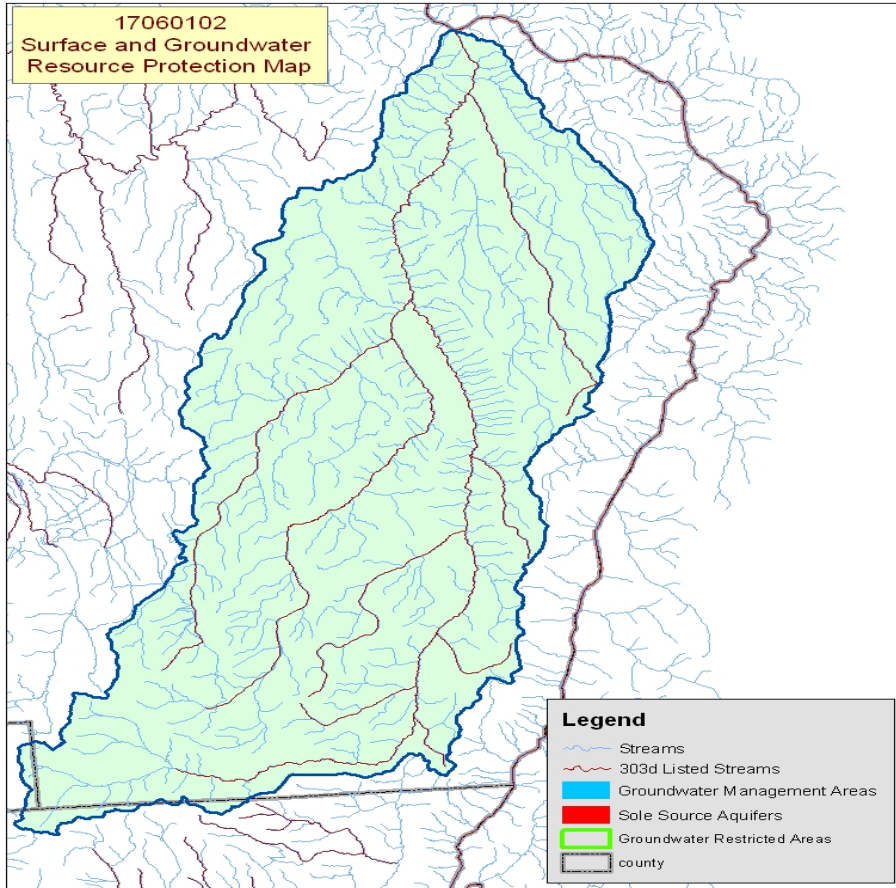
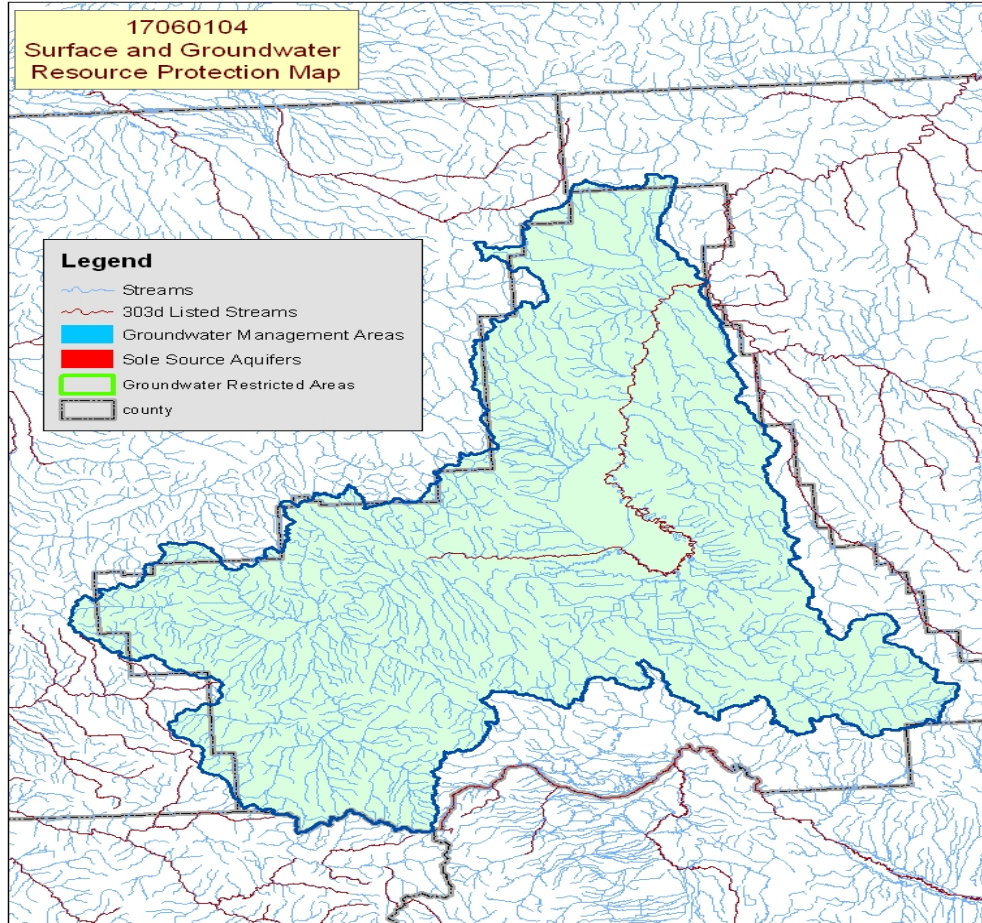


Figure 2. Map of the Imnaha watershed showing 303(d) listings of stream reaches.

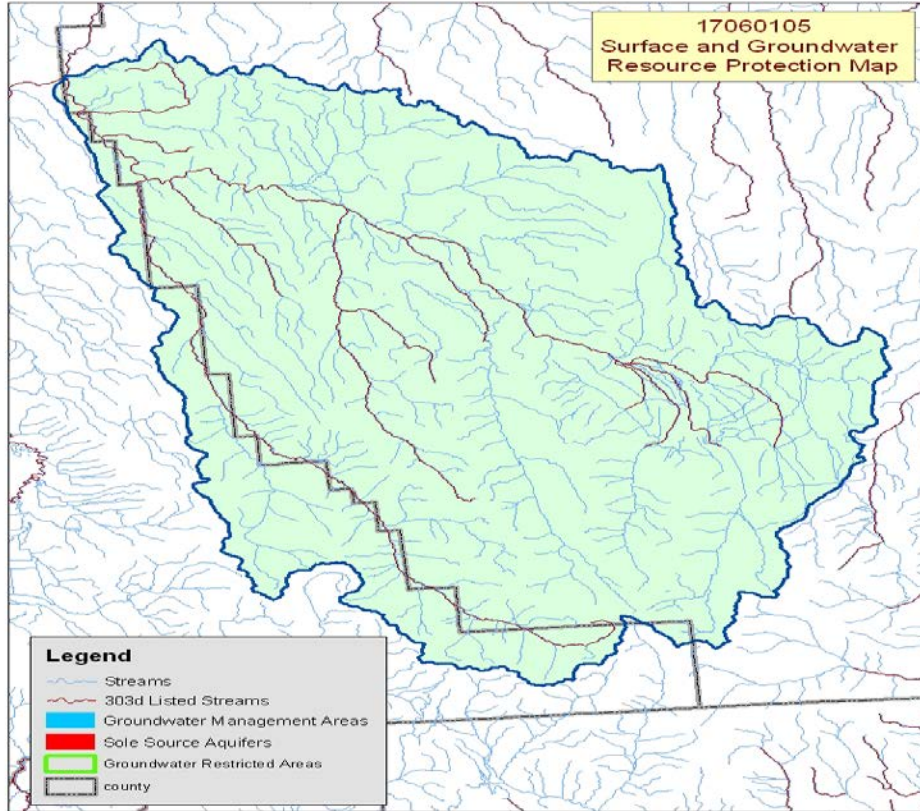
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In the Grande Ronde River Basin, the mainstem river and larger tributaries, such as the Wallowa River, are listed on the 303(d) list primarily for elevated stream temperature and excessive sediment input (Figure 3; Figure 4; Figure 5) (NRCS 2005a; 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).



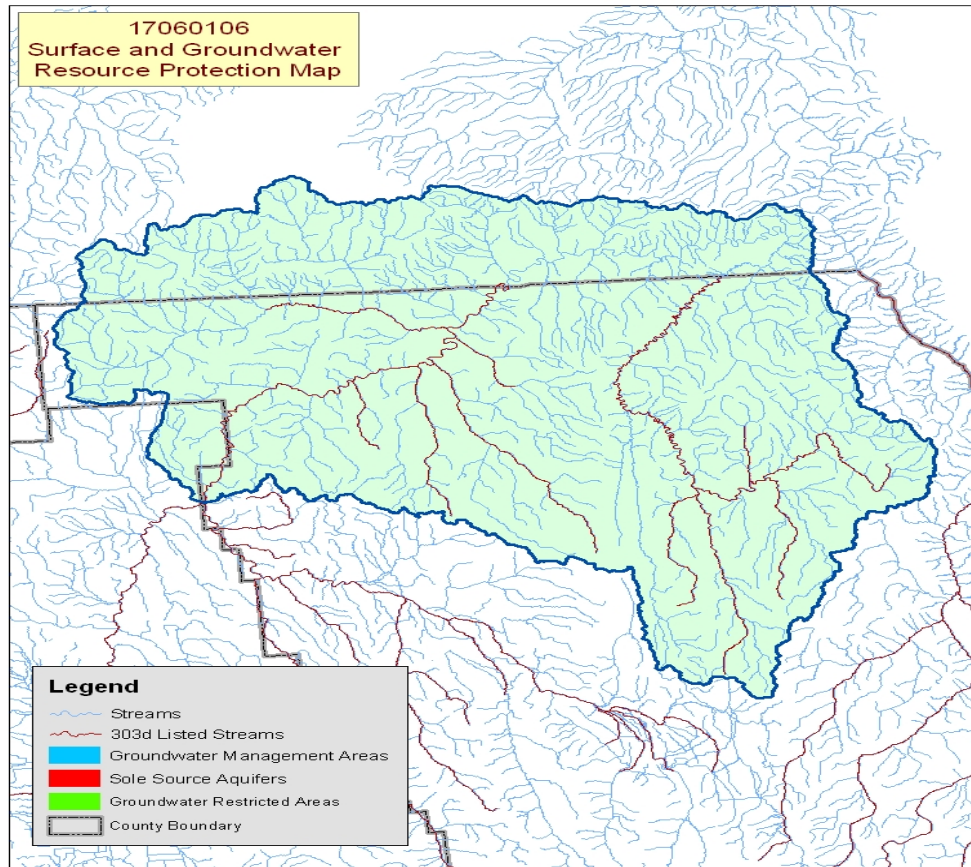
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Figure 3. Map of the Upper Grande Ronde watershed showing 303(d) listings of stream reaches.



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

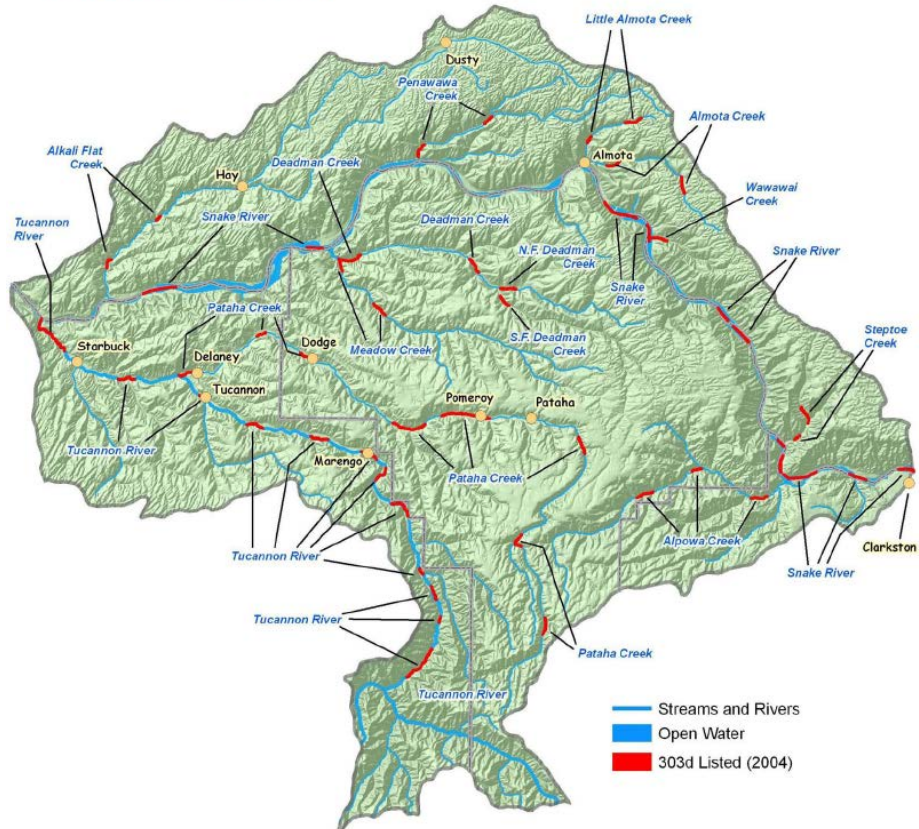


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Figure 5. Map of the lower Grande Ronde watershed showing 303(d) listings of stream reaches.

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.

303d Listed Surface Water Categories 4 & 5 Map



1
2 **Figure 6. Map of the Tucannon watershed (within the larger lower Snake River area)**
3 **showing 303(d) listings of stream reaches.**

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

9
10

1 **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

2 Source: NRCS 2005a; NRCS 2005b; NRCS 2006b; Ecology 2013; ODEQ 2006.

3 N/A = Not applicable because the facility is not yet operational or an NPDES permit is not required because the facility releases
4 less than 20,000 pounds of fish per year or feeds fish less than 5,000 pounds of fish feed per year.

5 ¹ Although the Snake and Columbia Rivers have 303(d) Category 5 assessed waters, the Lyons Ferry Hatchery, Irrigon, and Oxbow
6 Hatcheries do not release effluent into Category 5 assessed areas of these rivers (Ecology 2013).

7

1 3.4. Fish Listed Under the ESA

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

11
 12 Most of the empirical evidence of fitness depression due to hatchery-induced selection comes
 13 from studies of species that are reared in the hatchery environment for an extended period – 1 to
 14 2 years – prior to release (Berejikian and Ford 2004). Two especially well-publicized steelhead
 15 studies showed dramatic fitness declines in the progeny of naturally spawning hatchery-origin
 16 steelhead in the Hood River (Araki et al. 2007; Araki et al. 2008). However, the data and theory
 17 are insufficient to predict the magnitude and duration of loss in any particular situation. Recently
 18 studies of hatchery supplementation have also documented demographic benefits to natural
 19 production from hatchery fish spawning in the wild (Anderson et al. 2012; Berejikian et al. 2008;
 20 Hess et al. 2012). On balance, the benefits of artificial propagation for reducing extinction risk
 21 and for rebuilding severely depressed fish populations may outweigh the risks of fitness loss. In
 22 general, populations with fewer than 500 individuals are at a higher risk for inbreeding
 23 depression and a variety of other genetic concerns (McElhaney et al. 2000; McClure et al. 2003).
 24 Fifty spawners per year is the minimum number of individuals (often female) below which a
 25 population is likely to be critically and immediately imperiled (i.e., an extinction vortex) (Morris
 26 and Doak 2002).

27
 28 Hatchery supplementation also has the potential to increase competition with and predation on
 29 wild fish. However, hatchery programs may be designed to limit opportunities for co-occurrence
 30 and interaction between hatchery-origin fish and migrating natural-origin fish – **for example,**
 31 **through acclimation of hatchery-produced fish prior to release** – reducing potential adverse
 32 effects from competition and predation (Quinn 1993). Although poorly managed hatchery
 33 programs can increase disease and pathogen transfer risks, compliance with applicable protocols
 34 for fish health can effectively minimize this risk.

35
 36 Snake River spring/summer Chinook salmon, steelhead, and fall-run Chinook salmon are
 37 captured, handled, weighed, measured, sampled, and adipose fin-clipped or tagged for
 38 monitoring and evaluation at relatively high rates. In general, however, handling mortalities are
 39 very low. Although some of the monitoring is conducted for the purpose of evaluating the
 40 hatchery program, salmon and steelhead are also handled for run reconstruction purposes,
 41 broodstock collection (fall Chinook salmon), and for stock status monitoring. Adults are handled
 42 at Lower Granite Dam. Monitoring and evaluation to determine impacts on listed fish from
 43 hatchery programs can themselves have potential adverse impacts on listed fish through injuries
 44 incurred during sampling and marking. Sampling can include direct mortalities (e.g., genetic
 45 analysis, disease pathology, smolt condition) and incidental take (e.g., capture, sorting,
 46 handling). Marking is used for several reasons: (1) to determine which fish to include as

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

4
 5 Sampling methods can include the use of weirs, electro-fishing, hook and line, rotary screw
 6 traps, seines, hand nets, spawning ground surveys, snorkeling, radio tagging, and carcass
 7 recovery. Each sampling method can be used to collect a variety of information. Sample
 8 methods, like tagging methods, can adversely impact listed fish, both those targeted for data
 9 collection and those taken incidentally to the data collection.

10
 11 A more detailed discussion of the general effects of hatchery programs on salmon, steelhead, and
 12 their habitat can be found in the draft Environmental Impact Statement to Inform Columbia
 13 River Basin Hatchery Operations and the Funding of the Mitchell Act Hatchery Programs
 14 (NMFS 2010b).

15
 16 Since 1991, NMFS has identified two ESUs (Snake River spring/summer Chinook salmon and
 17 Snake River fall Chinook salmon) and one DPS (Snake River Basin steelhead) in the analysis
 18 area that require protection under the ESA (71 FR 834, January 5, 2006; 70 FR 37160, June 28,
 19 2005). In addition, the USFWS has identified bull trout as requiring protection under the ESA
 20 (63 FR 31647, June 10, 1998). Although Snake River sockeye salmon and other ESA-listed
 21 salmon and steelhead in the Columbia River Basin may intermingle with Snake River
 22 spring/summer Chinook salmon and steelhead while in the mainstem Snake and Columbia
 23 Rivers and Columbia River estuary, effects on these species are low to negligible for the
 24 following reasons:

- 25
- 26 • Hatchery-origin spring/summer Chinook and steelhead do not rear in the mainstem Snake
 27 and Columbia Rivers, and would only be in these areas for a short time while actively
 28 outmigrating.
- 29 • Once in the estuary, steelhead and spring/summer Chinook salmon migrate quickly into
 30 marine waters and, therefore, would not compete for food or space.
- 31

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

Effect Category	Description of Effect
Genetic risks	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Hatchery-origin fish can increase competition for food and space. • Hatchery-origin fish can increase predation on natural-origin salmon and steelhead.
Facility effects	<ul style="list-style-type: none"> • Hatchery facilities can reduce water quantity or quality in adjacent streams through water withdrawal and discharge.

Effect Category	Description of Effect
	<ul style="list-style-type: none"> • Weirs for broodstock collection or to control the number of hatchery-origin fish on the spawning grounds can have the following unintentional consequences: <ul style="list-style-type: none"> ○ Isolation of formerly connected populations ○ Limiting or slowing movement of migrating fish species, which may enable poaching or increase predation ○ 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
Masking	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Fisheries targeting hatchery-origin fish have incidental impacts on natural-origin fish.
Disease transfer	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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.

1 **Table 6. Abundance thresholds, current abundance, and viability risk ratings for six**
 2 **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?

3 ¹ ICTRT's recommended minimum abundances are based on a 10-year geometric mean.
 4 ² 5-year geometric mean 2003-2008
 5 ³ WDFW now has 5 years of adult estimates in Asotin Creek, and the returns are well over the 500 natural-origin spawner goal
 6 identified by the ICTRT (G. Mendel, pers. comm., WDFW, District Fish Biologist, March 11, 2013).
 7 ⁴ The question marks in this table are from the Ford (2011) status review documents, which is the source of the table's data.
 8 Source: Ford (2011)
 9

10 **3.4.3. Snake River Fall-run Chinook Salmon**

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

20
 21 The most recent short-term trend in natural-origin spawners was strongly positive, increasing at
 22 an average rate of 16 percent per year (Ford 2011). This positive abundance trend has continued
 23 over the last 5 years (through 2012) (G. Mendel, pers. comm., WDFW, District Fish Biologist,
 24 March 11, 2013). However, abundance and productivity risk for this population is considered
 25 moderate by the ICTRT (Table 7).
 26

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

9
 10 **Table 7. Abundance thresholds, current abundance, and viability risk ratings for Snake**
 11 **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

12 ¹ ICTRT's recommended minimum abundances are based on a 10-year geometric mean.

13 ² 5-year geometric mean 2003-2008

14 Source: Ford 2011

15

16 **3.4.4. Columbia River Bull Trout**

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

26

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

31

32 **3.5. Fish Not Listed Under the ESA**

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

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

3
4 Spring/summer Chinook salmon and steelhead eat lamprey, sculpin, pygmy whitefish, trout,
5 rockfish, and forage fish (**Table 8**). Spring/summer Chinook salmon and steelhead may become
6 prey for lamprey, sculpin, northern pikeminnow, trout, and rockfish, but none of these species
7 feed exclusively on salmon (**Table 8**). All non-listed fish species, except mountain sucker,
8 compete with spring/summer Chinook salmon and steelhead for food or space at some life stage
9 (Table 8). All fish species benefit from the addition of marine-derived nutrients from the
10 decomposition of salmon and steelhead carcasses (Table 8).

11
12 There are no species within the analysis area that have been designated by the State of Oregon as
13 threatened, endangered, or candidate fish species (except those that are federally listed and
14 discussed in Subsection 3.4, Fish Listed under the Endangered Species Act) (ODFW 2013).

15 There are several fish species as species of concern in the State of Washington, including leopard
16 dace, margined sculpin, mountain sucker, Paiute sculpin, river lamprey, and Umatilla dace (G.
17 Mendel, pers. comm., WDFW, District Fish Biologist, March 11, 2013). Pacific and river
18 lamprey are also a species of concern as identified by the USFWS (USFWS 2013).

19

1 **Table 8. Range and status of other fish species that may affected by Snake River**
 2 **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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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
			<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Prey for juvenile and adult salmon and steelhead • May compete with salmon and steelhead for food

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

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

6
7 **3.6. Instream Fish Habitat**

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

12
13 Water withdrawals may affect instream fish habitat if they reduce the amount of water in a river
14 between the hatchery’s water intake and discharge structures. A full discussion of the effects of
15 water withdrawal can be found in Subsection 3.2, Water Quantity.

16
17 The northeast Oregon and southeast Washington hatchery programs use hatchery facilities that
18 have several instream structures such as water intakes, fish ladders, and weirs. All hatchery
19 intakes on salmon and steelhead streams are screened to prevent fish injury from impingement or
20 permanent removal from streams. NMFS’s screening criteria for water withdrawal devices set
21 forth conservative standards that help minimize the biological risk of harming naturally produced
22 salmonids and other aquatic fauna (NMFS 2011). NMFS periodically updates its screening
23 criteria based on best available science and technology. Consequently, some hatcheries have
24 water intake screens that do not meet NMFS’s most current screening criteria, although they
25 meet the screening criteria that were in place when the water intake was installed. Hatchery
26 facilities upgrade their water intake screens as funding becomes available.

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

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

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

18
 19 Instream maintenance may include clearing of debris and bedload from hatchery intake screens
 20 and fish ladders or protecting banks from erosion. Instream maintenance such as clearing of
 21 debris and bedload from hatchery intake screens and fish ladders or protecting banks from
 22 erosion may increase stream sedimentation, but maintenance activities are usually small in scale
 23 and duration, and return conditions to what they were when structures were first constructed.

24

25 **3.7. Wildlife and Marine Mammals**

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

33

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

41

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

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

5
 6 There are several species of birds that feed on juvenile salmon including Caspian terns and
 7 cormorants. During the spring when salmon and steelhead juvenile outmigrate to the Pacific
 8 Ocean, they may be major food source for these bird populations.

9
 10 Finally, fishing in the analysis area has created fishery access points, roads, boat launches, and
 11 campsites that result in ongoing, but likely minor, habitat disruptions.

12 13 **3.8. Socioeconomics**

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

20
 21 NMFS (2010b) found that Columbia River basin hatchery operations and associated harvest on
 22 average contributed over \$10 million in personal income and 414 jobs to the lower Snake River
 23 regional economy between 2002 and 2006. The eight northeast Oregon and southeast
 24 Washington hatchery programs directly employ 49 full-time employees and 18 seasonal
 25 employees (CTUIR 2011; NPT 2011; ODFW 2011a; ODFW 2011b; ODFW 2011c; ODFW
 26 2011d; WDFW 2011a; WDFW 2011b).

27
 28 Fisheries contribute to local economies through the purchase of supplies such as fishing gear,
 29 camping equipment, consumables, and fuel at local businesses. All of these expenditures would
 30 be expected to support local businesses, but it is unknown how dependent these businesses are on
 31 fishing-related expenditures. Anglers would also be expected to contribute to the economy
 32 through outfitter/guide/charter fees.

33
 34 Hatchery-origin fish produced in northeast Oregon and southeast Washington are caught in
 35 mixed-stock fisheries in the Columbia and Snake River mainstems. Hatchery-origin steelhead
 36 are targeted in non-tribal, recreational fisheries in the Tucannon, Imnaha, and Grande Ronde
 37 River Basins. Non-tribal, recreational fisheries also target hatchery-origin spring/summer
 38 Chinook salmon in the Imnaha River, Wallowa River, and Lookingglass Creek. Spring Chinook
 39 salmon fisheries that target hatchery-origin fish are anticipated in the Tucannon and lower
 40 Grande Ronde Rivers in the near future. Although data on the amount of money and the number
 41 of jobs currently supported through fishing-related expenditures in the northeast Oregon and
 42 southeast Washington are not available, fishing-related expenditures in the state of Washington

1 accounted for less than 0.2 percent (\$534 million³) of the total state revenue in 2006, and salmon
2 and steelhead angling only accounted for a portion of that total (USCB 2013). No similar study
3 was found for Oregon, but fishing could be expected to contribute to a similar proportion of the
4 total state economy based on similarities between industries found in the two states. Although,
5 fishing represents a small percentage of the overall state revenue, fishing for salmon and
6 steelhead can contribute substantially to local economies in Northeast Oregon and Southeast
7 Washington (G. Mendel, pers. comm., WDFW, District Fish Biologist, March 11, 2013).

8
9 Hunting, fishing, and gathering have been important to tribes for thousands of years. These
10 activities continue to be important today, both economically and for subsistence and ceremonial
11 purposes. Natural resources continue to play a dominant role in tribal culture, and a primary
12 factor in tribal economies.

13
14 The fish that escape the ocean and Columbia River fisheries are targeted in tribal fisheries in the
15 analysis area. Tribal fisheries occur within the action area, using traditional fishing equipment
16 created by local tribal craftsmen. It is difficult or impossible to monetize these purposes to the
17 tribal people. The harvest of spring/summer Chinook salmon have a monetary benefit for tribal
18 members and their families by providing a local, traditional food source as well as supporting
19 local craftsmen who make traditional fishing gear for harvest. The sale of some harvested fish
20 also brings in revenue for tribal members and their families. Additionally, the availability of
21 local fish reduces tribal reliance on other consumer goods, or travel costs to participate in other
22 fisheries.

23 24 **3.9. Tourism and Recreation**

25 Tourism and recreation in the analysis area are generally focused on outdoor activities such as
26 camping, hiking, sightseeing, fishing, and hunting. Hatchery programs contribute to tourism and
27 recreation in the analysis area by increasing fishing opportunity and providing tours of their
28 hatchery facilities. Specific data are not available on the proportion of fishing trips taken in
29 Oregon and Washington when compared to all tourism and recreational trips. However, data are
30 available for Idaho (not in the analysis area), where fishing only accounts for about 3 percent of
31 all tourism and recreation trips (Travel USA 2008; ASA 2008; Felder 2007). Slightly higher
32 percentages are expected in Oregon and Washington because Oregon and Washington have
33 freshwater and marine fisheries. However, the proportion of fishing trips relative to all tourism
34 and recreations trips in Oregon and Washington would still be expected to be low because they
35 provide similar outdoor recreational opportunities as in Idaho. The regions affected also have
36 similar populations, industry, and access to outdoor activities through public land. Therefore, it
37 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).

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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 Hispanic⁴
- 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.

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

7
 8 Four additional hatchery facilities support the northeast Oregon and southeast Washington
 9 hatchery programs but are found outside of the Tucannon, Innaha, and Grande Ronde River
 10 Basins: the Lyons Ferry, Irrigon, Oxbow, and Bonneville Hatcheries. The Lyons Ferry Hatchery
 11 is located in Franklin County (WA), the Irrigon Hatchery is located in Morrow County (OR), the
 12 Oxbow Hatchery is located in Hood River County (OR), and the Bonneville Hatchery is located
 13 in Multnomah County (OR) (Subsection 1.4, Action Area). All nine counties in the analysis area
 14 are environmental justice counties of concern because they meaningfully exceed thresholds for
 15 low income or minority populations (Table 9).

16
 17 **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

18 Shading of cells represents values that meaningfully exceeded (greater than 10 percent) those of the reference population, making
 19 them an environmental justice community of concern.

20 Source: <http://quickfacts.census.gov/qfd/states/53/53003.html>

21
 22 EPA guidance regarding environmental justice extends beyond statistical threshold analyses to
 23 consider explicit environmental justice effects on Native American tribes (EPA 1998). Federal
 24 duties under the Environmental Justice Executive Order, the presidential directive on
 25 government-to-government relations, and the trust responsibility to Indian tribes may merge
 26 when the action proposed by another federal agency or the EPA potentially affects the natural or
 27 physical environment of a tribe. The natural or physical environment of a tribe may include
 28 resources reserved by treaty or lands held in trust; sites of special cultural, religious, or
 29 archaeological importance, such as sites protected under the National Historic Preservation Act
 30 or the Native American Graves Protection and Repatriation Act; and other areas reserved for
 31 hunting, fishing, and gathering (usual and accustomed, which may include “ceded” lands that are
 32 not within reservation boundaries). Potential effects of concern may include ecological, cultural,

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

3
4 Two Native American Tribes are operators of the proposed hatchery programs in the analysis
5 area: the Confederated Tribes of the Umatilla Reservation and the Nez Perce Tribe. These
6 Tribes have treaty-guaranteed rights to fish in northeast Oregon and southeast Washington. The
7 rights of these Stevens' Treaty Tribes have been adjudicated in federal court. The Shoshone-
8 Bannock Tribes have also indicated that they plan to develop fisheries in northeast Oregon and
9 southeast Washington in the future consistent with their claims of treaty rights (NMFS 2010b).
10 For analytical purposes, they have been considered here for environmental justice review.⁵

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12
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14

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 United 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.

1 **4. ENVIRONMENTAL CONSEQUENCES**

2 **4.1. Introduction**

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

14

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

18	Undetectable:	The impact would not be detectable.
19	Negligible:	The impact would be at the lower levels of detection and could be
20		positive or negative.
21	Low:	The impact would be slight, but detectable, and could be positive or
22		negative.
23	Medium:	The impact would be readily apparent and could be positive or negative.
24	High:	The impact would be severe or greatly beneficial.
25		

25

26 **4.2. Effects on Water Quantity**

27 **4.2.1. Alternative 1 (No Action) – Do Not Issue Section 10 Permits for the Continued**
28 **Operation of the Eight Hatchery Programs**

29 Under Alternative 1, eight northeast Oregon and southeast Washington hatchery programs would
30 be terminated immediately (Subsection 2.1, Alternative 1). Seven of the hatchery facilities that
31 support these hatchery programs would close, but six hatchery facilities (Irrigon Hatchery,
32 Wallowa Hatchery, Oxbow Hatchery, Bonneville Hatchery, Tucannon Hatchery, and Lyons
33 Ferry Hatchery) would continue to operate since these facilities are also used to support hatchery
34 programs that are not part of the Proposed Action. Consequently, short- and long-term water use
35 would be less under Alternative 1 relative to baseline conditions. There would be no change in
36 compliance with water permits or water rights at any of the hatchery facilities under Alternative
37 1 because less water would be used at the hatchery facilities relative to baseline conditions or the
38 permits or water rights would no longer be necessary or applicable (Subsection 3.2, Water
39 Quantity). An analysis of the site-specific effects of Alternative 1 is provided below. All effects
40 of the alternatives are localized, short- and long-term effects.

41

42

1 **Lyons Ferry and Irrigon Hatcheries**

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

9
 10 **Catherine Creek Acclimation Facility, Upper Grande Ronde Acclimation Facility, Lostine
 11 Acclimation Facility, Imnaha Satellite Facility, Curl Lake Acclimation Pond, Little Sheep
 12 Creek Acclimation Facility and Oxbow Hatchery**

13
 14 Catherine Creek Acclimation Facility, Upper Grande Ronde Acclimation Facility, Lostine
 15 Acclimation Facility, Imnaha Satellite Facility, Curl Lake Acclimation Pond, Little Sheep Creek
 16 Acclimation Facility, and Oxbow Hatchery use surface water exclusively. All water diverted
 17 from rivers (minus evaporation) is returned after it circulates through the facility, so the only
 18 segment of the river that may be impacted by a hatchery facility would be the area between the
 19 water intake and discharge structures (Subsection 3.2, Water Quantity).

20
 21 Under Alternative 1, all of the acclimation and satellite facilities would be closed, and between 5
 22 and 15 cfs less water would be diverted from rivers and creeks between the water intake and
 23 discharge structures relative to baseline conditions (Table 10). Under baseline conditions,
 24 Catherine Creek Acclimation Facility, Upper Grande Ronde Acclimation Facility, Imnaha
 25 Satellite Facility, and Curl Lake Acclimation Pond divert less than 6 percent of surface water
 26 during low-flow conditions (Table 2), so closing these hatchery facilities would be expected to
 27 have a low, beneficial effect on surface water between the water intake and discharge structures
 28 during low-flow conditions in Catherine Creek, Upper Grande Ronde River, Lostine River,
 29 Imnaha River, Tucannon River, Little Sheep Creek, and Columbia River relative to baseline
 30 conditions (Table 2).

31
 32 It is unknown what percentage of surface water is diverted to Little Sheep Creek Acclimation
 33 Facility because flow information is not available for Little Sheep Creek. Under Alternative 1,
 34 the Little Sheep Acclimation Facility would close, though, and up to 8.9 cfs more water would
 35 remain in Little Sheep Creek between the intake and discharge structures relative to baseline
 36 conditions.

37
 38 Under Alternative 1, hatchery production at Oxbow Hatchery would be reduced since
 39 approximately 15 percent of the facility is used to support the northeast Oregon and southeast
 40 Washington hatchery programs. Consequently, approximately 15 cfs less water would be
 41 diverted from Oxbow Springs. This would be expected to have a low, beneficial effect on
 42 surface water between the intake and discharge structures relative to baseline conditions because
 43 the impact would be slight but detectable.

44

1 **Lookingglass Hatchery, Northeast Oregon Hatchery, Tucannon Hatchery, Wallowa**
2 **Hatchery, and Bonneville Hatchery**

3
4 Lookingglass Hatchery, Northeast Oregon Hatchery, Tucannon Hatchery, Wallowa Hatchery,
5 and Bonneville Hatchery use both groundwater and surface water (Table 10). All surface water
6 diverted (minus evaporation) is returned after it circulates through the facility. The only segment
7 of the rivers and creeks that may be impacted by the hatchery facilities would be the area
8 between the water intake and discharge structures (Subsection 3.2, Water Quantity).

9
10 Under Alternative 1, the Wallowa, Tucannon, and Lookingglass Hatcheries would be closed.
11 The Wallowa Hatchery diverts up to 0.2 percent of surface water (0.25 cfs) during low-flow
12 conditions (Table 2), so although 0.25 cfs more water would be in the Wallowa River between
13 the water intake and discharge structures, Alternative 1 would be expected to have a negligible
14 effect on flow in the Wallowa River relative to baseline conditions because the change would be
15 at the lower levels of detection. Under Alternative 1, the Wallowa Hatchery would use 0.15 cfs
16 less groundwater relative to baseline conditions (Table 10), which would be expected to have a
17 negligible effect on groundwater levels because the impact would be at the lower level of
18 detection.

19
20 The Tucannon Hatchery diverts up to 5 percent of surface water available between the water
21 intake and discharge structures during low-flow conditions to support the steelhead hatchery
22 program (Table 2), so the effects of Alternative 1 would be medium and beneficial relative to
23 baseline conditions and may reduce the long-term potential for impacts on fish and wildlife as a
24 result of stream dewatering. Under Alternative 1, the Tucannon Hatchery would use 0.53 cfs
25 less groundwater than under baseline conditions (Table 10), which would be expected to have a
26 negligible effect on groundwater levels because the impact would be at the lower level of
27 detection.

28
29 The Lookingglass Hatchery diverts up to 94 percent of the water in Lookingglass Creek between
30 the water intake and discharge structures during low-flow conditions (Table 2). Alternative 1
31 would have a medium and beneficial effect on surface flow between the water intake and
32 discharge structure relative to baseline conditions because the effect would be readily apparent,
33 and it would be expected to reduce the long-term potential for impacts on fish and wildlife as a
34 result of stream dewatering in Lookingglass Creek. Under Alternative 1, the Lookingglass
35 Hatchery would use 5 cfs less groundwater than under baseline conditions (Table 10). These
36 reductions in water use would be slight but detectable to groundwater levels, and may increase
37 the amount of water available for other users of the aquifer. Therefore, Alternative 1 would have
38 a low and beneficial effect on groundwater relative to baseline conditions.

39
40 Under Alternative 1, the Upper Grande Ronde captive brood hatchery program would be
41 terminated, which would reduce the amount of water used at Bonneville Hatchery relative to
42 baseline conditions (Table 10). Under baseline conditions, the captive brood program diverts
43 less than 1 percent of the water in Tanner Creek during low-flow conditions (Table 10), so
44 Alternative 1 would increase the amount of water in Tanner Creek relative to baseline
45 conditions, but the effects would be at the lower levels of detection. Therefore, Alternative 1
46 would be expected to have a negligible effect on flow in Tanner Creek relative to baseline

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

4
 5 The Northeast Oregon Hatchery is not currently in operation (Subsection 3.2, Water Quantity),
 6 so Alternative 1 would not lead to any changes in the amount of surface water or groundwater
 7 diverted to the hatchery relative to baseline conditions (Table 10).
 8

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

11 ¹Acclimation facilities operate from approximately February through April.

12 ²The NE Oregon Hatchery is not currently in operation. The values in Table 3 (Subsection 3.2, Water Quantity) represent
 13 forecasted water use.

14 ³Currently, the captive brood program at Bonneville Hatchery only used surface water for five months per year (June through
 15 October). After 2013, they expect to reduce their use of surface water from five months to two weeks per year.
 16

17 **4.2.2. Alternative 2 (Proposed Action) – Issue Section 10 Permits for the Continued**
 18 **Operation of the Eight Hatchery Programs**

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

1

2 **Lyons Ferry and Irrigon Hatcheries**

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

9

10 **Catherine Creek Acclimation Facility, Upper Grande Ronde Acclimation Facility, Lostine** 11 **Acclimation Facility, Imnaha Satellite Facility, Curl Lake Acclimation Pond, Little Sheep** 12 **Creek Acclimation Facility, and Oxbow Hatchery**

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

19

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

28

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

33

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

38

39 **Lookingglass Hatchery, Northeast Oregon Hatchery, Tucannon Hatchery, Wallowa** 40 **Hatchery, and Bonneville Hatchery**

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

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

3
4 Under Alternative 2, the Wallowa, Tucannon, and Lookingglass Hatcheries would continue to
5 operate. The Wallowa Hatchery would divert up to 0.2 percent of surface water during low-flow
6 conditions (Table 2). Because the amount of water diverted is very low relative to the total
7 amount of water in the Wallowa River, Alternative 2 would be expected to have a negligible
8 effect on flow in the Wallowa River relative to Alternative 1. Under Alternative 2, the Wallowa
9 Hatchery would use 0.15 cfs of groundwater (Table 10). Although the capacity of the aquifer
10 has not been calculated, effects on groundwater levels would likely be at the lower level of
11 detection. Therefore, Alternative 2 would be expected to have a negligible effect on
12 groundwater levels relative to Alternative 1.

13
14 The Tucannon Hatchery diverts up to 5 percent of surface water available between the water
15 intake and discharge structures during low-flow conditions to support the proposed hatchery
16 programs (Table 2), so the effects of Alternative 2 would be medium and adverse relative to
17 baseline Alternative 1 and may increase the long-term potential for impacts on fish and wildlife
18 as a result of stream dewatering. Under Alternative 2, the Tucannon Hatchery would use 0.57
19 cfs more groundwater than under baseline conditions (Table 10). Although the capacity of the
20 aquifer has not been calculated, effects on groundwater levels would likely be at the lower level
21 of detection. Therefore, Alternative 2 would be expected to have a negligible effect on
22 groundwater levels relative to Alternative 1.

23
24 The Lookingglass Hatchery diverts up to 94 percent of the water in Lookingglass Creek between
25 the water intake and discharge structures during low-flow conditions (Table 2). Because the
26 impact would be readily apparent, Alternative 2 would have a moderate, adverse effect on
27 surface flow between the water intake and discharge structure relative to Alternative 1. Under
28 Alternative 2, the Lookingglass Hatchery would use 5 cfs more groundwater than under
29 Alternative 1 (Table 10). This increase in water use would be slight but detectable to
30 groundwater levels. Therefore, Alternative 2 would have a low, adverse effect on groundwater
31 relative to Alternative 1.

32
33 Under Alternative 2, Bonneville Hatchery would divert 0.58 cfs more surface water from Tanner
34 Creek than under Alternative 1 to support the Upper Grande Ronde captive brood hatchery
35 program (Table 10). The captive brood program would divert less than 1 percent of surface
36 water during low-flow conditions (Table 2), which would be at the lower levels of detection, so
37 Alternative 2 would be expected to have a negligible effect on flow in Tanner Creek relative to
38 Alternative 1. Under Alternative 2, the Bonneville Hatchery would use 1.25 cfs more
39 groundwater than under Alternative 1 (Table 2), which would be expected to have a negligible
40 effect on groundwater levels.

41
42 Under Alternative 2, the Northeast Oregon Hatchery would use 16.7 cfs more surface water and
43 3.2 cfs more groundwater than under Alternative 1 (Table 10). Because the Northeast Oregon
44 Hatchery would divert up to 36 percent of surface water between the intake and discharge
45 structures during low-flow conditions (Table 2), the impact would be readily apparent.
46 Therefore, Alternative 2 would have a moderate, adverse impact on surface water relative to

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

5

6 **4.3. Effects on Water Quality**

7 **4.3.1. Alternative 1 (No Action) – Do Not Issue Section 10 Permits for the** 8 **Continued Operation of the Eight Hatchery Programs**

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

22

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

29

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

39

40 **4.3.2. Alternative 2 (Proposed Action) – Issue Section 10 Permits for the Continued** 41 **Operation of the Eight Hatchery Programs**

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

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

11
 12 Alternative 2 would not be expected to change any of the 303(d) lists relative to Alternative 1
 13 because the contribution of substances from these hatchery programs would be very small
 14 relative to the contribution of substances from activities such as livestock grazing, farming,
 15 forestry, and road building (Subsection 3.3, Water Quality). Relatively pristine conditions in the
 16 Imnaha, Grande Ronde, and Tucannon River basin headwater areas would remain unchanged
 17 under Alternative 2 relative to Alternative 1, as would ongoing lowland degradation to riparian
 18 areas and stream channels.

19
 20 Although there would be low, localized adverse impacts on water quality relative to Alternative
 21 1, there would be no change in compliance with applicable NPDES permits or tribal wastewater
 22 plans at the hatchery facilities relative to Alternative 1 because production levels would fall
 23 within the limits of existing permits or plans (Subsection 3.3, Water Quality).

24

25 **4.4. Effects on Fish Listed Under the ESA**

26 **4.4.1. Alternative 1 (No Action) – Do Not Issue Section 10 Permits for the** 27 **Continued Operation of the Eight Hatchery Programs**

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

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

6 **Snake River Spring/Summer Chinook Salmon**

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

16 **Snake River Basin Steelhead**

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

28 **Snake River Fall-run Chinook Salmon**

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

39 **Columbia River Bull Trout**

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

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

7
8 **THE FOLLOWING IS NEW TEXT FROM THE DRAFT ENVIRONMENTAL ASSESSMENT**
9

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

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

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

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

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

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

- 4 • Like under Alternative 1, there would be no masking effects under Alternative 2
 5 because 100 percent of the hatchery-origin releases would be marked or tagged such
 6 that they are identifiable as hatchery-produced.
- 7 • Disease risks associated with the proposed hatchery programs would increase under
 8 Alternative 2 relative to Alternative 1 since the hatchery programs would not operate
 9 under Alternative 1. However, under Alternative 2, disease transfer risks would be
 10 low because: (1) adults used in broodstock would be screened for disease and
 11 diseased eggs would be culled to minimize vertical transfer of disease from parent to
 12 offspring, (2) regular health exams would be performed on all juveniles in the
 13 hatchery, (3) juveniles would be reared in densities and flows designed to reduce
 14 stress and disease susceptibility, (4) protocols would be used to minimize transfer of
 15 disease between raceways, and (5) hatchery managers would adhere to disease
 16 protocols if disease was detected.
- 17 • Nutrient cycling benefits associated with the proposed hatchery programs would
 18 increase under Alternative 2 relative to Alternative 1 since the hatchery programs
 19 would not operate under Alternative 1. Nutrient cycling benefits would be low and
 20 result from increasing the abundance of adult returns that deliver marine-derived
 21 nutrients into interior freshwater systems.

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

- 28 1. The mortality rate for capture, tagging, and release is low (less than 1 percent) (B.
 29 Farman, pers. comm. April 22, 2013).
- 30 2. A small proportion of the total number of smolts are intercepted during monitoring and
 31 evaluation activities.

32 Best management practices used in the proposed hatchery programs would minimize impacts on
 33 salmon, steelhead, and bull trout in the analysis area. Because the proposed programs are only
 34 supplementing spring/summer Chinook salmon and steelhead, genetic risks would only be a
 35 concern for these species. That is, the proposed program could not affect the genetics of fall-run
 36 Chinook salmon or bull trout because steelhead and spring/summer Chinook salmon do not
 37 interbreed with these species. Species-specific summaries of the effects of Alternative 2 on
 38 population viability are discussed below. Effects of Alternative 2 on critical and essential fish
 39 habitat of listed fish species are discussed in Subsection 4.6, Effects on Instream Fish Habitat.
 40

~~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,

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

3 **Snake River Basin Steelhead**

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

29

30 **Snake River Fall-run Chinook Salmon**

31 Currently, the Snake River fall Chinook salmon population has a moderate level of risk
32 associated with its abundance, productivity, spatial structure, and diversity (Subsection 3.4.3,
33 Snake River Fall-run Chinook Salmon). There is limited overlap of spawning habitat between
34 spring/summer and fall Chinook salmon in the action area, and broodstock collection under
35 Alternative 2 would not be expected to impact fall Chinook salmon. Alternative 2 would not
36 change the percent of historical range remaining in this ESU or number of hatchery-origin fall
37 Chinook salmon relative to Alternative 1. Alternative 2 would increase the total number of
38 salmon and steelhead in the analysis **area by almost 2 million juvenile fish relative to Alternative**
39 **1**, which may increase competition for food and space relative to Alternative 1 and reduce
40 survival rates for Snake River fall Chinook salmon. However, **Alternative 2 would not change**
41 **production levels relative to baseline conditions, so competition would be similar as under**
42 **baseline conditions and there would be no expected change in survival rates compared to**
43 **baseline conditions.** ~~because Alternative 1 would only reduce the total number of Columbia-~~
44 ~~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.

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

4
5 **4.5.2. Alternative 2 (Proposed Action) – Issue Section 10 Permits for the Continued**
6 **Operation of the Eight Hatchery Programs**

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

19
20 Lamprey, margined sculpin, northern pikeminnow, trout, and rockfish are known to feed on
21 salmon species (Subsection 3.5, Fish Not Listed under the ESA). However, because Alternative
22 2 would increase the number of salmon and steelhead produced in the Columbia River Basin by
23 less than 1 percent relative to Alternative 1, and because none of these species feed exclusively
24 on salmon, Alternative 2 would be expected to have an undetectable effect on lamprey, margined
25 sculpin, northern pikeminnow, trout, and rockfish distribution or survival.

26
27 Alternative 2 would not be expected to change any state or federal species designations relative
28 to Alternative 1 because (1) the analysis area is only a small portion of each species range
29 (Subsection 3.5, Fish Not Listed under the ESA), (2) Alternative 2 would increase the number of
30 hatchery-origin salmon and steelhead in the Columbia River Basin by less than 1 percent, and (3)
31 Salmon and steelhead are not exclusive predators or prey for any of the fish species.

32
33 The proposed hatchery programs would not result in the introduction or spread of a non-
34 indigenous species because the action considered in this environmental assessment is limited to
35 production of salmon and steelhead, which are indigenous to the Grande Ronde and Imnaha
36 River basins. Though some non-indigenous fish species may benefit from the additional prey
37 available from the hatchery-production, the programs would not introduce new species or expand
38 their current range. Any additional effects of Alternative 2 on the habitat of non-listed fish
39 species are discussed in Subsection 4.6, Effects on Instream Fish Habitat.

1 **4.6. Effects on Instream Fish Habitat**

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

5 **4.6.1. Alternative 1 (No Action) – Do Not Issue Section 10 Permits for the**
6 **Continued Operation of the Eight Hatchery Programs**

7 Under Alternative 1, eight northeast Oregon and southeast Washington hatchery programs would
8 be terminated immediately (Subsection 2.1, Alternative 1). Seven of the hatchery facilities that
9 support these hatchery programs would close, but six hatchery facilities (Irrigon Hatchery,
10 Wallowa Hatchery, Oxbow Hatchery, Tucannon Hatchery, Lyons Ferry Hatchery, and
11 Bonneville Hatchery) would continue to operate since these facilities are also used to support
12 hatchery programs that are not part of the Proposed Action. Therefore, there would be no need
13 to withdrawal water, operate instream structures (e.g., fish ladders), or maintain instream
14 structures at these facilities. As a result, relative to baseline conditions, Alternative 1 would (1)
15 increase the amount of water in 10 streams and rivers between the water intake and discharge
16 structures⁶, which would increase fish habitat and reduce any fish displacement, (2) reduce
17 biological risks associated with weirs or water intake structures, and (3) reduce sedimentation
18 that may result from protecting banks from erosions or clearing debris from the water intake
19 structures (Subsection 3.6, Instream Fish Habitat).

20
21 As described in Subsection 3.5, Fish Listed under the ESA, critical and essential fish habitat for
22 Snake River salmon and steelhead includes stream reaches where the hatchery facilities are
23 located. Essential features of their habitat include adequate substrate (especially spawning
24 gravel), water quality, water quantity, water temperature, water velocity, cover/shelter, food,
25 riparian vegetation, space, and suitable migration conditions. Alternative 1 would provide some
26 benefits to water quality and water quantity relative to baseline conditions (Subsection 4.3,
27 Effects on Water Quality; Subsection 4.2, Effects on Water Quantity). Alternative 1 would also
28 reduce competition for space and food relative to baseline conditions (Subsection 4.4, Effects on
29 Fish Listed under the ESA). No other habitat features would be affected by Alternative 1.

30
31 **4.6.2. Alternative 2 (Proposed Action) – Issue Section 10 Permits for the Continued**
32 **Operation of the Eight Hatchery Programs**

33 Under Alternative 2, eight northeast Oregon and southeast Washington hatchery programs would
34 operate as proposed in submitted HGMPs (Subsection 2.2, Alternative 2). Consequently, there
35 would be an increase in water withdrawal, the use of instream structures (e.g., fish ladders), and
36 the maintenance of instream structures relative to Alternative 1. As a result, relative to
37 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).

1 between the water intake and discharge structures⁷, which would reduce fish habitat for rearing
 2 and may increase fish displacement; (2) increase biological risks associated with weirs or water
 3 intake structures; and (3) increase sedimentation that may result from protecting banks from
 4 erosions or clearing debris from the water intake structures (Subsection 3.6, Instream Fish
 5 Habitat).

6
 7 As described in Subsection 3.4, Fish Listed under the ESA, critical and essential fish habitat for
 8 Snake River salmon and steelhead includes stream reaches where the hatchery facilities are
 9 located. Essential features of their habitat include adequate substrate (especially spawning
 10 gravel), water quality, water quantity, water temperature, water velocity, cover/shelter, food,
 11 riparian vegetation, space, and suitable migration conditions. Alternative 2 would have some
 12 adverse effects on water quantity and water quality relative to Alternative 1 (Subsection 4.2,
 13 Effects on Water Quantity; Subsection 4.3, Effects on Water Quality). Alternative 2 would also
 14 increase competition for space and food relative to Alternative 1 (Subsection 4.4, Effects on Fish
 15 Listed under the ESA). As under Alternative 1, no other habitat features would be affected by
 16 Alternative 2.

17 **4.7. Effects on Wildlife and Marine Mammals**

19 **4.7.1. Alternative 1 (No Action) – Do Not Issue Section 10 Permits for the** 20 **Continued Operation of the Eight Hatchery Programs**

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

27
 28 Steller sea lions and California sea lions are known to feed on returning adult salmon in the
 29 Columbia River Basin downstream of Bonneville Dam and are likely eating hatchery-origin fish
 30 from the eight northeast Oregon and southeast Washington hatchery programs. (Subsection 3.7,
 31 Wildlife and Marine Mammals). Consequently, Alternative 1 would reduce the number of
 32 salmon and steelhead available to Steller sea lions and California sea lions in the vicinity
 33 downstream of Bonneville Dam. However, because Alternative 1 would only lead to a small
 34 reduction in the total number of salmon and steelhead migrating past Bonneville Dam while the
 35 sea lions present, Alternative 1 is not expected to change sea lion diet, survival, or distribution
 36 relative to baseline conditions.

37
 38 Southern resident killer whales also feed on adult salmon, and prefer Chinook salmon. However,
 39 because southern resident killer whales have limited spatial overlap with Snake River
 40 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).

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

4
 5 Alternative 1 would reduce the number of juvenile salmon and steelhead available as a food
 6 source for Caspian terns, cormorants, and other bird populations in the analysis area that
 7 traditionally feed on juvenile salmon (Subsection 3.7, Wildlife and Marine Mammals).
 8 However, because Alternative 1 would reduce the total number juvenile hatchery-origin salmon
 9 and steelhead by less than 1 percent, it would not be expected to change the diet, survival, or
 10 distribution of Caspian terns, cormorants, or other bird populations relative to baseline
 11 conditions.

12
 13 Habitat disruption may occur from physical damage or disruption by anglers targeting hatchery-
 14 origin spring/summer Chinook salmon and steelhead. There is some potential for these activities
 15 to displace wildlife that may be in the area. Habitat impacts from fishing activities are usually
 16 localized and short-lived and are currently occurring related to ongoing fisheries in the analysis
 17 area. Additionally, fishery access points, roads, boat launches, and campsites are already present
 18 in the analysis area.

19
 20 Alternative 1 would reduce the number of summer/spring Chinook salmon and steelhead
 21 available for harvest in northeast Oregon and southeast Washington relative to baseline
 22 conditions. However, fishing for other fish species would still occur in the analysis area (e.g.,
 23 trout), and there would be no change in fishery access points, roads, boat launches, and
 24 campsites in the analysis area relative to baseline conditions. Therefore, Alternative 1 would not
 25 be expected to change impacts on wildlife from fishing activities relative to baseline conditions.

26
 27 **4.7.2. Alternative 2 (Proposed Action) – Issue Section 10 Permits for the Continued**
 28 **Operation of the Eight Hatchery Programs**

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

35
 36 Steller sea lions and California sea lions are known to feed on returning adult salmon in the
 37 Columbia River Basin downstream of Bonneville Dam and are likely eating hatchery-origin fish
 38 from the eight northeast Oregon and southeast Washington hatchery programs. (Subsection 3.7,
 39 Wildlife and Marine Mammals). Consequently, Alternative 2 would increase the number of
 40 salmon and steelhead available to Steller sea lions and California sea lions in the vicinity
 41 downstream of Bonneville Dam. However, because Alternative 2 would only lead to a small
 42 increase in the total number of salmon and steelhead migrating past Bonneville Dam while the
 43 sea lions present, Alternative 2 is not expected to change sea lion diet, survival, or distribution
 44 relative to Alternative 1.

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

7
 8 Unlike Alternative 1, Alternative 2 would increase the number of juvenile salmon and steelhead
 9 available as a food source for bird populations. However, because Alternative 2 would increase
 10 the total number of juvenile hatchery-origin salmon and steelhead by less than 1 percent, it
 11 would not be expected to change the diet, survival, or distribution of Caspian terns, cormorants,
 12 or other bird populations relative to Alternative 1.

13
 14 As under Alternative 1, habitat disruption may occur from physical damage or disruption by
 15 anglers targeting hatchery-origin spring/summer Chinook salmon and steelhead. There is some
 16 potential for these activities to displace wildlife that may be in the area. Habitat impacts from
 17 fishing activities are usually localized and short-lived and are currently occurring related to
 18 ongoing fisheries in the analysis area. Additionally, fishery access points, roads, boat launches,
 19 and campsites are already present in the analysis area.

20
 21 Alternative 2 would increase the number of summer/spring Chinook salmon and steelhead
 22 available for harvest in northeast Oregon and southeast Washington relative to Alternative 1.
 23 However, fishing for other fish species would still occur in the analysis area (e.g., trout), and
 24 there would be no change in fishery access points, roads, boat launches, and campsites in the
 25 analysis area relative to Alternative 1. Therefore, Alternative 2 would not be expected to change
 26 impacts on wildlife from fishing activities relative to Alternative 1.

27 28 **4.8. Effects on Socioeconomics**

29 **4.8.1. Alternative 1 (No Action) – Do Not Issue Section 10 Permits for the** 30 **Continued Operation of the Eight Hatchery Programs**

31 Under Alternative 1, eight northeast Oregon and southeast Washington hatchery programs would
 32 be terminated immediately (Subsection 2.1, Alternative 1). Seven of the hatchery facilities that
 33 support these hatchery programs would close, but six hatchery facilities (Irrigon Hatchery,
 34 Wallowa Hatchery, Oxbow Hatchery, Tucannon Hatchery, Lyons Ferry Hatchery, and
 35 Bonneville Hatchery) would continue to operate since these facilities are used primarily to
 36 support hatchery programs that are not part of the Proposed Action. These programs directly
 37 employ 49 full-time employees and 18 seasonal employees (Subsection 3.8, Socioeconomics),
 38 and these jobs would be lost under Alternative 1. Additionally, the hatchery programs would no
 39 longer procure local goods and services, which contribute to personal income or jobs in the lower
 40 Snake River regional economy. NMFS (2010b) found that Columbia River Basin hatchery
 41 operations and associated harvest on average contributed over \$10 million in personal income
 42 and 414 jobs to the lower Snake River regional economy between 2002 and 2006 (Subsection
 43 3.8, Socioeconomics).

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

10
 11 Because fishing-related expenditures are a very small percentage of total state revenue (less than
 12 1 percent), Alternative 1 would not be expected to affect total state revenue relative to baseline
 13 conditions (Subsection 3.8, Socioeconomics). However, because fishing for salmon and
 14 steelhead can contribute substantially to local economies in Northeast Oregon and Southeast
 15 Washington (Subsection 3.8, Socioeconomics). Alternative 1 may have medium adverse effects
 16 on local economies in northeast Oregon and southwest Washington relative to baseline
 17 conditions.

18
 19 Tribal fisheries would also be adversely impacted by Alternative 1 relative to baseline conditions
 20 since natural resources have been the mainstay of the economies of the Native Americans in the
 21 Columbia River Basin (Subsection 3.8, Socioeconomics). Alternative 1 would reduce the
 22 number of salmon and steelhead available to tribal members as a food source from fish that
 23 escape the ocean and Columbia River fisheries (Subsection 3.8, Socioeconomics). Further,
 24 Alternative 1 would reduce the amount of revenue that could be generated through the sale of
 25 fish, and would reduce the demand for traditional fishing equipment created by local tribal
 26 craftsmen. Lack of spring/summer Chinook salmon fishery opportunities would preclude Native
 27 Americans from engaging in practices that are culturally, economically, and symbolically
 28 important to the tribes. Additionally, Alternative 1 may increase tribal reliance on other
 29 consumer goods or increase travel costs to participate in other fisheries (Subsection 3.8,
 30 Socioeconomics). Finally, Alternative 1 would result in lost educational opportunities for tribal
 31 youth to learn fishing and religious traditions from their tribal elders.

32 33 **4.8.2. Alternative 2 (Proposed Action) – Issue Section 10 Permits for the Continued** 34 **Operation of the Eight Hatchery Programs**

35 Under Alternative 2, eight northeast Oregon and southeast Washington hatchery programs would
 36 operate as proposed in submitted HGMPs (Subsection 2.2, Alternative 2). Unlike Alternative 1,
 37 there would be 49 more full-time and 18 more seasonal jobs than under Alternative 1
 38 (Subsection 3.8, Socioeconomics). Additionally, unlike under Alternative 1, these hatchery
 39 programs would procure local goods and services, which would contribute to personal income or
 40 jobs in the lower Snake River regional economy. NMFS (2010b) found that Columbia River
 41 Basin hatchery operations and associated harvest on average contributed over \$10 million in
 42 personal income and 414 jobs to the lower Snake River regional economy between 2002 and
 43 2006 (Subsection 3.8, Socioeconomics).

44
 45 Alternative 2 would increase the number of summer/spring Chinook salmon and steelhead
 46 available for non-tribal, recreational harvest in northeast Oregon and southeast Washington

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

8
 9 Because fishing-related expenditures are a very small percentage of total state revenue (less than
 10 1 percent), Alternative 2 would not be expected to affect total state revenue relative to
 11 Alternative 1 (Subsection 3.8, Socioeconomics). However, because fishing for salmon and
 12 steelhead can contribute substantially to local economies in Northeast Oregon and Southeast
 13 Washington (Subsection 3.8, Socioeconomics). Alternative 2 may have medium beneficial
 14 effects on local economies in northeast Oregon and southwest Washington relative to Alternative
 15 1.

16
 17 Tribal fisheries would also benefit under Alternative 2 relative to Alternative 1. Alternative 2
 18 would increase the number of salmon and steelhead available to tribal members as a food source
 19 would increase the amount of revenue that could be generated through the sale of fish, and would
 20 increase the demand for traditional fishing equipment created by local tribal craftsmen. Such
 21 benefits would be realized by ensuring fishing opportunities for Native Americans so that tribal
 22 members can engage in practices that are culturally, economically, and symbolically important to
 23 the tribes. Compared to Alternative 1, tribal fishing would continue to occur inside the analysis
 24 area, thereby eliminating an increase in travel costs to tribal members to fish elsewhere.
 25 Additionally, Alternative 2 may reduce tribal reliance on other consumer goods as a substitute
 26 for salmon, which would result in less economic cost to the tribes relative to Alternative 1
 27 (Subsection 3.8, Socioeconomics). Finally, Alternative 2 would increase educational
 28 opportunities for tribal youth to learn fishing and religious traditions from their tribal elders
 29 relative to Alternative 1.

30 **4.9. Effects on Tourism and Recreation**

31 **4.9.1. Alternative 1 (No Action) – Do Not Issue Section 10 Permits for the** 32 **Continued Operation of the Eight Hatchery Programs** 33

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

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

3
 4 Under Alternative 1, the Lookingglass Creek Hatcheries would close, which may reduce the total
 5 number of hatchery tours relative to baseline conditions. Access to public lands for other, non-
 6 fishery-related activities such as camping, hiking, sightseeing, and hunting would remain
 7 available under Alternative 1.

8

9 **4.9.2. Alternative 2 (Proposed Action) – Issue Section 10 Permits for the Continued**
 10 **Operation of the Eight Hatchery Programs**

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

23

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

28

29 **4.10. Effects on Environmental Justice**

30 **4.10.1. Alternative 1 (No Action) – Do Not Issue Section 10 Permits for the**
 31 **Continued Operation of the Eight Hatchery Programs**

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

42

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

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

27
28 **4.10.2. Alternative 2 (Proposed Action) – Issue Section 10 Permits for the Continued**
29 **Operation of the Eight Hatchery Programs**

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

39
40 Under Alternative 2, the following ecological, cultural, economic, and social effects on
41 environmental justice communities would be expected in both the short and long term:

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

- 1 • A small reduction in water quality relative to Alternative 1 (Subsection 4.3, Effects on
2 Water Quality)
- 3 • A gain of the local procurement of goods and services to support hatchery facilities
4 relative to Alternative 1 (Subsection 4.8, Effects on Socioeconomics)
- 5 • A gain of 49 full-time jobs and 18 seasonal jobs in environmental justice communities
6 relative to Alternative 1 (Subsection 4.8, Effects on Socioeconomics)
- 7 • An increase in fishing opportunities would increase the local purchase of supplies such as
8 fishing gear, camping equipment, consumables, and fuel at local businesses relative to
9 Alternative 1, which would benefit local businesses, although it is unknown how
10 dependent these businesses are on fishing-related expenditures (Subsection 4.8, Effects
11 on Socioeconomics)
- 12 • More anglers would contribute to the economy through outfitter/guide/charter fees
13 relative to Alternative 1 (Subsection 4.8, Effects on Socioeconomics)
- 14 • Tribal members may have more opportunity to engage in practices that are culturally,
15 economically, and symbolically important to the tribes (Subsection 4.8, Effects on
16 Socioeconomics)
- 17 • An increase in educational opportunities for tribal youth to learn fishing and religious
18 traditions from their tribal elders (Subsection 4.8, Effects on Socioeconomics)
- 19 • An increase in the number of Chinook salmon and steelhead available to tribal members
20 as a food source and an increase in the amount of revenue that could be generated
21 through the sale of fish relative to Alternative 1 (Subsection 4.8, Effects on
22 Socioeconomics)
- 23 • A reduction in tribal reliance on other consumer goods or an increase in travel costs to
24 participate in other fisheries relative to Alternative 1 (Subsection 4.8, Effects on
25 Socioeconomics)
- 26

1 **5. CUMULATIVE IMPACTS**

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

8
9 Chapter 3, Affected Environment, describes baseline conditions, which reflect the effects of past
10 and existing actions (including hydropower, habitat loss, harvest, and hatchery production).
11 Chapter 4, Environmental Consequences, evaluates the direct and indirect effects of the Proposed
12 Action on baseline conditions. Chapter 5, Cumulative Effects, now considers any additional,
13 incremental, cumulative impacts that may result from past, present, and reasonably foreseeable
14 future actions and conditions within the analysis area.

16 **5.1. Other Agency Programs, Plans, and Policies**

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

21
22 All future actions would be managed based on the impacts on ESA-listed salmon and steelhead.
23 These fish are subjected to the cumulative effects of other hatchery programs, fisheries, and
24 ocean conditions. Conservation efforts are in place to assist in salmon and steelhead recovery
25 while providing for the operation of the proposed hatchery programs and to support treaty and
26 non-treaty fisheries. Adjustments to fisheries and to the hatchery production levels and
27 management actions would be done according to the abundance-based hatchery and harvest
28 management frameworks that are, or likely will be, in place for these programs.

29
30 If the cumulative effects of salmon management efforts fail to provide for recovery of listed
31 species, then any adverse impacts due to the hatchery programs and any fishing in the analysis
32 area may be substantially diminished. Management of the hatchery programs and of fishing
33 opportunity is only one element of a large suite of regulations and environmental factors that
34 may influence the overall health of listed salmon and steelhead populations and their habitat.
35 The proposed hatchery programs are coordinated with monitoring so that hatchery managers can
36 respond to changes in the status of affected listed species. Monitoring and adaptive management
37 would help ensure that the affected ESA-listed species are adequately protected and would help
38 mitigate potential for adverse cumulative impacts.

40 **5.2. Climate Change**

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

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

5
6 Higher temperatures in the cool season (October through March) are likely to increase the
7 percentage of precipitation falling as rain rather than snow, and to contribute to earlier snowmelt.
8 The amount of snowpack measured on April 1, a key indicator of natural water storage available
9 for the warm season, has already declined substantially throughout the region. The average
10 decline in the Cascade Mountains, for example, was about 25 percent over the past 40 to 70
11 years, with most of this due to the 2.5°F increase in cool season temperatures over that period.
12 Further declines in Northwest snowpack are likely due to additional warming this century,
13 varying with latitude, elevation, and proximity to the coast. April 1 snowpack is likely to decline
14 as much as 40 percent in the Cascades by the 2040s (USGCRP 2009).

15
16 High and base stream flows are likely to change with warming. Increasing winter rainfall is
17 likely to increase winter flooding in relatively warm watersheds on the west side of the Cascade
18 Mountains. Earlier snowmelt, and increased evaporation and water loss from vegetation, will
19 increase stream flows during the warm season (April through September). On the western slopes
20 of the Cascade Mountains, reductions in warm season runoff of 30 percent or more are likely by
21 mid-century. In some sensitive watersheds, both increased flood risk in winter and increased
22 drought risk in summer are likely due to warming of the climate (USGCRP 2009).

23
24 In areas where it snows, a warmer climate means major changes in the timing of runoff:
25 increased stream flows during winter and early spring, and decreases in late spring, summer, and
26 fall. Flow timing has shifted over the past 50 years, with the peak of spring runoff shifting from
27 a few days earlier in some places to as much as 25 to 30 days earlier in others. This trend is
28 likely to continue, with runoff shifting 20 to 40 days earlier within this century. Major shifts in
29 the timing of runoff are not likely in areas dominated by rain rather than snow (ISAB 2007;
30 USGCRP 2009).

31
32 Fish habitat changes due to climate change are likely to create a variety of challenges for ESA-
33 listed species of fish. Higher winter stream flows can scour streambeds, damaging spawning
34 redds and washing away incubating eggs (USGCRP 2009). Earlier peak stream flows could
35 flush young salmon and steelhead from rivers to estuaries before they are physically mature
36 enough for the transition, increasing a variety of stresses and the risk of predation (USGCRP
37 2009). Lower summer stream flows and warmer water temperatures will degrade summer
38 rearing conditions in many parts of the Pacific Northwest for a variety of salmon and steelhead
39 species (USGCRP 2009), and are likely to reduce the survival of steelhead fry in streams with
40 incubation in early summer. Other likely effects include alterations to migration patterns,
41 accelerated embryo development, premature emergence of fry, and increased competition and
42 predation risk from warm-water, non-native species (ISAB 2007). The increased prevalence and
43 virulence of diseases and parasites that tend to flourish in warmer water will further stress
44 salmon and steelhead (USGCRP 2009). Overall, about one-third of the current habitat for the
45 Pacific Northwest's coldwater fish may well no longer be suitable for them by the end of this
46 century as key temperature thresholds are exceeded (USGCRP 2009).

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

7
8 While climate change may well have impacts on the abundance and/or distribution of ESA-listed
9 salmonids that are considered under the Proposed Action, the hatchery programs are directly
10 responsive to observed fish abundance, and so, as abundances change, the hatchery programs
11 (e.g. broodstock take) would be adjusted accordingly. It is possible that, over a relatively long
12 period, the hatchery programs could moderate the effects of climate change – particularly those
13 effects resulting in redd scouring, earlier flushing of juveniles, and increased water temperatures
14 – because of the protective nature of fish held in the hatchery.

15

1 **6. AGENCIES CONSULTED**

2 Confederated Tribes of the Umatilla Indian Reservation

3 Nez Perce Tribe

4 Oregon Department of Fish and Wildlife

5 Shoshone-Bannock Tribes

6 Washington Department of Fish and Wildlife

7

8

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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 DPS⁸. 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.

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

33
34 **Can the Proposed Action reasonably be expected to jeopardize the sustainability of any**
35 **non-target species?**

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

41
42 Because the proposed programs are only supplementing spring/summer Chinook salmon and
43 steelhead, genetic risks would only be a concern for these species. That is, the proposed program
44 could not affect the genetics of non-target species because steelhead and spring/summer Chinook
45 salmon do not interbreed with these species.

1
2 *Avian and Terrestrial Wildlife:* Relative to baseline conditions, there would be no change in the
3 number of salmon and steelhead available as a food source for bird populations and terrestrial
4 wildlife species. Therefore, there would be no expected change in the diet, survival, or
5 distribution of avian or terrestrial wildlife populations. The proposed hatchery programs would
6 continue to support fisheries, and anglers participating in these fisheries may disrupt avian and
7 terrestrial wildlife. However, these impacts would be localized and short-lived. Additionally,
8 fishery access points, roads, boat launches, and campsites are already present in the affected area,
9 and the need for additional infrastructure is not expected.

10
11 **Can the Proposed Action reasonably be expected to cause substantial damage to ocean and**
12 **coastal habitats and/or essential fish habitat as defined under the Magnuson-Stevens Act**
13 **and identified in Fisheries Management Plans?**

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

17
18 There would be little or no effect on essential fish habitat for any fish species. Essential fish
19 habitat for Chinook and coho salmon includes stream reaches where the hatchery facilities are
20 located. Essential features of their habitat include adequate substrate (especially spawning
21 gravel), water quality, water quantity, water temperature, water velocity, cover/shelter, food,
22 riparian vegetation, space, and suitable migration conditions. Effects on essential fish habitat
23 would be minimized by properly screening water intakes, using water non-consumptively by
24 returning surface water to the source from which it was removed, complying with NPDES
25 criteria under the Clean Water Act for any discharge into surface waters, and maintaining weirs
26 used for broodstock collection, including adequate staffing of the weirs to minimize the amount
27 of time fish are in the fish traps, which minimizes stress and unintended mortality. Additionally,
28 competition and predation risks would be minimized by acclimating hatchery-origin fish prior to
29 release, and releasing fish volitionally (rather than forced releases) so that the majority of fish are
30 fully smolted and thus actively outmigrating from the system. Hatchery-origin fish would also
31 be released in areas predominantly used by the same species, with the intent to minimize species
32 overlap that could increase interspecies competition and predation.

33
34 **Can the Proposed Action be reasonably expected to have a substantial adverse impact on**
35 **public health or safety?**

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

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

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

11
12 Critical habitat for Snake River salmon, steelhead, and bull trout includes stream reaches where
13 the hatchery facilities are located. Essential features of their habitat include adequate substrate
14 (especially spawning gravel), water quality, water quantity, water temperature, water velocity,
15 cover/shelter, food, riparian vegetation, space, and suitable migration conditions. Effects on
16 critical habitat would be minimized by properly screening water intakes, using water non-
17 consumptively by returning surface water to the source from which it was removed, complying
18 with NPDES criteria under the Clean Water Act for any discharge into surface waters, and
19 maintaining weirs used for broodstock collection, including adequate staffing of the weirs.
20 Additionally, competition and predation risks would be minimized by acclimating hatchery-
21 origin fish prior to release, and releasing fish volitionally (rather than forced releases) so that the
22 majority of fish are fully smolted and thus actively outmigrating from the system. Hatchery-
23 origin fish would also be released in areas predominantly used by the same species, with the
24 intent to minimize species overlap that could increase interspecies competition and predation.

25
26 No marine mammals (either listed or non-listed) would be adversely affected by the proposed
27 hatchery program. Steller sea lions and California sea lions are known to feed on returning adult
28 salmon in the Columbia River Basin downstream of Bonneville Dam and are likely eating
29 hatchery-origin fish from the proposed hatchery programs. Consequently, the proposed hatchery
30 programs would increase the number of salmon and steelhead available to Steller sea lions and
31 California sea lions in the vicinity downstream of Bonneville Dam. However, because the
32 proposed hatchery programs would only lead to a small increase in the total number of salmon
33 and steelhead migrating past Bonneville Dam while the sea lions are present, the proposed
34 hatchery programs would not be expected to change sea lion diet, survival, or distribution. The
35 Proposed Action would not impact critical habitat for sea lions.

36
37 Southern resident killer whales also feed on adult salmon, and prefer Chinook salmon. However,
38 because southern resident killer whales have limited spatial overlap with Snake River
39 spring/summer Chinook salmon, few Snake River Chinook salmon are likely to be eaten by
40 southern resident killer whales. Consequently, the proposed hatchery programs would not be
41 expected to change the diet, survival, or distribution of southern resident killer whales. The
42 Proposed Action would not impact critical habitat for southern resident killer whales.

43

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

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

10

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

14

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

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

20

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

43

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

2 The use of hatcheries can be controversial, and NMFS must carefully consider potential adverse
3 effects of a hatchery program on listed fish. However, there is no known controversy
4 surrounding the proposed hatchery programs. No comment letters were received on the draft EA
5 during the public comment period. NMFS takes this as an indication that the methodology and
6 best available information used to analyze effects are not “highly controversial” to the public.
7

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

11 The proposed hatchery programs are not expected to result in substantial impacts on unique
12 areas, such as historical or cultural resources, park land, prime farmlands, wetlands, wild and
13 scenic rivers, or ecologically critical areas, because none of the proposed activities would occur
14 in such areas. Designated critical habitat for Snake River salmon, steelhead, and bull trout is
15 within the affected area; however, all habitat impacts would be small under the proposed
16 hatchery programs and are not considered significant.
17

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

20 The effects on the human environment are not highly uncertain and do not involve unique or
21 unknown risks. Although there are some uncertainties involved in the on-going operation of
22 hatchery programs, the risks are understood, and the proposed hatchery programs include explicit
23 steps to monitor and evaluate these uncertainties in a manner that allows timely adjustments to
24 minimize or avoid adverse impacts. The proposed operation of the hatchery programs is similar
25 to other recent hatchery operations in many areas of the Pacific Northwest, and the procedures
26 and effects are well known.
27

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

30 The cumulative impacts of the proposed hatchery programs have been considered in the EA.
31 The take of ESA-listed species will be limited to avoid jeopardizing any listed species when
32 considering all existing conditions, all other permits, and other actions in the area affecting these
33 conditions and permits. The proposed hatchery programs are coordinated with monitoring so that
34 fish managers can respond to changes in the status of affected listed species. If the cumulative
35 effects of salmon management efforts fail to provide for recovery of listed species, adjustments
36 to fisheries and to the hatchery production levels would likely be proposed.
37

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

1
2 **Is the Proposed Action likely to adversely affect districts, sites, highways, structures, or**
3 **objects listed or eligible for listing in the National Register of Historic Places or to cause**
4 **loss or destruction of significant scientific, cultural, or historical resources?**

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

9

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

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

18

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

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

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

32

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

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

42

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

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

9

10 **8.1. List of Reviewers**

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

14

15 **8.2. Finding of No Significant Impact References**

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 22 Ronde River stock. Grande Ronde River Basin. Draft June 2011.

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 25 Plan. Grande Ronde Basin Catherine Creek Spring/Summer Chinook Program.
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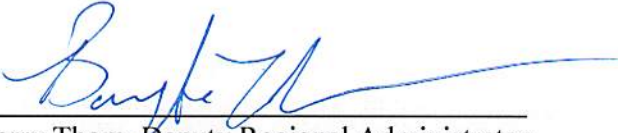
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4 Program. Lyons Ferry Complex – Lyons Ferry Hatchery and Tucannon Hatchery.
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9 Tucannon River Stock: Lyons Ferry Complex. Tucannon River Summer Steelhead.
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11 2011.
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13 **8.3. Determination**

14 In view of the information presented in the environmental assessment and analysis prepared for
15 the proposed hatchery programs, it is hereby determined that issuance of an ESA Section 10
16 permits for the proposed hatchery programs will not significantly impact the quality of the
17 human environment. In addition, all beneficial and adverse impacts of the proposed hatchery
18 programs have been considered in reaching a finding of no significant impact. Accordingly,
19 preparation of an Environmental Impact Statement is not necessary to further analyze the
20 potential for significant impacts resulting from issuance of Section 10 permits by NMFS for the
21 proposed hatchery programs.
22

23
24 
25 _____
26 Barry Thom, Deputy Regional Administrator
27 West Coast Region, NMFS
28



Date