



OCT 11 2012

To All Interested Government Agencies and Public Groups:

Under the National Environmental Policy Act (NEPA), an environmental review has been performed on the following action.

TITLE: Finding of No Significant Impact for the Environmental Assessment on a NMFS Determination that the Hatchery and Genetic Management Plans for Sandy River Programs Submitted by the Oregon Department of Fish and Wildlife Satisfy the Endangered Species Act Section 4 (d) Rule under Limit 5

LOCATION: Sandy River Basin, Oregon

SUMMARY: The Oregon Department of Fish and Wildlife proposes to continue the operation of four hatchery programs on the Sandy River. The programs rear and release Chinook salmon, coho salmon, chum salmon, and steelhead. The plans were submitted for evaluation by the National Marine Fisheries Service (NMFS) for approval under Limit 5 of the Endangered Species Act 4(d) Rule for salmon and steelhead. The approval of the implementation of these programs will not result in any significant impacts on the human environment.

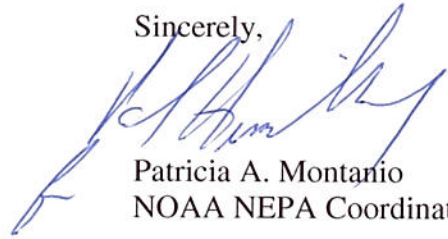
RESPONSIBLE OFFICIAL: Barry Thom
Deputy Regional Administrator, Northwest Region
NOAA National Marine Fisheries Service
7600 Sand Point Way, N.E.
Seattle, WA 98115-0070

The environmental review process led us to conclude that this action will not have a significant effect on the human environment. Therefore, an environmental impact statement will not be prepared. A copy of the finding of no significant impact (FONSI) including the supporting environmental assessment (EA) is enclosed for your information.



Although NOAA is not soliciting comments on this completed EA/FONSI we will consider any comments submitted that would assist us in preparing future NEPA documents. Please submit any written comments to the responsible official named above.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Patricia A. Montano', is written over the typed name.

Patricia A. Montano
NOAA NEPA Coordinator

Enclosure

Final Environmental Assessment

Determination that the Hatchery and Genetic Management Plans for Sandy River
Programs Submitted by the Oregon Department of Fish and Wildlife Satisfy the
Endangered Species Act Section 4 (d) Rule under Limit 5



National Marine Fisheries Service
Northwest Region

September 2012

Cover Sheet
April 2012 Public Review Draft
September 26, 2012 Final Environmental Assessment

Title of Environmental Review: Environmental Assessment to Analyze Impacts of a NOAA's National Marine Fisheries Service Determination that the Hatchery and Genetic Management Plans Submitted by the Oregon Department of Fish and Wildlife Satisfies the Endangered Species Act Section 4(d) Rule under Limit 5

Evolutionarily Significant Units: Lower Columbia River Chinook salmon
Lower Columbia River Coho salmon
Columbia River Chum salmon
Lower Columbia River Steelhead
Pacific Eulachon

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Legal Mandate: Endangered Species Act (ESA) of 1973, as amended and implemented – 50 CFR Part 223

Location of Proposed Activities: Sandy River, Oregon

Activity Considered: Endangered Species Act determination regarding four Hatchery Genetic and Management Plans through part of the range of the ESA-listed Evolutionarily Significant Units and Distinct Population Segment pursuant to Limit 5 of the ESA 4(d) Rule

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EXECUTIVE SUMMARY

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

On May 9, 2012, the National Marine Fisheries Service (NMFS) provided for public review and comment four Hatchery Genetic Management Plans (HGMPs) submitted by the Oregon Department of Fish and Wildlife pursuant to the protective regulations promulgated for Pacific salmon and steelhead under the Endangered Species Act (ESA) and the associated a draft Environmental Assessment (EA) prior to a decision by NMFS to approve the hatchery programs (77 FR 27188). The draft EA was made available for public review and comment before a final decision to issue a Finding of No Significant Impact is made by NMFS. The public comment period was held from May 9, 2012 to June 8, 2012 (77 FR 27188, May 9, 2012). The public comment period was then extended for 30 days (77 FR 34349, June 11, 2012) and closed at 5 p.m. Pacific time on July 9, 2012. During the public comment period, NMFS received comments from 219 commenters on the draft EA.

This final EA describes NMFS's evaluation of effects of approving the four HGMPs under Limit 5 of the ESA 4(d) rule for programs artificially propagating the Lower Columbia River (LCR) Chinook Salmon (*Oncorhynchus tshawytscha*) Evolutionarily Significant Unit (ESU), LCR Coho Salmon (*O. kisutch*) ESU, and LCR Steelhead (*O. mykiss*) Distinct Population Segment (DPS). NMFS has conducted this environmental review under the National Environmental Policy Act in support of evaluating the authorization of the hatchery programs under Limit 5 of the 4(d) rule. The EA evaluates the environmental consequences of alternative actions for approving ODFW's artificial propagation of LCR spring Chinook salmon, LCR coho salmon, and LCR winter steelhead. The analysis of alternatives and consequences will inform NMFS' decision regarding approval of the four HGMPs. The species whose take would be authorized by NMFS approval include the threatened ESUs of LCR Chinook salmon, LCR coho salmon, and Columbia River chum salmon (*O. keta*), and the threatened DPSs of LCR steelhead (*O. mykiss*), and Pacific Eulachon (*Thaleichthys pacificus*).

Changes to the Draft Environmental Assessment

The final EA reflects changes from the draft EA based on comments received as well as new information collected since the draft was published. All new text is indicated in redline/strikeout format to show changes from the draft EA, or is indicated with a new subsection title and explanation of the new text, as described under this Executive Summary.

1 This final EA includes only those revisions based on public comment and new information provided
2 during the public comment period on the draft EA. The following summarizes key changes to the draft
3 EA.

- 4 • Expanded description of the Action Area (see Subsection 1.4, Action Area).
- 5 • Added language describing Habitat Conservation Plan and mitigation responsibilities of the City
6 of Portland's Bull Run water supply (see Subsection 1.6, Relationship to Plans and Policies).
- 7 • Updated description of the proposed Sandy River spring Chinook salmon program to include the
8 installation and operation of the proposed weir in the Bull Run River, adaptive management
9 actions that may be taken if program goals are not achieved, changes in rearing location from
10 Marion Hatchery to Leaburgh Hatchery, change of release locations to Bull Run acclimation
11 pond, and discussions on how spring Chinook salmon spawning ground surveys would be
12 conducted annually (see Subsection 2.2.1, Sandy River Spring Chinook Salmon Program).
- 13 • Updated description of the proposed Sandy River Coho salmon program to include changes to
14 broodstock collection goals, information on how flows in Cedar Creek will be managed with the
15 installation of the upgraded adult weir and hatchery water supply intake structure, information on
16 how coho salmon would be reared at the Sandy Hatchery and no longer at the Cascade or
17 Bonneville Hatcheries, and discussion on how coho salmon spawning ground surveys would be
18 conducted annually (see Subsection 2.2.2, Sandy River Coho Salmon Program).
- 19 • Updated description of the proposed Sandy River winter steelhead program to include
20 information on how natural-origin and hatchery winter steelhead will be released above the
21 hatchery into Cedar Creek, and how winter steelhead spawning ground surveys would be
22 conducted annually (see subsection 2.2.3, Sandy River Winter Steelhead Program).
- 23 • Updated description of the proposed Sandy River summer steelhead program to include the
24 program goal of limiting the hatchery summer steelhead to less than 5 percent of the naturally
25 spawning steelhead population (see subsection 2.2.4, Sandy River Summer Steelhead Program).
- 26 • Updated description and analysis of how flow would be managed in Cedar Creek with coho
27 salmon production being reared on-station at the Sandy Hatchery and how minimum flows would
28 be established for the by-pass reach between the hatchery intake and the hatchery outfall (see
29 Subsection 3.2, Water Quality and Water Quantity).

- Updated coho salmon escapement data and references in Table 3 (see Subsection 3.3.1.1, Spring Chinook Salmon Status and Trends).
- Added Subsection 3.3.5.3, Bull Trout, to describe ESA-listed bull trout in the Sandy River Basin.
- Updated description and analysis of water quantity due to the on-station rearing of coho salmon at the Sandy Hatchery and the establishment of minimum flows in the section of Cedar Creek between the hatchery intake and the hatchery outfall (see Subsection 4.2.2, Alternative 2 (Proposed Action) – Approve the HGMPs under Limit 5 of the 4(d) Rule).
- Added Subsection 4.3.1.6, Bull Trout, to describe the effects of the No-action Alternative on bull trout, which are expected to be minimal because bull trout have not been observed in the Sandy River since 2002.
- Updated description and analysis of impacts on coho salmon from the rearing on-station of the hatchery coho salmon production and the establishment of minimum flows in the by-pass reach. Updated genetic analysis to incorporate new data (see Subsection 4.3.2.2, Sandy River Coho Salmon).
- Updated description and analysis of impacts on winter steelhead from the release of hatchery winter steelhead into Cedar Creek above the Sandy Hatchery (see Subsection 4.3.2.3, Sandy River Winter Steelhead).
- Added Subsection 4.3.2.6, Bull Trout, to describe the effects of the Proposed Action Alternative on bull trout, which are expected to be minimal because bull trout have not been observed in the Sandy River since 2002.
- Citations have been added, and are reflected in Section 7, References.
- Comments received and subsequent responses have been added as Appendix A.

1 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

1.1 Background

NOAA's National Marine Fisheries Service (NMFS) is the lead agency responsible for administering the Endangered Species Act (ESA) as it relates to listed salmon and steelhead. Actions that may affect listed species are reviewed by NMFS under section 7 or section 10 of the ESA or under section 4(d), which can be used to limit the application of take prohibitions described in section 9. NMFS issued a final rule pursuant to ESA section 4(d) (4(d) Rule), adopting regulations necessary and advisable to conserve threatened species (50 CFR 223.203). The 4(d) Rule applies the take prohibitions in section 9(a)(1) of the ESA to salmon and steelhead listed as threatened, and also sets forth specific circumstances when the prohibitions will not apply, known as 4(d) limits. With regard to hatchery programs described in Hatchery and Genetic Management Plans (HGMPs), NMFS declared under limit 5 of the 4(d) Rule that section 9 take prohibitions would not apply to activities carried out under those HGMPs that have been approved by NMFS and that are implemented in accordance with a letter of concurrence from NMFS.

On June 16, 2011, NMFS received four HGMPs from the Oregon Department of Fish and Wildlife (ODFW), describing hatchery programs that release salmon and steelhead into the Sandy River affecting Lower Columbia River (LCR) Chinook salmon, LCR coho salmon, Columbia River (CR) chum salmon, and LCR steelhead in 2011 and beyond (ODFW 2011a; ODFW 2011b; ODFW 2011c; ODFW 2010d). For the purpose of this analysis, the four submitted plans will be collectively referred to as the HGMPs that describe the hatchery programs.

In the review of hatchery programs, NMFS must consider whether these HGMPs satisfactorily address the criteria contained in the ESA under limit 5 of the 4(d) Rule. If NMFS determines that the HGMPs submitted by ODFW "...are not likely to appreciably reduce the likelihood of survival and recovery..." and otherwise satisfy criteria of the 4(d) Rule, then NMFS can approve the HGMPs. NMFS' approval of the HGMPs and disbursement of related Mitchell Act funding constitutes the Federal action that is subject to analysis as required by the National Environmental Policy Act (NEPA).

NMFS seeks to consider, through NEPA analysis, how its pending action may affect the natural and physical environment and the relationship of people with that environment. NMFS is also required to review compliance of ESA actions with other applicable laws and regulations. The NEPA analysis provides an opportunity to consider, for example, how the action may affect conservation of non-listed species and socioeconomic objectives that seek to balance conservation with wise use of affected resources and other legal and policy mandates.

1.2 Description of the Proposed Action

The Federal action evaluated here is the proposed approval by the Secretary (through the Northwest Regional Administrator for NMFS) of ODFW's HGMPs including a determination that activities described by the HGMPs would not appreciably reduce the likelihood of survival

1 and recovery of the ESA-listed LCR Chinook salmon, LCR coho salmon, CR chum salmon
2 Evolutionarily Significant Units (ESU), and the LCR steelhead Distinct Population Segment
3 (DPS)¹. The Proposed Action would result in the implementation of hatchery programs as
4 described in the HGMPs. Implementation of the programs would include use of funds distributed
5 by NMFS to ODFW pursuant to the Mitchell Act² (Subsection 1.6, Relationship to Other Plans
6 and Policies). For the purposes of this analysis, use of those funds is included entirely within the
7 HGMPs, and analyses focus on effects of implementing the HGMPs. The fact that Mitchell Act
8 funds are being used does not substantively alter the action but is nevertheless considered here.

9
10 Alternatives considered in this EA are: (1) do not approve the four HGMPs under limit 5 of the
11 4(d) Rule that would result in the termination of the hatchery programs (No-action) and possible
12 redirection of Mitchell Act funds to other ODFW purposes; and (2) approve the HGMPs under
13 limit 5 of the 4(d) Rule (Proposed Action) including the use of Mitchell Act funds for the rearing
14 facilities. No other alternatives that would meet the purpose and need were identified that were
15 appreciably different from the two alternatives analyzed in detail below (Section 2.0,
16 Alternatives Including the Proposed Action).

17 18 **1.3 Purpose of and Need for the Action**

19 The purpose of the Proposed Action is to ensure that on-going and proposed hatchery programs
20 for the production of spring Chinook salmon, coho salmon, winter steelhead, and summer
21 steelhead as described in the four HGMPs comply with the requirements of the ESA, the State of
22 Oregon's Native Fish Conservation Policy (ODFW 2003a), and the State of Oregon's Fish
23 Hatchery Management Policy (ODFW 2003b). The programs are designed to meet mitigation
24 responsibilities, related to impacts from development in the Sandy River and Columbia River
25 basins, by providing hatchery fish to support fishing opportunities while minimizing potential
26 risks to natural-origin spring Chinook salmon, coho salmon, and winter steelhead populations,
27 consistent with Oregon's Lower Columbia River Conservation and Recovery Plan for Oregon
28 Populations of Salmon and Steelhead (hereafter Recovery Plan)(ODFW 2010). The State of
29 Oregon's Native Fish Conservation Policy (ODFW 2003a) and the Fish Hatchery Management
30 Policy (ODFW 2003b) limit the use of natural-origin salmon and steelhead as broodstock for
31 hatchery programs primarily designed to support harvest, if the natural populations are
32 depressed. ODFW procures funds distributed by NMFS under the Mitchell Act to support its
33 hatchery programs, with the identical purpose of meeting mitigation responsibilities.

34
35 The need for the Proposed Action is for the continuation of on-going and proposed hatchery
36 production described in the four HGMPs that would provide fishing opportunities for the citizens
37 of the Columbia River basin while conserving natural-origin populations. In fulfilling the

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 NMFS is also analyzing the distribution of Mitchell Act funds across the Columbia River basin in an Environmental Impact Statement (EIS) (75 FR 47591, Aug 6, 2010). The current action considers only the use of Mitchell Act funds in support of the Sandy River hatchery programs. ~~The draft EIS for the Mitchell Act Funding action is herein incorporated by reference.~~

purpose and need, the Proposed Action would provide hatchery fish production for meeting mitigation responsibilities.

1.4 Action Area

The Sandy River in Oregon enters the Columbia River at river mile (RM) 120.5. Originating in the Reid, Sandy, and Zigzag Glaciers on the west slope of Mt. Hood (elevation 11,235 feet) and flowing in a northwesterly direction for 55 miles, the Sandy River and its tributaries drain an area of 508 square miles (Figure 1). While the action area is large due to the amount of habitat for the species being analyzed, impacts from the operation of the hatchery programs tend to be localized to areas immediately adjoining the hatchery facility on Cedar Creek, the acclimation site on the lower Bull Run River, and potential weir locations on the Bull Run, Salmon, and Zigzag Rivers, and in Still Creek (Figure 1).

NMFS considered whether the mainstem Columbia River, the estuary and the ocean should be included in the action area, ~~but the effects analysis was unable to detect or measure effects of the Proposed Action beyond the Sandy River Basin. Available knowledge and research abilities are insufficient to discern the role and contribution of the Proposed Action to density dependent interactions affecting salmon and steelhead growth and survival in the mainstem Columbia River, the Columbia River estuary, and in the Pacific Ocean. NMFS' general conclusion is that the influence of density dependent interactions on growth and survival is likely small compared with the effects of large scale and regional environmental conditions. While there is evidence that hatchery production, on a scale many times larger than the Proposed Action, can impact salmon survival at sea, the degree of impact or level of influence is not yet understood or predictable. Thus, i~~Impacts of the programs on the human environment outside ~~of this area~~the Sandy River Basin are not expected.

As described below under the Proposed Action, limitations on the quantity and quality of water in Cedar Creek used by the Sandy Hatchery means that not all of the hatchery production can occur at the Sandy Hatchery. Hatchery salmon and steelhead produced for the proposed hatchery programs would be reared at a number of facilities outside the immediate action area. These include the Bonneville Hatchery ~~and Cascade Hatchery~~ in Multnomah County, the Clackamas Hatchery in Clackamas County, the Willamette Hatchery and Leaburg Hatchery in Lane County, the South Santiam Hatchery in Linn County, ~~the Marion Forks Hatchery in Marion County,~~ and the Oak Springs Hatchery in Wasco County. All of these hatcheries rear salmon and steelhead for other hatchery programs and the production for that Sandy Hatchery programs is only a small part of the overall production at these hatcheries. All of the hatchery salmon and steelhead reared at these hatcheries for the Sandy River programs would ~~continue to~~ be released at the Sandy Hatchery or at the Bull Run River acclimation pond and not outside the Sandy River Basin. Impacts on the natural environment from the operation of these hatcheries would continue to occur and would not be expected to change due to the inclusion or exclusion of the proposed Sandy Hatchery programs.

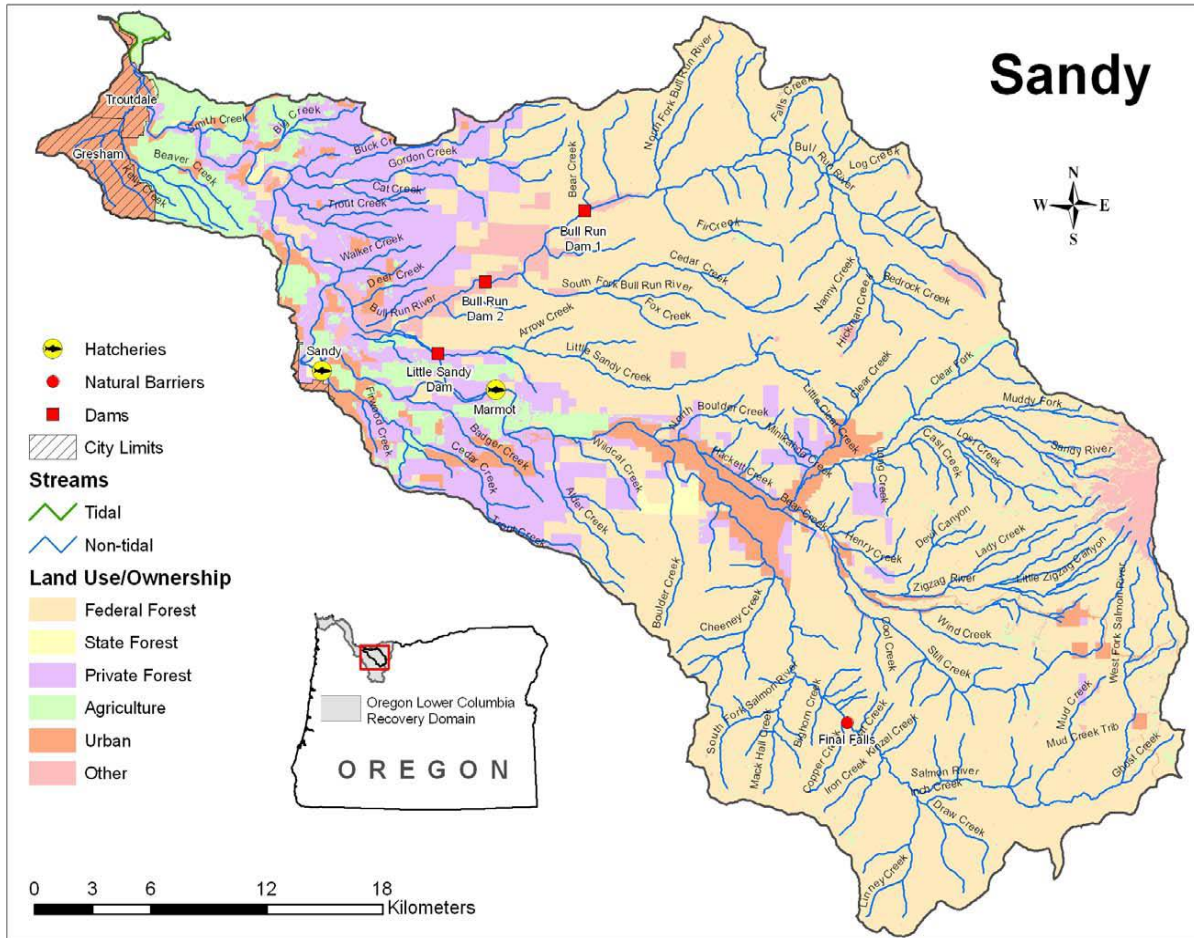


Figure 1. Sandy River Basin; note that the Little Sandy Dam and the Marmot Dam and fish facility were removed in 2007.

1.5 Scope

The scope of the action considered here includes the rearing and release of hatchery salmon and steelhead in the Sandy River. The review addresses potential effects in the entire action area, although adult collection, rearing, and release activities would occur in localized areas only. The HGMPs are open-ended and would be in effect after the associated ESA 4(d) determinations are signed. There would be periodic reviews of these HGMPs by NMFS every 5 years, and the plans would be modified as warranted by NMFS.

There are four ESA-listed anadromous salmonid species **under NMFS jurisdiction** that **originate are present** in the Sandy River Basin (Table 1). In addition to the four salmonid species, NMFS has also listed as threatened under the ESA the southern distinct population of Pacific eulachon (*Thaleichthys pacificus*), which is present in the Sandy River Basin (Table 1).

Table 1. Federal Register notices (publication date and citation) for final listing status determinations, designation of -critical habitat, and protective regulations for listed species under NMFS jurisdiction considered in this consultation.

	Listing Status Determination	Critical Habitat Designation	Protective Regulations
Chinook salmon (<i>Oncorhynchus tshawytscha</i>)			
Lower Columbia River Chinook Salmon	June 28, 2005; 70 FR 37160	September 2, 2005; 70 FR 52630	June 28, 2005; 70 FR 37160
Coho Salmon (<i>Oncorhynchus kisutch</i>)			
Lower Columbia River Coho Salmon	June 28, 2005; 70 FR 37160	[not yet designated]	June 28, 2005; 70 FR 37160
Steelhead (<i>Oncorhynchus mykiss</i>)			
Lower Columbia River Steelhead	January 5, 2006; 71 FR 834	September 2, 2005; 70 FR 52630	June 28, 2005; 70 FR 37160
Chum Salmon (<i>Oncorhynchus keta</i>)			
Columbia River Chum Salmon	June 28, 2005; 70 FR 37160	September 2, 2005; 70 FR 52630	June 28, 2005; 70 FR 37160
Pacific Eulachon (<i>Thaleichthys pacificus</i>)			
Southern Distinct Population Segment	March 18, 2010; 74 FR 13012	October 20, 2011; 76 FR 65324	[Not yet designated]

1.6 Relationship to Other Plans and Policies

This environmental assessment (EA) was prepared pursuant to regulations implementing NEPA (42 USC 4321), in compliance with Federal regulations for preparing an EA (40 CFR 1502), and consistent with recovery plans being developed pursuant to section 4 of the ESA by NMFS in conjunction with interested stakeholder groups. The Proposed Action analyzed in this EA relates to other plans and policies regarding the management and restoration of anadromous fish resources in the Pacific Northwest and ESA recovery planning. ~~NMFS and the City of Portland have completed a Habitat Conservation Plan (HCP) for the Bull Run Water Supply System (NMFS 2008a). Under the HCP, the City of Portland provides funding for the spawning and rearing of Sandy River spring Chinook salmon to mitigate for habitat lost to construction and operation of the Bull Run Water Supply System. The HCP also funds habitat improvement projects and monitoring and evaluation activities that will be coordinated with monitoring and evaluation of the hatchery programs. The City of Portland has also provided funds to ODFW to make changes to the Sandy Hatchery water intake structure that will bring the intake structure up to NMFS passage criteria (NMFS 2008b) and will allow passage into upper Cedar Creek that was blocked at the hatchery until 2010. The HCP includes other habitat actions in the Sandy River Basin that are expected to benefit hatchery and natural origin salmon and steelhead in the basin. The HCP does not include the hatchery actions within the basin and thus the need for this analysis.~~ The City of Portland is currently mitigating for the fisheries and habitat impacts of the Bull Run water supply under a habitat conservation plan (HCP). The City of Portland completed, and NMFS approved, the Bull Run Water Supply Conservation Plan (HCP) in 2008 (NMFS 2008b). The primary focus of the HCP is protection for natural-origin ESA-listed anadromous

1 fish under the jurisdiction of NMFS. By following the HCP commitments, the City of Portland is
2 achieving compliance with the ESA and Clean Water Act for all Bull Run water supply
3 operational impacts. In addition, in 1979, the City of Portland received a hydropower license
4 from the Federal Energy Regulatory Commission (FERC) to install electric power production
5 facilities at the Bull Run dams. Under the terms of that license and an agreement with ODFW,
6 the City of Portland each year provides ODFW money to produce hatchery fish for release into
7 the Sandy River Basin. In return, ODFW agreed to seek no additional actions by the City of
8 Portland based on the construction and operation of the hydropower dams as long as the City
9 operated in compliance with the FERC license.

10
11 The City of Portland's hydropower license term expires in 2029, while the HCP's term expires in
12 2059. Under the terms of the HCP Implementation Agreement signed by NMFS and the City of
13 Portland, if the City of Portland seeks to renew its hydropower license, it must incorporate the
14 HCP into its relicensing application. The purpose of this is to assure, absent substantially change
15 circumstances, that the HCP terms will become the fish and wildlife protection conditions for
16 any new license.

17
18 There are 49 conservation measures in the HCP (NMFS 2008b), and they are being implemented
19 in the Bull Run Basin and elsewhere in the greater Sandy River Basin. The HCP provides
20 funding for habitat improvement projects and monitoring and evaluation efforts, all targeted
21 towards improving natural-origin fish populations. The City of Portland is also providing much
22 of the funding to improve the Sandy Hatchery intake structure.

23
24 Recovery plans are in place or being developed for most parts of the Columbia River system in
25 which anadromous fish occur (for example, see NMFS 2005; NMFS 2009; ODFW 2010).
26 Typically, development and on-going implementation of these plans includes participation by
27 multiple Federal, tribal, state, and local agencies and stakeholder groups. These recovery plans
28 contain (1) measurable goals for delisting, (2) a comprehensive list of the actions necessary to
29 achieve delisting goals, and (3) an estimate of the cost and time required to carry out those
30 actions.

31
32 After listing 27 Pacific salmon ESUs as threatened or endangered under the ESA, NMFS
33 initiated a coastwide process to develop recovery plans for these species. An important part of
34 this process was the creation of geographically based Technical Recovery Teams (TRTs). The
35 TRTs are multi-disciplinary science teams chaired by the NMFS' Northwest Fisheries Science
36 Center or the NMFS' Southwest Fisheries Science Center staff. They were tasked with
37 providing science support to recovery planners by developing biologically based viability
38 criteria, analyzing alternative recovery strategies, and providing scientific review of draft plans.

39
40 With the imminent publication of recovery plans for most ESA-listed salmon and steelhead in
41 the Pacific Northwest, the Pacific Northwest TRTs either have completed or are close to
42 completing their initial tasks of developing viability criteria and providing science support for
43 recovery plan development. Most of the original TRTs have, therefore, been phased out as the
44 TRTs completed their final tasks in late 2007 and early 2008.

1 A draft plan for the LCR salmon and steelhead populations in Oregon (i.e., Recovery Plan;
2 ODFW 2010) has been completed and is being combined, by NMFS, with the Lower Columbia
3 Fish Recovery Board's updated recovery plan for Washington populations (LCFRB 2010), into a
4 draft Lower Columbia River ESU/DPS-wide recovery plan. All factors that have been identified
5 as leading to the decline of ESA-listed salmon and steelhead are being addressed in the Recovery
6 Plan. For ESA-listed Chinook, coho, and chum salmon and steelhead in the Sandy River Basin,
7 these factors include hydroelectric operations, harvest, habitat use, and artificial propagation.
8

9 As discussed below (Section 3, Affected Environment), the HGMPs describe the salmon and
10 steelhead that would be affected in a manner consistent with the population descriptions given by
11 the Willamette/Lower Columbia Technical Recovery Team (WLC-TRT) (Meyers et al. 2006).
12 The Recovery Plan (ODFW 2010) also included an assessment of the status of the Sandy River
13 populations and built on the assessment completed by Meyers et al. (2006). These evaluations
14 assessed the status of populations with regard to the Viable Salmonid Populations (VSP)
15 parameters of abundance and productivity, spatial structure, and diversity (McElhany et al.
16 2000).
17

18 The decline in Pacific eulachon (Table 1) abundance in the Lower Columbia River from 1993 to
19 2000 led to the States of Oregon and Washington to develop the Joint State Eulachon
20 Management Plan that was designed to provide research and management guidance primarily for
21 Columbia River recreational and commercial fisheries targeting eulachon (WDFW and ODFW
22 2001).
23

24 The Mitchell Act (16 United States Code [USC] 755-757: 52 Stat. 345) was enacted in 1938 for
25 the conservation of anadromous (salmon and steelhead) fishery resources in the Columbia River
26 basin (defined as all tributaries of the Columbia River in the United States and the Snake River
27 basin). It authorized the establishment, operation, and maintenance of one or more hatcheries in
28 the states of Oregon, Washington, and Idaho; scientific investigations to facilitate the
29 conservation of the fishery resource; and "all other activities necessary for the conservation of
30 fish in the Columbia River basin in accordance with law." Since 1946, Congress has continued
31 to appropriate Mitchell Act funds on an annual basis. These funds have been used to support
32 research, improve fish passage, screen water diversions, and build and operate over 20 salmon
33 and steelhead hatchery facilities. Each year, Congress allocates a specific portion of the money
34 appropriated for the Mitchell Act to hatchery operations. For each of the past 10 years, hatchery
35 program funding has been between \$11 - 16 million dollars. The NMFS currently distributes
36 these appropriations to managers of 20 existing Columbia River hatchery facilities for the annual
37 production of more than 71 million fish in 62 hatchery programs.
38

39 In 2008, NMFS concluded multiple ESA consultations for several Federal actions that occur
40 simultaneously affecting the same listed species of Columbia River salmon and steelhead
41 (NMFS 2008c; NMFS 2008d; NMFS 2008e). The Federal Columbia River Power System
42 (FCRPS) Action Agencies, with the U.S. Bureau of Reclamation for its Upper Snake projects,
43 based their two biological assessments for their actions on a common comprehensive analysis
44 entitled Comprehensive Analysis of the Federal Columbia River Power System and Mainstem
45 Effects of Upper Snake and Other Tributary Actions (Corps et al. 2007). NMFS later prepared
46 its own Supplemental Comprehensive Analysis (SCA) to capture the best available data and

analysis contemporaneous with its issuance of its biological opinions in 2008 (NMFS 2008c). NMFS' SCA builds on the FCRPS Action Agencies' Comprehensive Analysis, incorporating by reference the information relevant to NMFS' analysis on the FCRPS; that analysis includes information relevant to the consideration of fishery harvest in the Columbia and Snake Basins (NMFS 2008c).

2 ALTERNATIVES INCLUDING THE PROPOSED ACTION

Alternatives considered in this EA are: (1) Do not approve the four HGMPs under limit 5 of the 4(d) Rule that would result in the termination of the hatchery programs (No-action); and (2) Approve the HGMPs under limit 5 of the 4(d) Rule (Proposed Action). The following describes the alternatives.

2.1 Alternative 1 (No-action) – Do Not Approve the HGMPs under Limit 5 of the 4(d) Rule

Under this alternative, the Secretary would not approve the four HGMPs, likely by determining that the four hatchery programs as described by the HGMPs do not meet the criteria under limit 5 of the 4(d) Rule, and therefore the Secretary would not provide a concurrence letter. Because the HGMPs would not be approved, NMFS treats the No-action Alternative as resulting in the termination of all hatchery programs as described in the HGMPs. It is assumed that terminating the hatchery programs would lead to the adult weir and intake structure at the Sandy Hatchery being removed or modified to allow voluntary passage up and down Cedar Creek. Terminating these programs may or may not result in the redirection of Mitchell Act funds considered here; ODFW would have the option of reprogramming the funds dedicated to rearing facilities or continuing to use them as planned. There are a number of other potential outcomes that might result from this determination – Oregon could, for example, pursue other regulatory mechanisms for allowing the program operations – but because the closure or substantial re-structuring of the programs is one possible outcome, and because it represents one end of the spectrum of potential effects, NMFS has defined the No-action Alternative this way to help provide the broadest possible range of effects to evaluate.

2.2 Alternative 2 (Proposed Action) – Approve the HGMPs under Limit 5 of the 4(d) Rule

Under this alternative, the Secretary would approve the four proposed hatchery programs under limit 5 of the 4(d) Rule, and the hatchery programs and associated Best Management Practices (BMPs) would be implemented as described in the four HGMPs. BMPs are a set of hatchery protocols develop within the region that are designed with the goal of producing a quality smolt that will meet the objectives of the hatchery program (IHOT 1995; HSRG 2004; Mobrand et al., 2005; ICF – Jones and Stokes 2009). For the purpose of this analysis, NMFS treats the Proposed Action Alternative as resulting in the hatchery production of Chinook salmon, coho salmon, and steelhead as proposed in the four HGMPs. Each of the four hatchery programs is described below, providing details regarding management, hatchery operations, broodstock collection, rearing, and release.

Sandy Hatchery is the primary location that would be used for the Proposed Action. Sandy Hatchery is located at approximately RM 0.75 on Cedar Creek, a tributary to the Sandy River, Clackamas County, Oregon. Cedar Creek is the water source for the Sandy Hatchery. Stream water rights for the hatchery total 12,577 gallons per minute (gpm). Water is supplied to the hatchery by gravity flow. Cedar Creek's average water temperature is 45°F during the acclimation period. River water withdrawal is covered under Oregon water permit number 23300 (issued December 3, 1954). Discharge water is currently covered under NPDES 300-J General Permit number 10598. To meet permit requirements, hatchery effluent would be passed through a pollution abatement pond to remove sediment (e.g., total suspended solids and settleable solids).

2.2.1 Sandy River Spring Chinook Salmon Program

The Sandy River Spring Chinook Salmon program, as described in the HGMP (ODFW 2011a), is an on-going program. The Proposed Action would continue this program that provides returning adults for two purposes. The first is to augment the Sandy River, Lower Columbia, and ocean spring Chinook salmon fisheries with hatchery-reared, in-basin-origin spring Chinook salmon (designated as Oregon stock 11). The second is to release 300,000 smolts annually to mitigate for the loss of spring Chinook salmon catch in recreational and commercial fisheries due to habitat degradation and passage impairment resulting from construction and operation of dams by Portland General Electric (Marmot Dam, removed in 2007 and no longer requiring mitigation) and the City of Portland (dams on the Bull Run River, a tributary to the lower Sandy River).

There are no numeric harvest goals for ocean, Columbia River, and Sandy River fisheries; however, a minimum of 200 adults is needed to meet broodstock objectives (ODFW 2011a). In-basin harvest of Sandy River hatchery spring Chinook salmon has ranged from 324 to 4,436 adults during the period from 1995 to 2009 (Table 3.3.1a in ODFW 2011a). The harvest of Sandy River spring Chinook salmon in ocean, Columbia River, and Sandy River fisheries has averaged 3,165 adult for brood years 1994 to 2004. Total harvest has declined for the most recent brood years due to a reduction in the total number of smolts released and changes in fisheries management (ODFW 2011a).

The harvest of the Sandy River hatchery-origin spring Chinook salmon is managed to comply with the Fisheries Management and Evaluation Plan (FMEP) for Lower Columbia River Chinook salmon, which explains the management implications of holding a recreational fishery where hooking mortality of listed fish may occur (see the evaluation of the FMEP in NMFS 2003a and NMFS 2008f). Since 2003, refinements in fisheries management within the Sandy River Basin as assessed by NMFS (2007a) have occurred. These refinements are largely due to the removal of Marmot Dam; Section 4, Environmental Consequences, below, updates and considers the effects of those adjustments. Current fishing regulations in the area of the Lower Columbia River Chinook Salmon ESU require that all unmarked adult spring Chinook salmon be released back to the water unharmed. Only adult spring Chinook salmon marked with an adipose fin-clip may be retained in recreational fisheries. Mainstem Columbia River commercial fisheries also require the release of unmarked adult spring Chinook salmon, and ocean fisheries are investigating techniques to facilitate the safe release of unmarked fish.

1 The effects of the Proposed Action on the fisheries in the Sandy River will be included in this
2 analysis. The effects of the proposed action on fisheries outside the Sandy River Basin (Ocean
3 and Columbia River mainstem fisheries) would not be discernible because Sandy River hatchery
4 production accounts for only a small percentage of the total spring Chinook salmon available to
5 the Ocean and mainstem fisheries (ODFW and WDFW 2011; WDFW 2006; WDFW 2011), and
6 thus will not be considered further in this analysis.

8 This hatchery program was developed from an integrated broodstock program utilizing naturally
9 produced Sandy River spring Chinook salmon for hatchery broodstock. Prior to brood year 2002
10 all hatchery releases of spring Chinook salmon into the Sandy River were Clackamas River stock
11 spring Chinook salmon (designated as Oregon stock 19). Naturally produced Sandy River spring
12 Chinook salmon were first collected as broodstock for this program in 2002. The first release of
13 hatchery smolts from the Sandy River stock was in the spring of 2004. From 2002 to 2007, all of
14 the fish captured for broodstock were naturally produced Sandy River spring Chinook salmon.
15 Broodstock conversion to the localized stock was complete by broodyear 2008, when broodstock
16 consisted of hatchery returns with up to 30 percent of the broodstock being from naturally
17 produced fish. Beginning in 2011, under the proposed HGMP, the program would be operated
18 as an isolated program using only returning hatchery-origin adults for broodstock (designated as
19 Oregon stock 11). No natural-origin spring Chinook salmon would be collected for broodstock
20 until ODFW determines that the natural-origin population can support removal of natural-origin
21 adults to integrate into the hatchery broodstock. When ODFW determines that the natural-origin
22 population can support natural-origin spawners being integrated into the hatchery broodstock, the
23 HGMP would be amended and resubmitted to NMFS for review and approval prior to integration
24 with natural-origin spring Chinook salmon. In the Sandy River, the number of naturally
25 produced spring Chinook salmon has averaged 1,654 adults from 2002-2010 (ODFW 2011a).

27 Natural-origin broodstock for the local-brood program was collected at Marmot Dam until
28 removal of the dam in 2007. Under the program described in the HGMPs, hatchery-origin
29 broodstock would be collected at Sandy Hatchery through volitional returns, and from
30 seining/tangle net activities or weirs/traps located throughout the basin. The broodstock needed
31 to meet the current production goal is 200 hatchery-origin adults, and includes extra adults to
32 account for pre-spawning mortality. Anglers and volunteers may also assist ODFW staff with
33 hatchery brood collection utilizing hook and line in the lower Sandy River, primarily from
34 Oxbow Park downstream to Lewis and Clark State Recreational Area. Volunteers employed to
35 collect spring Chinook salmon would be required to enroll with ODFW and receive special
36 instruction on proper handling and transport of fish collected. Anglers would also receive
37 specific written instructions, and written authorization to hold and transport hatchery fish for the
38 broodstock program. An evaluation of the various methods of broodstock collection (e.g.,
39 seines/tangle-net, weirs, traps) will be included in this analysis.

41 From 2008 to 2010, the natural-origin component of the broodstock was collected from the
42 Sandy River Basin using seine/tangle nets. These techniques would continue to be periodically
43 employed in the Sandy basin to collect broodstock and remove hatchery-origin fish to prevent
44 them from reaching primary natural-origin spring Chinook salmon spawning habitats. These
45 techniques have been previously employed at sites in the Salmon River, lower Still Creek, lower
46 Zigzag River, and the lower Sandy River. Collection by seine/tangle net would occur from June

1 through September. Hatchery fish collected in the nets would be promptly transferred to a fish
2 liberation truck portable tank (approximately 300 gallon) equipped with supplemental oxygen,
3 and transported to the Clackamas Hatchery at the end of the collection activities. All natural-
4 origin spring Chinook salmon would be placed in recovery holding pen located in a greater than
5 one-meter deep, well-oxygenated resting pool and held there until seining is complete to prevent
6 recapture of natural-origin adults. Once the seining is complete for that day the natural-origin
7 adults would be released back into the river.

8
9 As in 2011, a temporary weir/trap would be installed in Cedar Creek near its confluence with the
10 Sandy River to trap fish attempting to enter Cedar Creek; most of these fish are expected to be of
11 hatchery-origin. This facility would be installed annually in April or May and operated until
12 adult coho arrive in late September. The weir/trap would be monitored at least daily, but more
13 frequently during periods of high adult migration, and fish would be promptly removed.

14
15 Additional temporary weirs/traps would be installed in the upper Sandy basin to collect
16 broodstock and remove hatchery-origin fish from primary natural-origin spring Chinook salmon
17 spawning habitats. These weirs/traps were first installed in 2011 in the Zigzag River and the
18 Salmon River. Other potential locations for broodstock collection weirs are described in Section
19 1.5 of the HGMP (ODFW 2011a). These temporary weirs/traps would be installed annually in
20 May or June and would be operated through early October. The weirs would be installed by hand
21 with limited manipulation of the channel, with the exception of hand movement of small
22 boulders/cobble along the base of the picket fence. The weirs would be fixed to the shore using
23 ropes tied to trees or boulders of sufficient size to prevent movement of the weir and trap.

24
25 The traps would be operated by trained personnel, and monitored at least daily, but more
26 frequently during periods of high adult salmonid migration. Surveys would be periodically
27 conducted immediately downstream of the traps to ensure the facilities are not substantially
28 delaying the migration of native fish. ODFW estimates that, at the Salmon River weir, up to
29 1,500 hatchery and 1,000 natural-origin spring Chinook salmon could be handled. At the Zigzag
30 River site, up to 1,000 hatchery and 500 natural-origin spring Chinook salmon could be handled.
31 A third location at the mouth of Cedar Creek may handle up to 2,000 hatchery and 1,000 natural-
32 origin spring Chinook salmon.

33
34 ODFW ~~is will be installing pursuing the development of~~ a weir/trap facility on the lower Bull
35 Run River ~~beginning in 2013~~ (see Section 1.5 of the HGMP (ODFW 2011a) ~~for location~~
36 ~~information~~). The preliminary plan is to install a resistance board weir that would span the Bull
37 Run River and would be fixed to the stream bottom through the placement of I-beams
38 perpendicular to the flow that would be used to attach the individual weir panels. The installation
39 will require the movement of cobble and boulders by hand/pry-bar in order to have a relatively
40 smooth bottom to place the I-beams, and no mechanized equipment would be used to move
41 instream material. Two cables running from shore to shore, one on the bottom of the panels and
42 one at the top would be used to hold the weir together and fix it to the shore. The weir would be
43 expected to be very efficient and not over topped during the trapping season because flows in the
44 lower Bull Run during the summer are highly regulated. Activities at this site would include
45 collection of returning hatchery spring Chinook salmon (for broodstock collection and reduction
46 of potential strays), and sorting of natural-origin and hatchery spring Chinook salmon. The

weir/trap would be installed annually in April or May (depending on arrival of spring Chinook salmon adults) and would be operated through late September when adult coho salmon arrive. The facility would be monitored at least daily, but more frequently during periods of high adult salmonid migration. ODFW estimates that up to 1,000 hatchery and 250 natural-origin spring Chinook salmon would be handled at the weir.

For all of these weirs, natural-origin salmonids would be returned promptly to the Sandy River. Hatchery-origin adult spring Chinook salmon collected for brood at these sites would be transported to holding ponds at the Clackamas Hatchery and hatchery fish collected in excess of broodstock needs would be taken to Sandy Hatchery for final disposition. If surplus adults are of high quality, they may be sold or given to charitable food banks; in addition, carcasses may be used for stream nutrient enrichment.

Currently, the proportion of hatchery spring Chinook salmon in the naturally spawning population exceeds the 10 percent goal for the Sandy River spring Chinook salmon population that was identified in the Recovery Plan (ODFW 2010). The operation of the proposed weir/trap facilities and the possible use of seines and tangle-net to collect broodstock also have an additional goal of removing hatchery spring Chinook salmon from the naturally spawning population. It is unknown if the operation of the weir/traps will be successful in removing enough of the hatchery spring Chinook salmon adults to meet the 10 percent goal, while at the same time minimizing impacts on natural-origin spring Chinook salmon that are handled and released during collection activities. Monitoring activities described below would monitor the status of the naturally spawning population to determine if the goal is being achieved and if the operation of the weirs is adversely impacting the naturally spawning population. ODFW has indicated that if the weirs and the acclimation of juveniles at the Bull Run acclimation pond are unsuccessful in achieving the 10 percent goal then additional action will be implemented. Potential actions include, but are not limited to, acclimating for a longer period of time, reducing the level of production, rearing the spring Chinook salmon in the Sandy River Basin, or possibly eliminating the program.

Broodstock collected for this program would be transported to the Clackamas Hatchery for holding and spawning. The Clackamas Hatchery is located at RM 22.6 on the Clackamas River in the Willamette River Basin, Clackamas County, Oregon. The water source for the Clackamas Hatchery is the Clackamas River and a well. Water rights to Clackamas River water for the hatchery total 44,354 gpm. Chinook salmon are incubated and reared in 52°F well-water or with Clackamas River water that is pumped to the facility and treated with ultraviolet light (UV). The river water intake is 100-percent-screened with 3/16" mesh. Fish screens have been inspected (ODFW 2002) and were deemed non-compliant with current NMFS fish screening criteria. ODFW is investigating alternatives to redesign this intake and water delivery system and will resolve the non-compliant screen issue as part of that project. River water withdrawal is covered under Oregon water permit numbers S49433 and S42105. Well water is withdrawn under permit number G8257. Discharge water is currently covered under a National Pollution Discharge Elimination System (NPDES) individual permit number 102663.

After spawning, the eggs would be reared to eyed stage at Clackamas Hatchery. Clackamas River water is limited by water quality (pathogens) during summer months. Exposing eggs, fry,

1 and fingerlings to untreated river water may create a disease transmission concern. To avoid
2 these problems, eyed-eggs would be shipped to Willamette Hatchery for final incubation and
3 early rearing, and marking (otolith, Coded Wire Tag (CWT), and adipose fin-clip). The
4 fingerlings from Willamette Hatchery would then be transferred (at about 200 fish per pound
5 (fpp)) to Marion Forks Leaburgh Hatchery for further rearing. All program fish from Marion
6 Forks Leaburgh Hatchery would then be returned-sent to the Clackamas-Sandy Hatchery (at
7 around 18 fpp) for final rearing to smolt size. The operation of the Willamette and Marion
8 Forks Leaburgh- hatcheries was evaluated is a separate ESA consultation and determined not to
9 jeopardize listed salmon and steelhead in the Upper Willamette River basin (NMFS 2008g).
10 Mitchell Act funds are used to support the Sandy River spring Chinook salmon program at the
11 Clackamas Hatchery and pays for feed to support rearing at Willamette Hatchery and Marion
12 Forks Leaburgh Hatchery. The operation of the Willamette and Marion Forks Leaburgh
13 hatcheries will not be evaluated as part of this analysis because these facilities would continue to
14 be operated in a similar manor without the addition of the production and associated funding
15 from the proposed hatchery program.

16
17 The spring Chinook salmon would be reared at Clackamas-Sandy Hatchery until the following
18 spring and then transferred to the Sandy Hatchery or the Bull Run acclimation pond at 10-12 fpp.
19 – these are This is the only proposed release sites for this program. The annual release numbers
20 have declined from a mean of about 430,000 smolts, when Clackamas River stock was being
21 used, to the current production goal of 300,000 smolts. Past release sites have included the Sandy
22 Hatchery, Marmot Dam, Salmon River, and several mainstem sites (Dodge and Oxbow Parks,
23 Marsh and Kubitz Roads, and Brightwood and Sleepy Hollow Bridges).

24
25 Prior to the 2002 release, the majority of spring Chinook salmon were direct-stream released into
26 the Sandy River at Marsh Road (downstream of Cedar Creek) with no acclimation prior to
27 release. Starting with the 2003 release, approximately 200,000 spring Chinook salmon were
28 acclimated at Sandy Hatchery for approximately 3 weeks prior to being volitionally released
29 along with the remaining 100,000 spring Chinook salmon production. Beginning in 2006, all
30 300,000 smolts released from this program were acclimated for a minimum 2-3 week period at
31 Sandy Hatchery.

32
33 ~~ODFW proposes to release spring Chinook salmon on station (i.e., from the hatchery) or at an~~
34 ~~alternative location in the lower Sandy River (the first 30 miles). The lower river release~~
35 ~~locations were proposed to reduce the proportion of hatchery adults that stray into the upper~~
36 ~~basin. The removal of Marmot Dam eliminated the primary method to remove hatchery-origin~~
37 ~~adults that might stray into the upper Sandy River. The potential for spring Chinook salmon to~~
38 ~~stray is a concern because upstream migration into Cedar Creek (the current release site) at the~~
39 ~~time of adult return is typically limited by low stream flows. ODFW did an analysis of number of~~
40 ~~potential acclimation pond locations within the lower Sandy River and determined that a site~~
41 ~~located on the Bull Run River was the only location that would meet minimum flow~~
42 ~~requirements for holding adults spring Chinook salmon (Alsburry 2011). The City of Portland~~
43 ~~owns and operates Dodge Park at the confluence of the Bull Run River with the Sandy River.~~
44 ~~ODFW proposed to locate an acclimation pond within or near the park on City of Portland~~
45 ~~property; however, in August of 2011, ODFW was informed by the City of Portland that they~~

1 ~~could not reach an agreement on the use of the land, and this location was removed from~~
2 ~~consideration.~~

3
4 In 2011, ODFW constructed a temporary acclimation pond adjacent to the former Bull Run
5 Powerhouse located at river mile 1.5 on the Bull Run River to a ~~acclimate and release a~~
6 ~~proportion of the hatchery spring Chinook salmon production with the remainder being released~~
7 ~~from the Sandy Hatchery. Beginning in 2013, a portion (approximately one-third) of all of the~~
8 ~~production would be released from the Bull Run acclimation pond in three separate groups of~~
9 ~~100,000 each, with first release starting in early March.~~ The portable acclimation pond is an
10 above-ground structure that is 10 feet wide by 60 feet long by 4.74 feet high. The pond is located
11 on a level gravel pad that was installed after removing an asphalt driveway immediately adjacent
12 to the closed Bull Run Powerhouse. Approximately 450-600 gallons of water per minute are
13 pumped from the Bull Run River up the bank 20 feet via a 6-inch pipe and then returned to the
14 river, into the same pool, via an 8-inch pipe. The intake is screened to NMFS criteria with a
15 backwash cleaning system. ODFW proposes to continue to use this facility in the future and not
16 construct any additional acclimation facilities.

17
18 Smolt releases are targeted for mid-March (see Table 10.3 of the HGMP (ODFW 2011a).
19 Typically, a portion (approximately ~~two-thirds~~ 100,000) of the total smolt production would be
20 acclimated at ~~Sandy Hatchery~~ Bull Run acclimation pond for 2 to 3 weeks and then volitionally³
21 released. The ~~remaining-next~~ group of smolts (~~approximately one-third~~) would be acclimated for
22 a 2 to 3 week period after the first release group goes out. ~~The release would occur by removing~~
23 ~~the standpipe from the pond causing the water level in the pond to drop. A crowder (e.g., seine~~
24 ~~net or some other device to constrain fish to one area of the pond) would be used to move the~~
25 ~~smolts towards the water outlet for release. Any fish not exiting the acclimation ponds would be~~
26 ~~forced out at the end of the final three-week acclimation period~~ (see Section 10.6 of the HGMP)
27 (ODFW 2011a). Exact release dates would vary based on fish status (primarily weight), river
28 flow conditions, onset of water quality problems, transfer scheduling, and logistical constraints
29 for rearing other stocks. ~~Smolts at the off-station acclimation ponds (e.g., the Bull Run~~
30 ~~acclimation pond) would be force-released after the conclusion of the acclimation period. The~~
31 ~~release would occur by removing the standpipe from the pond causing the water level in the pond~~
32 ~~to drop. A crowder (e.g., seine net or some other device to constrain the fish to one area of the~~
33 ~~pond) would be used to move the smolts toward the water outlet pipe for release.~~

34
35 Sandy Hatchery spring Chinook smolts would be fin marked (adipose fin-clip) to differentiate
36 between natural and hatchery-origin fish, ~~as well as being otolith marked (a discernible ring left~~
37 ~~on the otolith caused by manipulated changes in water temperature in the hatchery) to determine~~
38 ~~mis-mark rate and to distinguish between broodyears.~~ The mean likelihood of detecting an
39 ~~external~~ mark is approximately 97 percent. Approximately 50,000 fish would be implanted with
40 a coded-wire tag (CWT) and adipose fin-clipped for stock assessment purposes. Smolts released
41 from off-station acclimation ponds may have a differential mark (e.g., left or right maxillary) in
42 addition to the adipose fin-clip in order to assess contribution to fisheries and to determine stray
43 rates.

³ Volitionally refers to the practice of removing hatchery pond screens and partially lowering the water level in the acclimation pond to facilitate a gradual release and dispersed downstream migration of hatchery smolts.

Spring Chinook salmon spawning ground surveys in the Sandy River Basin would consist of carcass recovery and redd counts. These activities have been funded with Sport Fish Restoration funds in the past and are currently funded with Mitchell Act funds. These surveys are designed to be a complete census of the primary spawning areas in the upper Sandy River Basin. Conducting surveys in the mainstem Sandy River would be problematic because of limited visibility from glacial meltwater. Because of this the Sandy River mainstem has been surveyed with less intensity and consistency through the years and is dependent on water clarity.

Surveys in the Little Sandy River were initiated in the 2008. Data collected from carcasses would include pre-spawning mortality (based on females), hatchery and natural-origin composition (based on presence or absence of fin clips or thermal marks in otoliths), and age composition and freshwater life history in natural-origin fish (based on analysis of scales). Redd counts would be used to estimate spawner escapement and run size, as well as spawning distribution. Because of the placement of the weirs in the Salmon and Zigzag Rivers, surveys would record live fish, carcasses, pre-spawning mortality, hatchery and natural-origin composition, and redds upstream and downstream of the weirs.

2.2.2 Sandy River Coho Salmon Program

The Sandy River Coho Salmon program as described in the HGMP (ODFW 2011b) is an on-going program. The Proposed Action would continue this program that aims to provide a high quality, hatchery reared, basin-origin coho salmon for harvest in the lower Columbia River commercial and recreational fisheries, the Sandy River recreational fishery, and the Pacific Ocean commercial and recreational fisheries. Although no numeric harvest goal for this program has been adopted the average smolt-to-adult survival rates of 1.75 percent (Table 1.12a of the HGMP (ODFW 2011b)) have provided good opportunities for commercial and recreational fishing in the Pacific Ocean, the Lower Columbia River and the Sandy River Basin. Sandy River harvest of program coho salmon has averaged 3,872 from 2000 to 2009, and the harvest in all fisheries combined has averaged 7,856 adult for broodyears 2002 through 2006 (ODFW 2011b). Harvest is expected to decline because releases in these broodyears averaged over 737,000 compared to the current the annual release goal of 500,000 smolts. This program ~~also used to provide~~ provides eggs to support an annual release of 420,000 smolts by the Clatsop County Fisheries (CCF) to support a terminal gill-net fishery in Youngs Bay and Blind Slough and for recreational angling in the lower Columbia River. ~~The fish transferred to Youngs Bay and Blind Slough are discussed under a separate HGMP, and that program is not part of the current NEPA analysis or related ESA consultation~~ The collection of broodstock for this program ended in 2011.

The harvest of Sandy Hatchery coho salmon is managed to comply with the FMEP that explains the management implications for holding a recreational fishery where hooking mortality of listed fish may occur. The FMEP for LCR coho salmon fisheries has been submitted to NMFS for ESA compliance. Since 2003, relatively small changes in fisheries management have occurred relative to the assessment by NMFS (2007a); the effects of those refinements are considered in Section 4 Environmental Consequences, below.

Based on observed encounter and hooking mortality rates, ODFW estimates a maximum fishery impact of 3 percent for all fall tributary salmon fisheries. Current recreational fishing regulations

for the Lower Columbia River ESU require that all unmarked coho salmon be released back to the water unharmed. Only adult coho salmon marked with an adipose fin clip may be retained in recreational fisheries (ODFW 2011e). Recreational fishing for coho salmon in the Sandy River is open year-around with regulations requiring the release of any unmarked fish to protect natural-origin coho salmon that tend to migrate into tributaries in November and December. Direct harvest of natural-origin coho salmon may occur in commercial fall gill-net fisheries in the mainstem Columbia River that target returning hatchery coho salmon. Fisheries are managed to limit impacts to levels developed during the ocean fisheries management process and are these levels are based on the ocean survival and broodyear abundance of natural-origin coho salmon from the populations in the Sandy and Clackamas Rivers (NMFS 2008f2008d). The effects of the Proposed Action on the fisheries in the Sandy River will be included in this analysis. The effects of the Proposed Action on fisheries outside the Sandy River Basin (Ocean and Columbia River mainstem fisheries) would not be discernible because Sandy River hatchery production accounts for only a small percentage of the total coho salmon available to the ocean and mainstem fisheries (ODFW and WDFW 2011; WDFW 2006; WDFW 2011), and thus will not be considered further in this analysis.

The Sandy River coho salmon hatchery program is managed as a segregated hatchery program and would continue to be under the Proposed Action. The program started in 1952 with the vast majority of the broodstock for the program coming from natural-origin coho salmon captured in Cedar Creek. The current program utilizes only hatchery-produced Sandy River coho salmon returning to the Sandy Hatchery as broodstock. There are a limited number of returning hatchery adults that migrate into the Sandy River upstream past the mouth of Cedar Creek but the number has been limited to less than 5 percent of the natural spawning population in the upper Sandy Basin as measured at the former Marmot Dam. ODFW evaluations have identified that a majority (greater than 70 percent) of natural spawning habitat for coho salmon in the Sandy River Basin exists above the former Marmot Dam site, with the vast majority of habitat in the upper basin being found in the Salmon and Still Creek/Zigzag Rivers. A small portion (less than 30 percent) exists in the lower mainstem and tributaries including the Bull Run River, Little Sandy River, Cedar Creek, Gordon Creek, Trout Creek, and Beaver Creek. In the eight years prior to Marmot Dam removal, the escapement of natural-origin coho salmon above the dam averaged 795 adults (ODFW 2011b). After the removal of Marmot Dam, basin-wide population estimates have averaged over 1,120 adults (2008-2010)(ODFW 2011b).

Broodstock for the program have been, and would continue to be, collected from hatchery adults returning to the Sandy Hatchery. Broodstock collection at the Sandy Hatchery is dependent on flows in Cedar Creek that provides access to the hatchery and generally begins in September and continues through the middle of November. During the spring, when acclimating and releasing juvenile fish on-station, the Sandy Hatchery removes up to 8,000 gpm, and during September, when coho salmon broodstock collection begins, the hatchery uses around 1,732,300 gpm. The water flows through the hatchery and exits through the adult holding ponds back into Cedar Creek. Currently Prior to 2012, there is was a weir immediately above the outfall of to the adult holding ponds that prevented adult passage, in addition, upstream at the hatchery water intake structure, the adult fish ladder is was inoperable and blocked passage at low flows. When the adult holding ponds are first watered up in September, minimum flows in the bypass section can be too low for adult passage. The low flows would remain until such time that rain events raise

water levels in Cedar Creek. During this period, any adult coho salmon that migrated up Cedar Creek would encounter the adult weir and be directed into the hatchery for broodstock collection and enumeration and would not be affected by the low flow below the intake structure. All coho salmon returning to the hatchery would be directed into the adult holding ponds by the weir in Cedar Creek above the outfall. ~~All marked adults voluntarily entering the adult trap at the Sandy Hatchery would be collected.~~ Coho salmon with an adipose fin that volunteer into the trap would be tested for the presence of a CWT. If no CWT is present then the fish would be assumed to be natural-origin and are passed upstream into Cedar Creek. However, due to marking error, up to 3 percent of un-marked fish may be hatchery-origin fish that were either not marked or poorly marked allowing for the adipose fin to regenerate. Only marked fish would be used for broodstock. Even after the ~~completion proposed rehabilitation~~ of the intake structure and modifications to the weir at the adult holding pond outfall, natural-origin adult coho salmon would continue to be transported upstream until minimum ~~adult passage~~ flows (3,600 gpm) are achieved in the bypass reach at which time adults would be released into Cedar Creek directly ~~from above~~ the adult ~~holding pond weir~~ and allow to migrate upstream past the intake structure.

The annual broodstock collection goal is ~~1,000~~450 adults (~~600~~200-~~650~~250 females and ~~400~~200-~~350~~150 males). However, all marked coho entering the trap would be collected to the increase recovery of CWT information. Numbers collected are substantially larger than the number taken for broodstock to compensate for adult mortality that may occur prior to spawning. Hatchery adults not used for broodstock would be used for nutrient enrichment activities or provided to the Oregon Food Bank or local food banks. ~~The 1,000 adult fish would be used to produce eggs/smolt for this program as well as for the CCF Net Pen program.~~ The broodstock collected at the Sandy Hatchery would be held and spawned on-station.

The hatchery intake on Cedar Creek is 100 percent screened throughout the year; however, the screens ~~are were~~ considered out of compliance with current NMFS fish screening criteria (NMFS 2008b). The City of Portland provided funding to upgrade screens to current NMFS standards and to provide passage for naturally produced fish in Cedar Creek. Providing passage for natural-origin winter steelhead and coho salmon above the structure ~~is was~~ identified as one of the highest priority hatchery reform measures in the entire lower Columbia River. ~~The p~~Project ~~designs are was~~ completed ~~and implementation is expected to occur~~ during the 2012 in-water work period. ~~The upgraded intake structure and the adult weir at the hatchery outfall were designed to provide upstream and downstream juvenile and adult passage. ODFW would maintain minimum flows between intake structure and the hatchery outfall would be maintained to allow for juvenile passage in this section of Cedar Creek.~~ Over 230 coho salmon were passed for the first time in over 50 years during the fall of 2010. All unmarked coho salmon and winter steelhead would be transported upstream of the hatchery for release until ~~trap modifications can~~flows would allow for volitional release ~~above the adult weir~~ after sorting of marked and unmarked fish.

After spawning, the coho salmon would be reared ~~to full term~~ on-station ~~and released at Sandy Hatchery as occurred in the past prior to the transfer of fish to Bonneville and Cascade Hatcheries in 2010 and 2011.~~ ODFW staff were concerned that the transition to off-station rearing could increase the level of stray hatchery coho salmon in the Sandy River, which historically has been very low based on former Marmot Dam counts (Table 3) and spawning

1 surveys from 2007-2010. Flows in Cedar Creek are expected to exceed 3,600 gpm, 95 percent of
2 the time, but low flows can occur during the late summer and early fall (primarily September).
3 The adult ladder at the intake structure was designed to be able to pass adult salmonids at flows
4 greater than 3,600 gpm.

5
6 Rearing the coho salmon at the Sandy Hatchery would require a minimum water withdrawal
7 from Cedar Creek of 2,200 gpm through August and 2,300 gpm through September. These
8 withdrawals would be expected to leave between 1,300-1,400 gpm in Cedar Creek to provide for
9 juvenile rearing and passage flows, but not provide for adult passage through the by-pass reach.
10 Minimum flows that would provide for juvenile passage at the adult weir and intake structures
11 are expected to be established based on evaluation of flows over the upgraded structures. ~~to the~~
12 ~~eyed-egg stage at which time they are transported to Cascade Hatchery. Eyed-eggs for the CCF~~
13 ~~coho program would be also transferred to Oxbow Hatchery at this stage. Flows within Cedar~~
14 ~~Creek are not sufficient to rear the coho salmon to smolt stage and still provided instream flows~~
15 ~~for passage of natural origin adults and juveniles. Because of this limitation, the coho salmon~~
16 ~~would be transferred to Cascade and Bonneville Hatcheries for rearing. Cascade Hatchery~~
17 ~~typically receives 550,000 eyed-eggs from Sandy Hatchery for the Sandy River program for~~
18 ~~further incubation and early rearing. At Cascade Hatchery the water is supplied by gravity flow~~
19 ~~from Eagle Creek. The total stream water right for the hatchery is 20,205 gpm. The water supply~~
20 ~~does not impose any production limitations. Currently, the intake screens at Cascade Hatchery do~~
21 ~~not meet NMFS screening criteria. Screens will be improved to comply with NMFS criteria~~
22 ~~when funding becomes available. Discharge water is currently covered under NPDES 300-J~~
23 ~~General Permit number 10572.~~

24
25 ~~After early rearing at Cascade Hatchery, the coho salmon would be transferred to Bonneville~~
26 ~~Hatchery at around 200 fpp in May. At Bonneville Hatchery the water supply is obtained from~~
27 ~~two sources (Tanner Creek and wells). Water from Tanner Creek is supplied by gravity, and no~~
28 ~~natural origin fish use the area above the water intake. The wells at Bonneville Hatchery are on-~~
29 ~~station and provide water for rearing. The wells are recharged with water coming from the~~
30 ~~Columbia River below Bonneville Dam. Discharge water is currently covered under NPDES~~
31 ~~300-J General Permit number 10570. Mitchell Act funds are used to support the operation of the~~
32 ~~Bonneville Hatchery and Cascade Hatchery to rear Sandy River coho salmon, but also funds~~
33 ~~production at these facilities for other hatchery programs. The operation of the Cascade and~~
34 ~~Bonneville Hatcheries will not be evaluated as part of this analysis because these facilities would~~
35 ~~continue to be operated and funded in a similar manner without the addition of the production~~
36 ~~from the proposed coho salmon program.~~

37
38 The coho salmon would be reared at ~~Bonneville~~ the Sandy Hatchery until March when they
39 would ~~be transferred at each~~ 18 fpp and placed into raceways at Sandy Hatchery. The fish
40 ~~would then be acclimated for a minimum of 3 weeks prior to release.~~ Smolts would then be
41 transferred from the raceways to the adult holding pond and allowed to recover for
42 approximately 24 hours prior to release. The fish would then be released from the adult holding
43 pond by removing screens and partially lowering the water level in the pond to facilitate a
44 gradual release and dispersed downstream migration of smolts. Fish would be allowed to
45 volitionally migrate from the pond for a 24 hour period. After 24 hours water levels in the pond
46 would be gradually dropped further to promote migration. After approximately 48 hours, water

1 levels would be dropped fully and any remaining fish would be transported into Cedar Creek.
2 Based on long-term observations, almost all coho smolts out-migrate volitionally during the first
3 24 hour period after screen removal (ODFW 2011b).

4
5 All of Sandy Hatchery coho salmon smolts would be fin marked and/or tagged with a CWT to
6 differentiate between natural and hatchery-origin fish. Sandy Hatchery coho salmon would be
7 fin marked with an adipose fin-clip. Approximately 25,000 non-adipose fin-clipped coho smolts
8 would be released annually with a CWT but with no external mark identifying it as a hatchery
9 fish, to serve as a double index group that is used to estimate fisheries impacts on natural-origin
10 adults. Spawning surveyors, hatchery staff, and weir/trap operators utilize CWT detectors on all
11 fish surveyed/handled to ensure proper identification of unmarked hatchery fish.

12
13 ODFW proposes to monitor the recolonization of coho salmon and winter steelhead in Cedar
14 Creek above the Sandy Hatchery. Monitoring in Cedar Creek would be coordinated with the
15 U.S. Forest Service and Portland Water Bureau efforts to monitor coho salmon and steelhead
16 smolt production throughout the Sandy River Basin. The study is intended to detect increases or
17 declines in abundance and productivity of smolts at the basin scale and to provide useful data at
18 the scale of individual tributaries to guide restoration efforts. The sampling design for the larger
19 study involves monitoring different sets of tributaries every year, with some tributaries
20 monitored every year and others monitored on an irregular rotating basis. Cedar Creek has been
21 identified as one of the trapping locations in this study that would receive yearly monitoring.

22
23 Downstream migrants would be trapped in a 5-foot rotary screw trap (i.e., migrant trap) located
24 in the mainstem Cedar Creek upstream of the Sandy Hatchery. The specific site has yet to be
25 determined. The migrant trap would be located in the thalweg (main channel) of a site that would
26 maximize both the flow into the trap and the amount of stream the trap would fish. Because of
27 seasonal variation in streamflow, the trap would be periodically repositioned in the stream
28 channel in order to optimize trapping efficiency. The trap would be fished seven days a week
29 annually from March to June, except when pulled during high-flow events or under other
30 circumstances to prevent fish injury.

31
32 The migrant trap would funnel downstream migrants into a live box that would be sampled on a
33 daily basis, usually in the morning to reduce temperature related stress. All fish would be
34 anesthetized with MS-222 (tricaine methanesulfonate) or Alka-Seltzer Gold (buffered sodium
35 bicarbonate), examined for mark combinations, and counted by species and life stage. All or a
36 random sample (depending on numbers of fish) of salmonids would be sampled for scales and
37 tissue samples, measured to the nearest millimeter fork length, and weighed to the nearest 0.1
38 gram.

39
40 Mark-recapture methodologies would be used to estimate numbers of anadromous salmonids
41 smolts migrating past the trap. Up to 25 smolts per day of each species would be given a fin
42 mark (small clip or injected dye) specific to the day of the week. Marked fish would be
43 temporarily held in dark, aerated buckets for transport and release upstream from the trap (site
44 yet to be determined) daily. ODFW proposes to sample up to 5,000 natural-origin coho salmon
45 smolts annually during monitoring activities in Cedar Creek, approximately 200 of these would

be tissue sampled. It should be noted that the monitoring of coho salmon and steelhead smolts in Cedar Creek would probably occur even if the hatchery programs are not present.

Coho spawning ground surveys would be conducted in the Sandy River as part of the larger Status of Oregon Stocks of Coho Salmon Project (Lewis et al. 2009; 2010; 2011). This project is part of the larger Oregon Plan for Salmon and Watersheds and funded in part through the Sport Fish and Wildlife Restoration Program, Pacific Salmon Treaty, Pacific Coast Salmon Recovery Fund, and State of Oregon (General and Lottery Funds)(Lewis et al. 2011). The coho salmon spawning ground surveys would be conducted weekly from October through January of each year. Crews would conduct surveys by walking up-stream and recording the number of live fish, dead fish, and redds observed and categorical information on weather, visibility, and stream flow. Surveyors would record the species of live fish observed, and for coho salmon, try to determine if the adipose fish has been clipped. For carcasses, surveyors would collect biological data along with mark information (fin-clips, marks, or tags). The data collected during the spawning ground surveys would be used to develop estimates of spawning escapement and the proportion of hatchery coho salmon spawning naturally (Lewis et al. 2011).

2.2.3 Sandy River Winter Steelhead Program

The Sandy Hatchery winter steelhead program as described in the HGMP (ODFW 2011c) is an on-going program. The Proposed Action would continue this program that aims to provide a high quality, hatchery reared, basin-origin winter steelhead for harvest in the Sandy River recreational fishery. The intent is to provide a recreational fishery with fish that are similar to the natural-origin fish in the Sandy River to maintain a quality fishery that meets public demand and satisfies the desires of anglers while minimizing potential risks to natural-origin spring Chinook salmon, coho salmon, and winter steelhead populations, consistent with the Recovery Plan (ODFW 2010). The program goal is to release 160,000 smolts annually (ODFW 2011c).

There are no specific numeric goals for harvest contribution for the winter steelhead program, but the program has been changed to increase fishing opportunity in the Sandy River Basin. Prior to 2000, Big Creek Hatchery winter steelhead were released into the basin. This stock tended to have a narrow adult return timing: from mid-November to mid-January. The winter steelhead currently used for broodstock have a more protracted return time from January to May allowing for greater fishing opportunities. The major concern regarding the recreational fishery is its potential impact on the listed population of winter steelhead. Subsection 2.1 of the FMEP for the Lower Columbia DPS Steelhead (ODFW 2003c) provides an evaluation of this recreational fishery where catch and release mortality can occur. The harvest of Sandy River hatchery-origin winter steelhead, supported by the proposed hatchery program, is managed to comply with this FMEP (see the evaluation of the FMEP in NMFS 2003a). Since 2003, relatively small changes in fisheries management have occurred relative to the assessment by NMFS (2003a); the effect of those refinements will be considered in Section 4, Environmental Consequences, below.

Current fishing regulations for the Lower Columbia River Steelhead DPS require that all unmarked steelhead be released back to the natural-origin unharmed (ODFW 2011e). There is no retention of unmarked, listed steelhead in the DPS with the exception of a fishery, where retention is allowed, from July 1 through August 31 in the upper Sandy River upstream of and including the Salmon River. This fishery is intended to harvest marked and unmarked (non ESA-listed) naturally produced summer steelhead that are not indigenous to the Sandy River Basin.

1 Only adult steelhead with an adipose fin clip may be retained in recreational fisheries targeting
2 winter steelhead in the lower river downstream of the mouth of the Salmon River. Prior to the
3 removal of Marmot Dam winter steelhead fishing was limited to below the dam site and
4 averaged 1,368 adults annually from 2003 to 2007 (ODFW 2011c). After the dam was removed,
5 the fishery was extended upstream to the mouth of the Salmon River with the goal of removing
6 hatchery steelhead that would have been removed at Marmot Dam. The catch has increased to an
7 average of 2,044 adults in 2008 and 2009 (ODFW 2011c).

9 The effects of the Proposed Action on the fisheries in the Sandy River will be included in this
10 analysis. The effects of the Proposed Action on fisheries outside the Sandy River Basin
11 (Columbia River mainstem fisheries) would not be discernible because Sandy River hatchery
12 production accounts for only a small percentage of the total winter steelhead available to the
13 mainstem fisheries (ODFW and WDFW 2011; WDFW 2006; WDFW 2011), and thus will not
14 be considered further in this analysis.

16 The Sandy Hatchery Winter Steelhead Program was managed as an integrated hatchery program
17 until 2010. The program was developed utilizing hatchery and naturally produced Sandy River
18 winter steelhead adults collected at Sandy Hatchery, or by hook and line, for broodstock. The
19 original program released Big Creek Hatchery winter steelhead. The broodstock conversion to a
20 Sandy basin origin broodstock took place between 2000 and 2002, when all (100 percent) of the
21 fish captured for broodstock were naturally produced Sandy River winter steelhead. In 2004,
22 conversion to the local broodstock was complete and hatchery-reared adults derived from
23 naturally produced parents are now returning to the Sandy River. The program integrated
24 natural-origin adult steelhead into the broodstock until 2010. Beginning in 2011, no natural-
25 origin winter steelhead would be collected for broodstock; the program is intended to remain
26 segregated, and this is how it would be operated under the Proposed Action. It would continue to
27 be operated as a segregated program until ODFW determines that the natural-origin population
28 can support natural-origin adults being integrated into the hatchery broodstock. When ODFW
29 determines the natural-origin population can support natural-origin spawners being integrated
30 into the hatchery broodstock, this HGMP would be amended and resubmitted to NMFS for
31 review and approval.

33 Prior to removal of Marmot Dam in 2007, returning hatchery-origin adults were segregated from
34 the natural spawning population through sorting operations at the Marmot Dam fish collection
35 facilities and only naturally produced fish were allowed to pass upstream to the primary winter
36 steelhead spawning areas of the upper Sandy River Basin. ODFW evaluations have identified
37 that a majority (approximately 70 percent) of the remaining natural spawning habitat for winter
38 steelhead in the Sandy basin exists in the primary production areas above the confluence of the
39 Salmon and upper Sandy Rivers.

41 Broodstock collection for this program would occur primarily by adult winter steelhead
42 swimming into the adult trap at Sandy Hatchery. Adults would be allowed to swim-up the fish
43 ladder from Cedar Creek and into a pre-sort holding pool within the fish ladder or in the entrance
44 pen of the adult holding pond. These returning fish would be handled individually in soft mesh
45 nets, identified, sorted by gender, counted and held for later spawning. The adults may be held
46 in a raceway for up to three months prior to spawning in March/early April. Hatchery adults

1 would be Floy tagged (an alpha-numeric external tag, available in multiple colors, that is
2 anchored under the skin and can be read without removal), as they are collected for brood to
3 document their time of return and may be removed from the broodstock population later in order
4 to match the return timing of the broodstock with the natural run-timing of natural-origin winter
5 steelhead in the Sandy River. Natural-origin coho salmon and winter steelhead that enter the trap
6 at the Sandy Hatchery would be sorted and allowed to pass upstream of the hatchery into Cedar
7 Creek. ODFW has a minimum escapement goal of 300 adult winter steelhead (50 percent female
8 and 50 percent male) above the Sandy Hatchery in Cedar Creek, but cannot currently meet this
9 minimum because less than 25 adults natural-origin steelhead are collected annually. ODFW
10 proposes to pass hatchery winter steelhead to achieve the escapement goal and would reduce the
11 number of hatchery winter steelhead released as natural-origin winter steelhead adults returning
12 to Cedar Creek increase.

13
14 The program goal is to collect 120 adults (60 pairs) of hatchery-origin winter steelhead for
15 broodstock. All hatchery winter steelhead that would be surplus to broodstock needs at Sandy
16 Hatchery would be either recycled to the lower river for additional angling opportunities,
17 released upstream to meet the escapement goal, given to food banks (e.g., Oregon Food Bank) if
18 in suitable condition, used for stream nutrient enrichment, or disposed of if not fit for human
19 consumption. Disposal of fish would be done in accordance with ODFW policies and
20 procedures, which include freezing, rendering, and/or placing in a landfill.

21
22 Fish that return to Sandy Hatchery in a condition suitable for angler use from December through
23 mid-February may be recycled once through the lower river fishery to provide additional angling
24 opportunities. Recycled fish would be released at Lewis and Clark Recreational Area. All
25 recycled fish would be distinctly marked (e.g., caudal punch (the removal of a small portion of
26 the caudal fin using a hand-held paper punch) or Floy tag) prior to release. Fish would only be
27 recycled once; all fish that are collected a second time would be permanently removed from the
28 Sandy River either by killing the fish or transferring them to isolated standing waters (e.g., Salish
29 Ponds) to provide additional angling opportunity associated with trout fisheries. No fish would
30 be recycled to the lower river after February 16. Recycling would be discontinued if stray rates
31 exceed the level established in the Recovery Plan (ODFW 2010).

32
33 The broodstock collected at the Sandy Hatchery would be held and spawned on-station. The
34 program goal is to collect 210,000 green eggs to produce 160,000 smolts. After spawning the
35 eggs would be reared on-station to the eyed-egg stage and then transferred to Oak Springs
36 Hatchery in May. Oak Springs Hatchery is located at RM 47.0 on the Deschutes River in the
37 Deschutes River Basin, Wasco County, Oregon. The water source for the Oak Springs Hatchery
38 is Oak Springs, a tributary to the Deschutes River. Water rights provide for 53 cfs from 15
39 different certified points of the spring. The present water delivery system can deliver
40 approximately 24,062 gpm to the hatchery. Intake screens at the hatchery do not meet current
41 NMFS screening criteria but no ESA-listed species are known to exist in the water source.
42 Discharge water is currently covered under NPDES individual permit 300-J General Permit
43 number 64515.

44
45 After rearing at Oak Springs Hatchery, the winter steelhead would be transferred to Bonneville
46 Hatchery for further rearing. The fish are typically transferred in October at 30 fpp. Mitchell Act

1 funds are used to support the production of Sandy River winter steelhead at the Oak Springs and
2 Bonneville Hatcheries. The operation of the Oak Springs and Bonneville hatcheries will not be
3 evaluated as part of this analysis because these facilities would continue to be operated and
4 funded in a similar manner without the addition of the production from the proposed hatchery
5 program.

7 All winter steelhead for this program would be transported from Bonneville Hatchery to Sandy
8 Hatchery raceways for final acclimation and release at a target size of 6 fpp. The fish would be
9 acclimated for at least 2 to 3 weeks prior to release. Smolts would be transferred from the
10 raceways to the adult holding pond and allowed to recover for approximately 24 hours prior to
11 release. The fish would then be released from the adult holding pond by removing screens and
12 partially lowering the water level in the pond to facilitate a gradual release and dispersed
13 downstream migration of smolts. Fish would be allowed to volitionally migrate from the pond
14 for a 24-hour period. After 24 hours, water levels in the pond would be gradually dropped
15 further to promote migration. After approximately 48 hours, water levels would be dropped fully
16 and any remaining fish transported into Cedar Creek. Based on long-term observations,
17 approximately 80-90 percent of the steelhead smolts volitionally migrate during the first 24-hour
18 period after screen removal, and nearly all have migrated by the end of the 48-hour period;
19 usually less than 1,000 smolts remain after 48 hours. ODFW will investigate the option of
20 “holding back” juvenile steelhead that do not migrate during the volitional release period after
21 necessary facility improvements are completed as part of the fish passage restoration project.
22 Under this option, all fish remaining after the volitional release period would be transferred to
23 trout fisheries in standing water bodies after reaching legal (8-inch) size. This option could
24 reduce the potential for winter steelhead juveniles to residualize and compete with native fish
25 species after release from the hatchery.

27 All Sandy winter steelhead smolts would be fin marked (adipose fin-clip) to differentiate
28 between natural and hatchery-origin fish. The adipose fin-clipping for the program fish would
29 be conducted at Bonneville Hatchery.

31 ODFW proposes to monitor winter steelhead juvenile production in Cedar Creek to evaluate the
32 recolonization efforts. The same monitoring and evaluation activities described for the coho
33 salmon program, above, would also be used to sample winter steelhead. ODFW proposes to
34 sample up to 3,500 natural-origin winter steelhead smolts annually, and of these approximately
35 500 would be tissue sampled. The monitoring of coho salmon and steelhead smolts in Cedar
36 Creek would probably occur even if the hatchery programs are not present.

38 Monitoring of spawning winter steelhead has been conducted by ODFW in the Sandy River in
39 2004, 2006, 2007, and 2010-2012. The project uses methods developed by ODFW on the Oregon
40 Coast and is designed to assess the yearly status and trend, presence of hatchery fish, and
41 distribution of winter steelhead spawners within the basin. Winter steelhead abundance would be
42 based on counts of redds instead of live or dead fish. Selected sites would be visited
43 approximately every 14 days from February through May to generate a total redd count. The
44 proportion of hatchery spawners would be based on a combination of live counts and recovered
45 carcasses observed within survey sites. Steelhead carcass recoveries are rare, and as a result live
46 observations are the primary data source for hatchery stray estimates. Currently live observations

in the Sandy River have been below the levels needed to accurately depict the distribution of hatchery steelhead due to high turbidity and high flows that make viewing difficult. ODFW proposes to investigate the use of index sites where large numbers of live fish can be observed and which would represent areas thought to be of high risk or concern. This would be expected to produce a site with a biased or worst case scenario for the distribution of hatchery fish if applied to whole the basin.

2.2.4 Sandy River Summer Steelhead Program

The Sandy River summer steelhead program as described in the HGMP (ODFW 2011d) is an ongoing program. The Proposed Action would continue this program that is designed to provide fish for harvest. The intent of the program is to produce a high quality, hatchery-reared, summer-run steelhead to provide a fishery for recreational anglers while achieving recovery goals for listed Sandy River winter steelhead. This program aims to provide for harvest in the lower Columbia River and the Sandy River recreational fisheries. Although no numeric harvest goal has been adopted for this program, the average smolt-to-adult survival of summer steelhead in the past 10 years (2.12 percent) (see Table 1.12 in ODFW 2011d) has provided for good angling opportunities in the Lower Columbia and Sandy Rivers. The numeric goal for this popular summer steelhead program is to release 75,000 smolts each year.

Summer-run steelhead are not considered indigenous to the Sandy River Basin, but counts from the former Marmot trap indicate naturally produced summer steelhead do exist with numbers declining annually after passage of hatchery summer steelhead into the upper basin ceased in 1997. Because the summer-run steelhead are not indigenous, the goal for the proportion of hatchery adults spawning naturally would be less than 5 percent of the naturally spawning population. However, Harvest of hatchery-produced summer steelhead is managed to comply with the lower Columbia steelhead DPS FMEP (ODFW 2003c), which explains the management implications of holding a recreational fishery where hooking mortality of listed fish may occur (ODFW 2011e). Current fishing regulations in the Lower Columbia River DPS require that all unmarked adult steelhead be released back to the water unharmed (see the evaluation of the FMEP in NMFS 2003a). Since 2003, relatively small changes in fisheries management have occurred relative to the assessment by NMFS (2007a); the effect of those refinements will be considered in Section 4, Environmental Consequences, below. ~~There is no retention of unmarked, listed steelhead in the DPS with the exception of a fishery, where retention is allowed, from July 1 through August 31 in the upper Sandy River upstream of and including the Salmon River. This fishery is intended to harvest unmarked (non-ESA-listed) naturally produced summer steelhead that are not indigenous to the Sandy River Basin.~~ Only adult steelhead with an adipose fin clip may be retained in recreational fisheries targeting winter steelhead in the lower river downstream of the mouth of the Salmon River. The catch of summer steelhead has averaged about 850 adults annually from 2001 to 2009 (ODFW 2011d).

The effects of the Proposed Action on the fisheries in the Sandy River will be included in this analysis. The effects of the Proposed Action on fisheries outside the Sandy River Basin (Columbia River mainstem fisheries) would not be discernible because Sandy River hatchery production accounts for only a small percentage of the total summer steelhead available to the mainstem fisheries (ODFW and WDFW 2011; WDFW 2006; WDFW 2011), and thus will not be considered further in this analysis.

1
2 Summer steelhead (identified as Skamania stock 24) were first introduced into the Sandy River
3 in 1975. The disposition of hatchery summer steelhead returning to Sandy Hatchery or to lower
4 basin collection facilities in a condition suitable for angler use prior to August 1 may be recycled
5 once through the lower river fishery to provide additional angling opportunities. Recycled fish
6 would be released at Lewis and Clark Park. All recycled fish would be distinctly marked (e.g.,
7 caudal punch or Floy tag) prior to release. Fish would only be recycled once; all fish that are
8 collected a second time would be permanently removed from the Sandy River. No fish would be
9 recycled to the lower river after July 31. No hatchery summer steelhead collected in the upper
10 basin weirs/traps would be recycled; these fish would be removed from the Sandy River.
11 Surplus fish may also be recycled to isolated standing waters (e.g., Salish Ponds) to provide
12 additional angling opportunity associated with trout fisheries. Fish that would be to be disposed
13 of are done so in accordance with ODFW policies and procedures, which include freezing,
14 rendering, and/or placement in a landfill.

15
16 Broodstock for the summer steelhead (Skamania stock 24) are not collected specifically for the
17 Sandy River program. About 2,000 adult hatchery summer steelhead are collected annually at
18 Foster Dam (on the South Santiam River) to meet egg requirements for all summer steelhead
19 (Skamania stock 24) propagation programs operated by ODFW. Broodstock is transferred to the
20 South Santiam Hatchery, which is adjacent to the Foster Dam trap. The South Santiam Hatchery
21 is located at RM 38.5 on the South Santiam River in the Upper Willamette River Basin, Linn
22 County, Oregon. The operation of the Santiam Hatchery was evaluated in a separate ESA
23 consultation and determined not to jeopardize listed salmon and steelhead in the Upper
24 Willamette River basin (NMFS 2008g). The operation of the Santiam Hatchery will not be
25 evaluated as part of this analysis because these facilities would continue to be operated in a
26 similar manner without the addition of the production from the proposed hatchery program.

27
28 Adult holding, spawning, and early incubation occurs at the South Santiam Hatchery. Eyed-eggs
29 are then transferred in February to Oak Springs Hatchery and to Bonneville Hatchery for egg
30 incubation and early rearing. Fish are reared at Oak Springs Hatchery until December when
31 approximately 40,000 summer steelhead juveniles, at a target size of 7.5 fpp, are transferred to
32 Sandy Hatchery for further rearing and release. The summer steelhead at Bonneville Hatchery
33 are reared to a target size of 4.5 fpp and would then be transferred in the spring to Sandy
34 Hatchery for acclimation and release. Mitchell Act funds are used to support the production of
35 Sandy River summer steelhead at the Oak Springs and Bonneville Hatcheries. These facilities
36 would continue to be operated and funded in a similar manner without the addition of the
37 production from the proposed hatchery program.

38
39 The fish would be acclimated at Sandy Hatchery for at least 2-3 weeks prior to release. Smolts
40 would then be transferred from the raceways to the adult holding pond and allowed to recover for
41 approximately 24 hours prior to release. The fish would then be released from the adult holding
42 pond by removing screens and partially lowering the water level in the pond to facilitate a
43 gradual release and dispersed downstream migration of smolts. Fish would be allowed to
44 volitionally migrate from the pond for a 24 hour period. After 24 hours water levels in the pond
45 would be gradually dropped further to promote migration. After approximately 48 hours, water
46 levels would be dropped fully and any remaining fish transported into Cedar Creek. Based on

1 long-term observations, approximately 80 to 90 percent of the steelhead smolts volitionally
2 migrate during the first 24 hour period after screen removal, and nearly all have migrated by the
3 end of the 48 hour period; usually less than 1,000 smolts remain after 48 hours. ODFW will
4 investigate the option of “holding back” juvenile steelhead that do not migrate during the
5 volitional release period after necessary facility improvements are completed as part of the fish
6 passage restoration project. Under this option, all fish remaining after the volitional release
7 period would be transferred to trout fisheries in standing water bodies after reaching legal (8-
8 inch) size. This option could reduce the potential for summer steelhead juveniles to residualize
9 and compete with native fish species after release from the hatchery.

10
11 All of Sandy Hatchery summer steelhead smolts are fin marked (adipose fin-clip) prior to release
12 to differentiate between natural and hatchery fish.

13 14 **2.3 Alternatives Considered but Not Analyzed in Detail**

15 Alternatives that would consider increases or decreases in hatchery production levels, or changes
16 in BMPs, were considered, but determined to be less likely to provide the intended benefit of
17 providing fishing opportunities while conserving and enhancing the natural-origin populations.

- 18
19 • The Secretary would determine that the four proposed hatchery programs, as
20 described in the HGMPs, meet the criteria for section 10(a)(1)(A) permits. Under
21 this alternative, the only change from the Proposed Action would be a difference
22 in ESA authorization for these hatchery programs. The analysis of impacts under
23 this alternative would not differ from the analysis that would occur under the
24 Proposed Action.
25
- 26 • Best Management Practices (BMPs) – Under this alternative, the Secretary would
27 approve the four proposed hatchery programs under limit 5 of the 4(d) Rule, and
28 the hatchery programs would be implemented as described in the HGMPs. BMPs
29 are protocols on the operation of hatcheries and hatchery programs to meet the
30 objectives of the hatchery program (IHOT 1995; HSRG 2004; Mobrand et al.,
31 2005; ICF – Jones and Stokes 2009). A recent review of these protocols produced
32 a list of 87 management practices (ICF – Jones and Stokes 2009). These
33 management practices do not apply to all hatchery programs but are specific to
34 the goal of the hatchery program (e.g., a harvest augmentation program would
35 have different protocols than a conservation hatchery program though some
36 would be consistent between the two). In addition, the protocols are separated into
37 different categories: broodstock choice; broodstock collection; adult holding;
38 spawning; incubation; rearing; release; facilities; monitoring and evaluation; and
39 effectiveness (ICF – Jones and Stokes 2009). Under this alternative, additional
40 BMPs not necessarily applied to all HGMPs under Alternative 2 would be applied
41 to reduce adverse impacts of the hatchery programs on natural-origin salmon and
42 steelhead populations. This alternative is not reasonable because any additional
43 BMPs that are not already proposed for the HGMPs would provide little or no
44 additional benefit to the listed species because the proposed HGMPs have already
45 implemented reforms that include BMPs considered necessary and appropriate for

the proposed hatchery programs. Such BMP implementation would be considered under Alternative 2 as the Proposed Action.

- Greater levels of hatchery production than those proposed – NMFS could have considered production levels greater than proposed in the four HGMPs. However, higher production levels would exceed the capacity of the production facilities and could potentially reduce the survival of the artificially propagated fish and, thus, would not meet the purpose and need.
- Lower levels of hatchery production than those proposed – NMFS could have considered production levels lower than proposed in the four HGMPs. The No-action Alternative will serve as a bookend with production being zero; any incrementally different level of production between no production and the proposed levels would not provide a large enough range to allow meaningful evaluation.
- Continue to operate the hatchery programs as they were operated in the past – NMFS could have considered the hatchery programs as they were operated prior to 2011 when program changes to the spring Chinook salmon program and the winter steelhead program were initiated as described in the HGMPs considered in Alternative 2. The spring Chinook salmon and winter steelhead programs prior to 2011 collected natural-origin adults for use in the hatchery broodstock. This practice discontinued because of concerns with the ability of the natural populations to support the removal of natural-origin adults for programs that primarily produce fish to support fisheries. The removal of natural-origin adults for broodstock to support fisheries is not consistent with the Oregon’s Native Fish Conservation Policy (ODFW 2003a) and the Fish Hatchery Management Policy (ODFW 2003b) and, thus, would not meet the purpose and need.

3 AFFECTED ENVIRONMENT

3.1 Internal Scoping

The two alternatives considered in this EA can potentially affect the physical, biological, social, and economic resources within the action area. Below is a description of the **baseline condition of the** environmental resources that would be affected by these alternatives ~~and the current baseline condition.~~

NMFS conducted an internal scoping process (NMFS 2011a) to identify those resources within the action area that could be impacted by the alternatives. During the scoping process, potential impacts on the geology and soils and listed plants resources were identified due to the proposed construction of an acclimation facility near the mouth of the Bull Run River. ODFW, in discussions with the City of Portland, has determined that the City will not permit the construction and operation of an acclimation pond on City property at Dodge Park, adjacent to the mouth of the Bull Run River. As a result, a new acclimation facility would not be included, and the release of spring Chinook salmon would be from a site already established adjacent to the decommissioned Bull Run Powerhouse. The decision to eliminate the construction of the new

1 acclimation pond near the Bull Run River removes any potential impacts on the geology and
2 soils and the listed plant resources.

3
4 Impacts on geology and soils would typically include changes from blasting, compaction, soil
5 removal, or chemical alterations that change the physical properties such as infiltration, erosion
6 potential, or suitability for vegetation growth. Impacts on listed plants would typically occur
7 when listed plants are exposed to physical damage or chemical exposure that would harm the
8 plant. Because all of the hatchery facilities used to rear and release hatchery salmon and
9 steelhead for the programs described in the HGMPs are already in place, no further effects on
10 these resources would be expected to occur as a result of the alternatives, and so are not
11 considered further in this assessment.

12
13 The following is a discussion of those resources within the action area that could be impacted by
14 the alternatives.

15 16 **3.2 Water Quality and Water Quantity**

17 Habitat conditions important to the various ESA-listed salmonids in the action area vary widely;
18 however, factors such as water quality and water quantity (i.e., flow conditions) are important to
19 most fish species in the action area. Salmonids and other native fish species depend on good
20 water quality for migration, spawning, rearing, and overall viability (Groot et al. 1995).
21 Salmonids, in particular, require clear, cold waters for optimal health (Groot et al. 1995). Water
22 temperature is a key factor affecting salmonid spawning and rearing in some areas of the Sandy
23 River Basin; other water quality parameters that are important to salmonids include turbidity,
24 dissolved oxygen, and availability of nutrients (Groot et al. 1995).

25
26 By authorities delegated by the Environmental Protection Agency (EPA), the Oregon
27 Department of Environmental Quality (ODEQ) manages the quality of Oregon's streams, lakes,
28 estuaries, and groundwater. ODEQ developed a Water Quality Management Plan (ODEQ 2006)
29 that provides a strategy for (1) reducing discharges from non-point sources to the required "load
30 allocations," and (2) reducing discharges from point sources to the required "waste load
31 allocations" described in the total maximum daily load plan for the Sandy River (ODEQ 2006).
32 ODEQ has the authority to manage effluent from hatchery facilities through NPDES permits
33 (ODEQ 2007). As described above, ODFW operates the Sandy River Hatchery under a NPDES
34 permit. Under section 303(d) of the Clean Water Act, ODEQ developed a list of "impaired
35 waters" for the Sandy River Basin (Table 2). The two temperature criteria that were exceeded for
36 the water bodies in Table 2 are related to salmon and steelhead spawning (a 7-day average
37 maximum of 55.4°F (13.0°C) from August 15 to June 15) and to salmon and steelhead rearing
38 and migration (a 7-day average maximum of 64.4°F (18.0°C) all year-around (during non-
39 spawning periods)).
40

Table 2. Water bodies in the Sandy River Basin listed under section 303(d) of the Clean Water Act (ODEQ 2006).

Water Body	303(d) Listing Parameter	Year Listed	River Mile
Alder Creek	Temperature	2004	0 – 2.0
Badger Creek	Temperature	2004	0 – 6.0
Beaver Creek	Temperature	2004	0 – 8.4
Blaze Alder Creek	Temperature	2004	0 – 3.9
Boulder Creek	Temperature	2004	0 – 5.7
Bull Run River	Temperature	2004	0 – 26.9
Cedar Creek	Temperature	2004	0 – 14.2
Clear Creek	Temperature	2004	0 – 0.7
Little Sandy Creek	Temperature	2004	0 – 15.7
Salmon River	Temperature	2004	0 – 33.9
Sandy River	Temperature	2004	0 – 55.5
South Fork Salmon	Temperature	2004	0 – 1.4
Still Creek	Temperature	2004	0 – 6.2
Zigzag River	Temperature	2004	0 – 6.9

ODFW, as part of the NPDES permit requirements, monitored effluent temperature for a period of 3 years to determine compliance with Oregon's water quality (temperature) criteria set for the Sandy River Basin. After the 3-year period, ODFW prepared the impact analysis that was submitted to the ODEQ (ODFW 2006). The analysis determined that the maximum instantaneous temperature of the hatchery effluent never reached the maximum limit in the NPDES permit of 77°F (25°C) during the 3-year period (2003-2005). During the spawning period (October 15 – May 15), water temperatures at the mixing zone exceeded 55.4°F (13.0°C) on two occasions (58.5°F (14.7°C) on October 20, 2003, and 57.6°F (14.2°C) on May 4, 2003), but the ambient water temperatures of the stream were also the same, and the hatchery effluent did not add any thermal load to the mixing zone on these dates (Tables 1 and 2 in ODFW 2006).

During the salmon and steelhead rearing and migration period, ODFW observed that water temperatures in the mixing zones exceeded 64.4°F (18.0°C) during July and August of 2003, but hatchery effluent did not increase the ambient temperatures of the receiving stream. In August 2004, ODFW measured a maximum thermal load of 0.2°F (0.1°C) at the mixing zone of the receiving stream. However, this increase was within the allowable limit for temperature increase under Oregon regulations and, furthermore, ODFW observed that there were no differences in water temperatures between the hatchery outfall and Cedar Creek's ambient temperatures during July and August 2004, and that the 0.2°F (0.1°C) temperature load may have been due to sampling error (ODFW 2006). ODEQ determined that the hatchery effluent did not add to the thermal load on Cedar Creek (ODFW 2006).

The NPDES permit sets limits on total suspended solids, settleable solids, temperature, and pH for hatchery effluent (ODEQ 2006). When fish are being reared at the Sandy Hatchery, total suspended solids and settleable solids (which contribute to turbidity) are controlled by passing the hatchery effluent through a pollution abatement pond to settle out un-eaten foods and fish wastes. The NPDES requires monthly monitoring of total dissolved solids and settleable solids as well as pH. Measurements are taken during normal operations and during pond cleaning

activities. ODEQ did not identify low dissolved oxygen as contributing to the impairment of the waters in the Sandy River basin (ODEQ 2006), and direct management of dissolved oxygen levels is not required under the NPDES permit. Dissolved oxygen levels in the hatchery effluent are restored to ambient levels due to mixing of the hatchery effluent water and water in the adult fish ladder prior to release into Cedar Creek. The hatchery effluent may contain aquaculture drugs and chemicals (formalin), however these are strictly monitored and are prescribed by licensed veterinarians to be effective in the treatment of the fish pathogen while meeting drug label criteria for environmental exposure. The location of the settlement pond is out of the Sandy River flood plain and high enough that it has never been impacted by flooding in Cedar Creek (ODFW 2012a).

In the past, the Sandy Hatchery operated year-around and, during the summer low flow periods, would de-water the section of Cedar Creek from the intake downstream to the outfall, a distance of approximately 900 feet. This would impede migration of, and adversely impact, any juvenile fish present in the dewatered section from the intake downstream to the hatchery outfall. When the facility was operated in this manner, adult salmon and steelhead were not passed above the hatchery.

More recently, the hatchery has not been operated during this low flow (water-quantity-limited) period, with the result that dewatering of the by-pass reach did not occur. Juvenile salmonids migrating in Cedar Creek in the section from the intake to the hatchery outfall can be impacted by the intake structure by blocking upstream passage and impingement on the intake screens. The intake structure ~~is being~~was upgraded in 2012 to meet NMFS screening and passage criteria. ODFW proposes to rear the coho salmon entirely at the Sandy Hatchery beginning in 2013. As described above (Subsection 2.2.2, Sandy River Coho Salmon Program) the minimum flows needed for rearing the coho salmon on station would be 2,200 gpm in August and 2,300 gpm in September. Flows in Cedar Creek are expected to exceed 3,600 gpm, 95 percent of the time, but low flows can occur during the late summer and early fall (primarily September). This is the critical period when flows in Cedar Creek tend to be there lowest. To prevent de-watering of the by-pass section below the intake structure, ODFW proposes to maintain a minimum flow that would ~~to~~ allow juvenile salmonids to pass freely through this e-section of Cedar Creek. Meeting minimum flows in this section during September may limit the ability to rear all of the coho salmon production on station.

The transport of marine nutrients to freshwater environments by returning anadromous fish has implications for the biology of fish, wildlife, and riparian systems, but can also be considered in terms of effects on water quality. Returning hatchery salmon can provide marine-derived nutrients to freshwater spawning and rearing areas. Gresh et al. (2000) estimated that only 6 to 7 percent of the marine-derived nitrogen and phosphorus that was delivered to the rivers of the Pacific Northwest by spawning salmon 140 years ago is currently returning to those streams. They attributed the loss to habitat destruction due to beaver trapping, logging, irrigation, grazing, pollution, dams, urban and industrial development, and commercial and recreational fishing. Bilby et al. (2002) found a positive linear relationship between the biomass of juvenile anadromous salmonids and the abundance of carcass material at sites in the Salmon and John Day Rivers, suggesting that spawning salmon may be influencing aquatic productivity and the availability of food for rearing fishes.

Salmon carcasses also appear to promote the growth of riparian forests, a source of large woody debris and stream shading. Helfield and Naiman (2001) hypothesized that there were several pathways for the transfer of marine-derived nutrients from streams to riparian vegetation, including the transfer of dissolved nutrients from decomposing carcasses into shallow subsurface flow paths and the dissemination in feces, urine, and partially-eaten carcasses by bears and other salmon-eating fauna. Studies from the mid-1990s to the early 2000s suggest that the biomass of carcasses affects the productivity of salmonids and salmonid rearing habitat, but functional and quantitative relationships are poorly understood and difficult to generalize from the specific conditions studied (Bilby et al. 1998; Cederholm et al. 1999; Gresh et al. 2000). Limiting factors, and thus the ecological importance of marine-derived nutrients, differ among streams. ODFW outplants excess hatchery salmon carcasses to enhance marine-derived nutrients in the Sandy River Basin. ODFW limits use of carcasses from outside the Sandy River Basin due to disease concerns and high demand for carcasses to support nutrient enhancement activities in other areas.

Human activity such as beaver trapping, logging, irrigation, grazing, pollution, dams, and urban and industrial development have all contributed to a decline in water quality parameters in the action area. Other human activities unrelated to hatchery programs that could affect water quality in the action area include agricultural practices, logging, irrigation, pollution, dams, and urban and industrial development.

3.3 Anadromous Fish Listed Under the ESA

Since 1991, NMFS has identified 12 ESUs and DPSs of Columbia River Basin salmon and Columbia River Basin steelhead as requiring protection under the ESA (Table 1). Four of the listed anadromous salmonid species originate in the Sandy River Basin (Table 1). In addition to the four salmonid species, NMFS has also listed as threatened under the ESA the Pacific Eulachon (*Thaleichthys pacificus*), which is present in the Sandy River Basin (Table 1). The current status of each of the listed species is described below.

3.3.1 Sandy River Spring Chinook Salmon

The Sandy River spring Chinook salmon population is part of the LCR Chinook Salmon ESU. The LCR Chinook Salmon ESU is characterized by numerous short- and medium-length rivers that drain the coast range and the west slope of the Cascade Mountains. This ESU includes all native populations from the mouth of the Columbia River to the crest of the Cascade Range, including the White Salmon River in Washington and the Hood River in Oregon (Figure 2, Figure 3). The ESU excludes populations above Willamette Falls. The Cowlitz, Kalama, Lewis, Washougal, and White Salmon Rivers constitute the major systems in Washington; the lower Willamette, Hood, and Sandy Rivers are the major systems in Oregon (BRT 2003). The ESU does not include spring Chinook salmon populations in the Clackamas River or the introduced Carson spring Chinook salmon stock. Tule fall Chinook salmon in the Wind and Little White Salmon Rivers are included in this ESU, but not the introduced upriver bright fall Chinook salmon populations in the Wind and White Salmon Rivers and those spawning naturally below Bonneville Dam (Myers et al. 1998). NMFS determined that 17 Chinook salmon hatchery programs were part of the LCR Chinook Salmon ESU, including the Sandy River spring

1 Chinook salmon program, which is the only one in the action area (NMFS 2005). Populations
2 outside the action area would not be affected by the Proposed Action, so the Sandy River
3 population is that only one that will be considered in this assessment.
4

5 There are three different runs of Chinook salmon included in the LCR Chinook Salmon ESU:
6 spring-run, late fall brights, and early fall tules; the Sandy River Basin supports all three run
7 types (for further information on Chinook salmon life histories, see Gilbert (1912), Fulton
8 (1968), and Healey (1983; 1986; 1991)). Spring-run Chinook salmon in the Sandy River tend, as
9 juveniles, to have an ocean distribution that takes them far from the coast; as adults, they enter
10 freshwater in March and April, well in advance of spawning in August and September.
11 Historically, fish migrations were synchronized with periods of high rainfall or snow melt to
12 provide access to upper reaches of most tributaries where spring-run stocks would hold until
13 spawning (Fulton 1968; Olsen et al. 1992; WDF et al. 1993). Typical of the general fall Chinook
14 salmon life history type, tule and bright fall Chinook returning to the Sandy River exhibit more
15 northerly ocean migration patterns, with bright fish tending to travel farther north than the tule
16 stocks; they enter freshwater in a more advanced stage of sexual maturity, move rapidly to their
17 spawning areas on the mainstem or lower tributaries of their natal rivers, and spawn within a few
18 days or weeks of freshwater entry (Fulton 1968; Healey 1991). Tule fall Chinook salmon begin
19 entering the Columbia River in August, rapidly moving into the lower Columbia River tributaries
20 to begin spawning in September and October. Bright fall Chinook salmon enter the Columbia
21 River over a longer period of time beginning in August and do not begin spawning until October
22 with spawning observed into the following March in some locations. All lower Columbia River
23 Chinook salmon mature from 2 to 6 years of age, primarily returning as 3- and 4-year-old adults
24 (Myers et al. 1998).
25

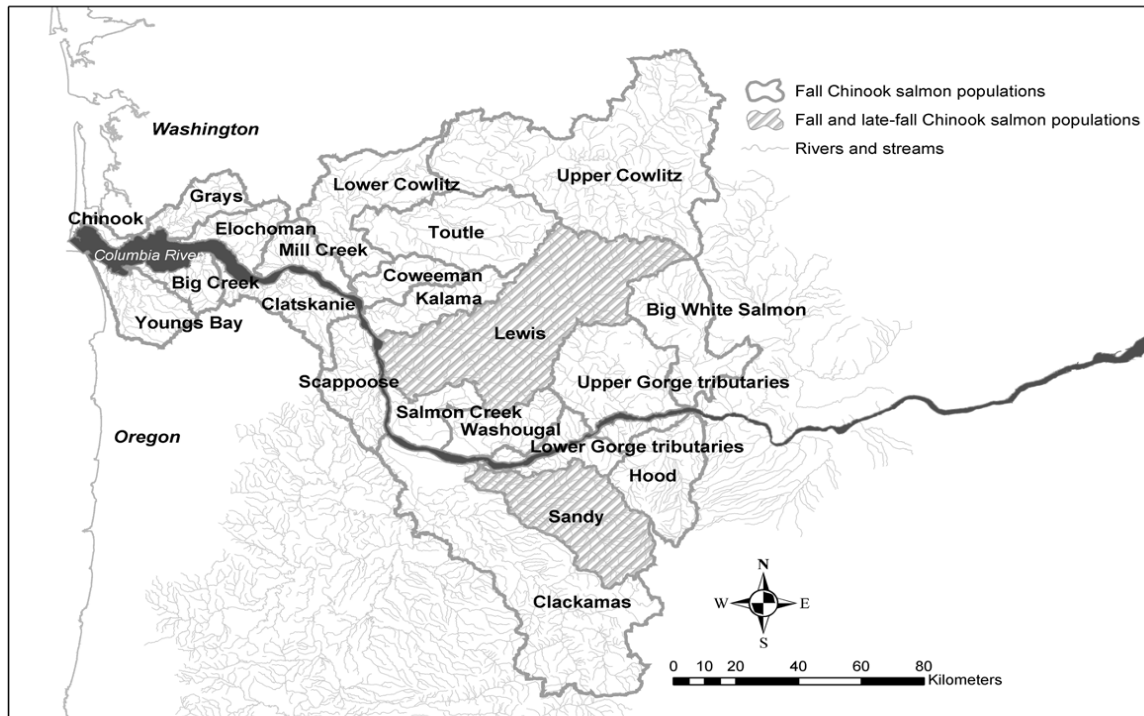


Figure 2. Historical independent LCR early and late fall Chinook salmon populations (Myers et al. 2006).

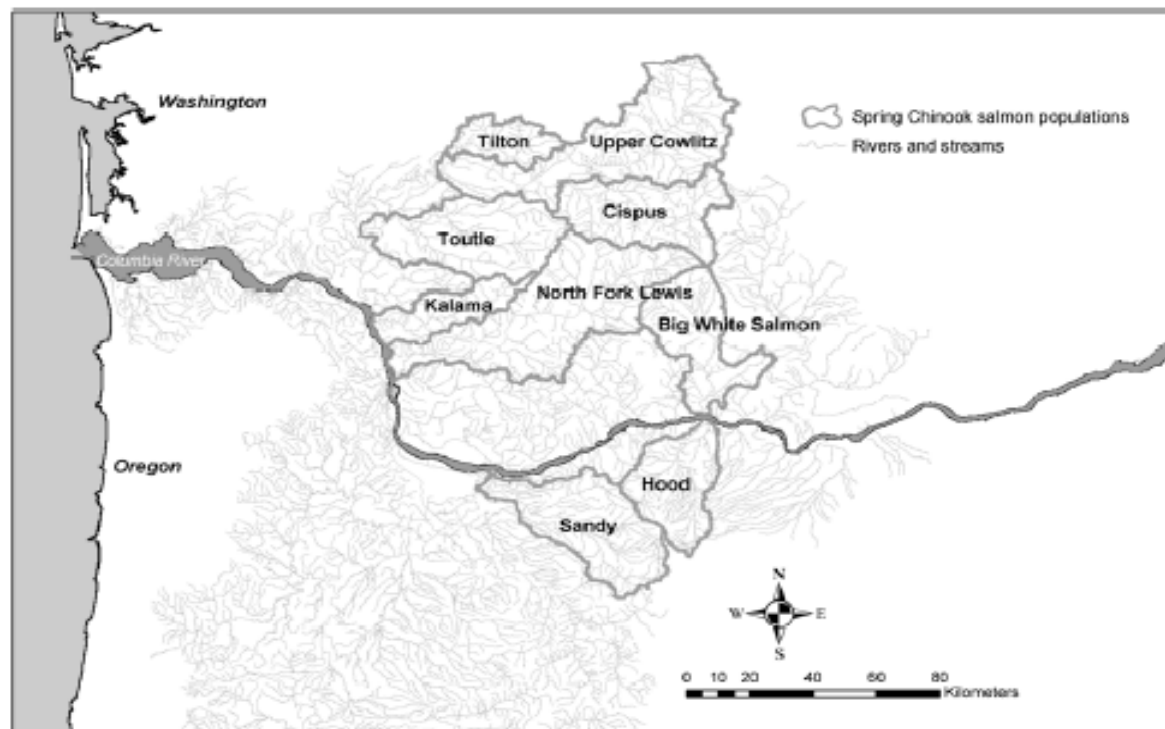


Figure 3. Historical independent LCR spring Chinook salmon populations (Myers et al. 2006).

3.3.1.1 Status and Trends

Ford (2011) recently updated the status review completed in 2005 (Good et al. 2005), concluding, consistent with previous evaluations, that the ESU as a whole is currently at very high risk of extinction. The Sandy spring Chinook salmon population, however, without a mainstem dam, is considered at moderate risk and is the only spring Chinook salmon population in the ESU not considered extirpated or nearly so (ODFW 2010). The recovery goal for the Sandy River population of spring Chinook salmon, as described in the Recovery Plan (ODFW 2010) (Subsection 1.6, Relationship to Other Plans and Policies), is for the population to be at low risk of extinction (less than 5 percent probability) with an annual abundance of 1,230 natural-origin adults.

The Sandy River late fall (bright) population is one of only two populations in the ESU considered to be at low or very low risk (LCFRB 2010; ODFW 2010). It contains relatively few hatchery fish and has maintained high spawner abundances since the last BRT evaluation (LCFRB 2010; ODFW 2010). The tule fall Chinook salmon population is considered to be at very high risk (ODFW 2010).

Recent escapement estimates for Sandy River spring Chinook salmon are provided in Table 3.

Table 3. Total numbers of salmon and steelhead counted at Marmot Dam (Sandy River), 1992-2007, and estimated from spawning ground surveys (2008-2010)(ODFW 2011a). Data from 1999-2007 are from ODFW-Marmot Dam counts. Marmot Dam data prior to 1999 were obtained from Doug Cramer-PGE.

Run Year	Spring Chinook ^a		Coho ^a		Winter Steelhead ^a		Summer Steelhead ^a	
	Total ^c	Wild ^b	Total ^c	Wild ^b	Total ^c	Wild ^b	Total ^c	No Mark
1992	4,451	1,255	790	790	2,916	2,563	2,914	
1993	3,429	967	193	193	1,636	1,438	1,865	
1994	2,309	653	601	601	1,567	1,377	1,979	
1995	1,503	418	697	697	1,680	1,477	1,313	
1996	2,561	697	179	179	1,287	1,131	1,164	
1997	3,301	935	116	116	1,426	1,253	1,859	
1998	2,612	700	261	261	745	655	837	
1999	2,032	581	160	160	928	928	681	20
2000	2,376	564	742	730	784	741	173	110
2001	3,758	988	1,396	1,380	974	902	723	262
2002	4,326	1,035	311	310	1,529	1,031	544	473
2003	3,880	1,053	1,178	1,173	692	671	278	230
2004 ^d	5,285	2,294	1,047	1,025	877	869	403	343
2005 ^d	3,923	1,542	755	745	632	626	148	128
2006 ^d	2,452	1,239	842	835	651	643	126	107
2007 ^d	2,417	1,505	687	687	858	845	162	138
2008 ^d	4,965	2,721	1,468	1,468	n/a	n/a	n/a	n/a
2009 ^d	1,821	856	1,667	1,493	n/a	n/a	n/a	n/a
2010 ^d	6,181	1,330	924	700	995	969	n/a	n/a

^a Spring Chinook were not 100 percent marked until the 1997 brood year (2002 -2005 adult return years). Coho were not mass marked until the 1996 brood year (1999-2000 adult returns). Summer and winter steelhead have been 100 percent marked since 1996.

^b 1992-1998 estimate of wild fish from LCRCRP (ODFW 2010). Wild fish count prior to 2008 does not include unmarked fish found below the former Marmot Dam.

^c Hatchery fish identified by adipose fin-clip were removed from the system beginning in 1998. Count corrected for estimated proportion of unmarked hatchery fish found upstream of the former Marmot Dam.

^d Coho estimate updated based on Lewis et al. (2009; 2010; 2011).

1 The Sandy River Working Group (2007 in NMFS 2008a) identified anchor habitats for salmon
2 and steelhead in the Sandy River. In the Sandy River Basin, effects on anchor habitats tend to
3 occur not as a result of juvenile releases, which occur downstream of those anchor habitats, but
4 due to the operation of the weirs and the return of hatchery spring Chinook salmon adults to
5 those areas. Anchor habitats are defined as distinct stream reaches that currently harbor specific
6 life history stages of salmon and steelhead to a greater extent than the stream system at large.
7 Spring Chinook salmon anchor habitat is located in the upper Sandy River Basin upstream of
8 Cedar Creek. Spawning and rearing habitat includes areas in the mainstem Sandy River from
9 approximately RM 24 (2 miles above the mouth of Cedar Creek) to the Salmon River, in the
10 mainstem Salmon River up to Final Falls (RM 14), in the Sandy River from the Salmon River
11 confluence to the Zigzag River, the lower end of Clear Fork Creek in the upper Sandy River, and
12 the lower end of Still Creek (downstream of Cool Creek) (Figure 1).

13
14 The action area includes areas designated as critical habitat for LCR Chinook salmon (70 FR
15 52630). Stream reaches that were accessible to anadromous salmon were designated as critical
16 habitat in 2005 (Table 1). The habitat in Cedar Creek above the Sandy Hatchery and those areas
17 above the dams on the Bull Run River were excluded. NMFS, in designating critical habitat,
18 identified primary constituent elements (PCEs) that consist of the physical and biological
19 features identified as essential to the conservation of the listed species. PCEs for salmon and
20 steelhead include sites essential to support one or more life stages of the ESU/DPS (sites for
21 spawning, rearing, migration, and foraging). These sites in turn contain physical or biological
22 features essential to the conservation of the ESU. Those specific types of sites and the features
23 associated with them that are found in the action area include:

- 24
25 • Freshwater spawning sites with water quantity and quality conditions and substrate
26 supporting spawning, incubation, and larval development
27
- 28 • Freshwater rearing sites with water quantity and floodplain connectivity to form and
29 maintain physical habitat conditions and support juvenile growth and mobility; water
30 quality and forage supporting juvenile development; and natural cover such as shade,
31 submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation,
32 large rocks and boulders, side channels, and undercut banks
33
- 34 • Freshwater migration corridors free of obstruction with water quantity and quality
35 conditions and natural cover such as submerged and overhanging large wood, aquatic
36 vegetation, large rocks and boulders, side channels, and undercut banks supporting
37 juvenile and adult mobility and survival.
38

39 **3.3.1.2 Limiting Factors and Threats**

40 The Recovery Plan (ODFW 2010) identified the key limiting factors for Sandy River Chinook
41 salmon as including:

- 42
- 43 • reduced habitat complexity and diversity
- 44 • access to off-channel habitats
- 45 • impacts on the estuary habitat from hydrosystem operations

- stray hatchery fish interbreeding with natural-origin adults

There are many factors in the Columbia River mainstem, the near-ocean environment, and the open ocean that have substantial effects on the survival of salmon and steelhead; all these areas are outside the action area for the Proposed Action. Key factors limiting juvenile fall, late-fall, and spring Chinook salmon viability that occur within the Sandy River Basin include reduced habitat quality and complexity, and connectivity with off-channel habitat are key factors limiting juvenile fall, late-fall, and spring Chinook salmon viability in all population areas. Land use practices in the Sandy River Basin, such as channelization, diking, wetland conversion, beaver dam removal, large woody debris removal, and gravel extraction have severed access to historically productive habitats, simplified many remaining tributary habitats, and weakened the important watershed processes and functions that once created healthy ecosystems for salmon and steelhead production. Impacts on the Sandy River population of spring Chinook salmon from hatchery fish interbreeding with natural-origin adults are discussed in further detail in Section 4.1, Potential Hatchery Effects.

Actions specifically related to the spring Chinook salmon program at Sandy Hatchery can be found in Table 9-3 of the Recovery Plan (ODFW 2010). In addition, Table 9-3 in ODFW (2010) also includes ESU-wide actions that apply to all hatcheries in the Lower Columbia River tributaries in Oregon. Those hatchery recovery actions that apply to the spring Chinook salmon hatchery program and have already been implemented (ODFW 2010). The Recovery Plan identified a number of recovery actions for the Sandy River spring Chinook salmon hatchery program (Table 4). Most of these actions are designed to reduce the proportion of hatchery spring Chinook salmon spawning naturally, with the goal of having the 9-year **moving** averaged proportion to be less than or equal to 10 percent (ODFW 2010). The hatchery stray rate target of 10 percent was identified as the level necessary to meet delisting goals for the naturally spawning population. Currently, hatchery spring Chinook salmon make up a substantial proportion of the naturally spawning Sandy River population (Table 3). The major concern with these hatchery programs is the effect hatchery strays have on the productivity and long-term fitness of naturally spawning populations (HSRG 2007).

Table 4. Sandy-specific Recovery Plan actions addressing the spring Chinook salmon hatchery program (ODFW 2010).

Action ID	Action	Status in the Sandy Basin
238-SY	Acclimate 100 percent of hatchery spring Chinook releases into the Sandy (Sandy Hatchery and Bull Run River or Gordon Creek)	On-going
239-SY	Trap and sort hatchery adults: Collect (weir and trap at or near acclimation sites) hatchery spring Chinook if stray rate is too high (mouth of Cedar Creek and Bull Run River or Gordon Creek)	In process of being implemented
240-SY	Increase water quantity in Cedar Creek for more attraction (end illegal diversions, increase outreach and coordination with Oregon Water Resources Department, potentially purchase water rights)	To be completed
241-SY	Implement a sliding scale for take of wild winter steelhead and spring Chinook broodstock for the integrated hatchery programs based on the forecasted total returns of wild fish to the population (less than 500: no take; 500 to 1000: reduced take); develop forecast model as necessary.	Action under review
242-SY	Eliminate the upper basin and Marmot Dam acclimation pond releases	Completed

Source: ODFW 2010

3.3.2 Sandy River Coho Salmon

The Sandy River coho salmon population is part of the LCR Coho Salmon ESU, listed as threatened on June 28, 2005 (Table 1). The ESU includes all naturally spawned populations of coho salmon in the Columbia River and its tributaries in Washington and Oregon, from the mouth of the Columbia River up to and including the Big White Salmon and Hood Rivers (Figure 4), and includes 27 hatchery programs. The Sandy Hatchery coho salmon program is considered to be part of the LCR Coho Salmon ESU. Populations outside the action area would not be affected by the Proposed Action, so the Sandy River coho salmon population is the only coho salmon population that will be considered in this assessment.

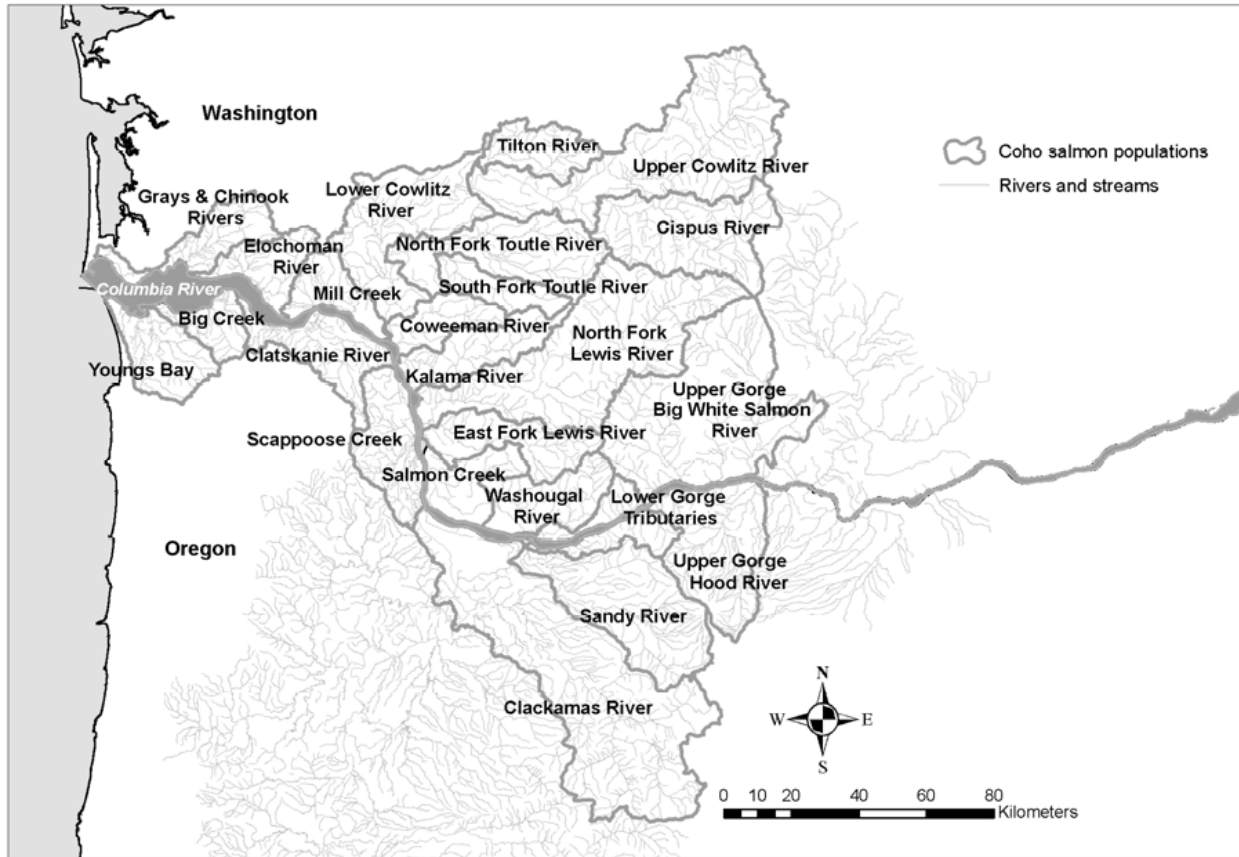


Figure 4. Historical Columbia River coho salmon populations (from Myers et al. 2006).

LCR coho salmon begin to return to the Columbia River in August, continuing through December or January and peaking in September and October. The onset of coho salmon spawning in lower Columbia River tributaries is tied to the first substantial fall rainfall event.

Columbia River coho salmon generally return in two runs, based generally on when they return to freshwater. The Sandy River population of coho salmon is considered to be an early returning run with spawning generally completed by the end of November.

3.3.2.1 Status and Trends

Ford (2011) recently updated the status review completed in 2005 (Good et al. 2005), concluding, consistent with previous evaluations that the ESU is currently at very high risk of extinction. Of the 27 historical populations in the ESU, 24 are considered at very high risk. The remaining three populations (Sandy, Clackamas, and Scappoose) are considered at high to moderate risk.

Table 3 provides escapement and hatchery proportion information for coho salmon returning to the Sandy River. Note that prior to 2007 abundance estimates and the proportion of hatchery spawners was based on counts at Marmot Dam. Spawning surveys have been conducted to estimate abundance for the most recent years (2008-2010) and have included tributaries to the

1 Sandy River below the former site of Marmot Dam, which may account for the increase in the
2 proportion of hatchery coho salmon observed.

3
4 The majority of the coho salmon anchor habitat reaches are located in the upper Sandy River
5 upstream of the confluence of the Sandy and Salmon Rivers (The Sandy River Working Group
6 2007 as referenced in NMFS 2008a). Anchor habitats are defined as distinct stream reaches that
7 currently harbor specific life history stages of salmon and steelhead to a greater extent than the
8 stream system at large. One area of anchor habitat is on lower Gordon Creek, which is a tributary
9 to the lower Sandy River. The mainstem Salmon River and the lower portions of Weeburn,
10 Sixes, and Cheney Creeks are anchor habitat reaches in the Salmon River. A portion of Still
11 Creek and portions of Lost Creek and Clear Fork Creek make up the remaining anchor habitat
12 reaches (Figure 1). The majority of suitable spawning and rearing habitat is located above the
13 former Marmot Dam site in the mainstem Sandy River, in the Salmon River and its tributaries
14 below Final Falls, and in Still Creek. Lower Sandy River tributaries that could support coho
15 salmon included Cedar, Trout, Beaver, Gordon, and Buck Creeks and the Bull Run River (NMFS
16 2008a). Critical habitat has not been designated for the LCR Coho Salmon ESU.

17 18 **3.3.2.2 Limiting Factors and Threats**

19 The Recovery Plan (ODFW 2010) identified key limiting factors for Sandy River coho salmon,
20 including reduced habitat complexity and diversity; access to off-channel habitats; impacts on
21 the estuary habitat from hydrosystem operations; and harvest in consumptive fisheries. Stray
22 hatchery adults interbreeding with natural-origin adults was not considered a limiting factor. A
23 secondary limiting factor for coho salmon adults in the Sandy River was habitat access, which
24 was limited by the adult weir located at the Sandy Hatchery on Cedar Creek. The weir ~~was is~~
25 ~~currently-being~~ modified in 2012 to ~~improve allow~~ passage, and ~~now~~ adult natural-origin coho
26 salmon are being passed above the weir into previously inaccessible habitat. Impacts on estuary
27 habitat from hydrosystem operations and fishery harvest of coho salmon in consumptive fisheries
28 occur outside the action area. Fisheries within the Sandy River Basin are selective for hatchery
29 coho salmon, requiring the release of unmarked natural-origin coho salmon.

30
31 The recovery goal for the Sandy River population of coho salmon, as described in the Recovery
32 Plan (ODFW 2010), is for the population to be at low risk of extinction (less than 5 percent
33 probability of extinction) with an annual abundance of 5,685 natural-origin adults. The Recovery
34 Plan identified a number of recovery actions for the Sandy River coho salmon hatchery program
35 (Table 5). These actions are designed to reduce the proportion of hatchery coho salmon
36 spawning naturally, with the goal of having the 9-year ~~moving~~ averaged proportion to be less
37 than or equal to 10 percent (ODFW 2010). The hatchery stray rate target of 10 percent was
38 identified as the level necessary to meet delisting goals for the naturally spawning population.
39 Recent hatchery stray rates have exceeded the 10 percent goal (Table 3).

40
41 The action in the Recovery Plan (ODFW 2010) that was specifically related to the coho salmon
42 program at the Sandy Hatchery can be found in Table 9-3 of the Recovery Plan and below in
43 Table 5. This action was completed in 2010 when hatchery coho salmon releases into the Sandy
44 River were reduced from 700,000 to 500,000 smolts. In addition, Table 9-3 in ODFW (2010)
45 also includes ESU-wide actions that apply to all hatcheries in the Lower Columbia River

1 tributaries in Oregon. Those hatchery recovery actions that apply to the coho salmon hatchery
2 program and have already been implemented (ODFW 2010).

3
4 Table 5. Sandy River Basin-specific Recovery Plan actions addressing the coho salmon
5 hatchery program (ODFW 2010).

Action ID	Action	Status in the Sandy Basin
237-SY	Eliminate/reduce/shift program: Reduce hatchery coho releases (700,000 smolts to 500,000 smolts in 2010; 200,000 smolts shifted to Youngs Bay).	Completed

6
7 Although stray hatchery adults interbreeding with natural-origin adults is not considered a
8 limiting factor for the Sandy River population of coho salmon, hatchery effects described in
9 Subsection 4.1, Potential Hatchery Effects, may impact LCR coho salmon in the Sandy River
10 Basin.

11 12 **3.3.3 Sandy River Winter Steelhead**

13 The Sandy River winter steelhead population is part of the LCR Steelhead DPS. The LCR
14 Steelhead DPS includes all naturally produced steelhead in tributaries to the Columbia River
15 between the Cowlitz and Wind Rivers in Washington and the Willamette and Hood Rivers in
16 Oregon, excluding steelhead in the upper Willamette River above Willamette Falls (Upper
17 Willamette DPS) (Busby et al. 1996) (Figure 5 and Figure 6). Steelhead in this DPS belong to
18 the coastal genetic group (Schreck et al. 1986; Reisenbichler et al. 1992; Chapman et al. 1994)
19 and include both winter steelhead and summer steelhead. In the Sandy River, only winter
20 steelhead are listed under the ESA; summer steelhead did not occur historically in the Sandy
21 River, and the summer steelhead now present in the Sandy River originated from hatchery
22 releases from a non-endemic stock and are not included in the ESA-listed DPS.

23
24 The Willamette/Lower Columbia River Technical Recovery Team (Myers et al. 2003) identified
25 23 historical populations within the DPS and estimated that four historical populations have been
26 extirpated (Figure 5 and Figure 6). Hatchery programs using endemic natural stocks of winter
27 steelhead have been developed in the Cowlitz, Sandy, Kalama, and Hood River Basins and are
28 considered to be part of the DPS (71 FR 834). Populations outside the action area would not be
29 affected by the Proposed Action, so Sandy River winter steelhead are the only ESA-listed
30 steelhead population considered in this assessment.

One aspect of steelhead is that they can spawn more than once as compared to other *Oncorhynchus sp.*, as a result winter steelhead adults emigrate from the Sandy River after soon spawning is completed. These emigrating adult steelhead are referred to as kelts.

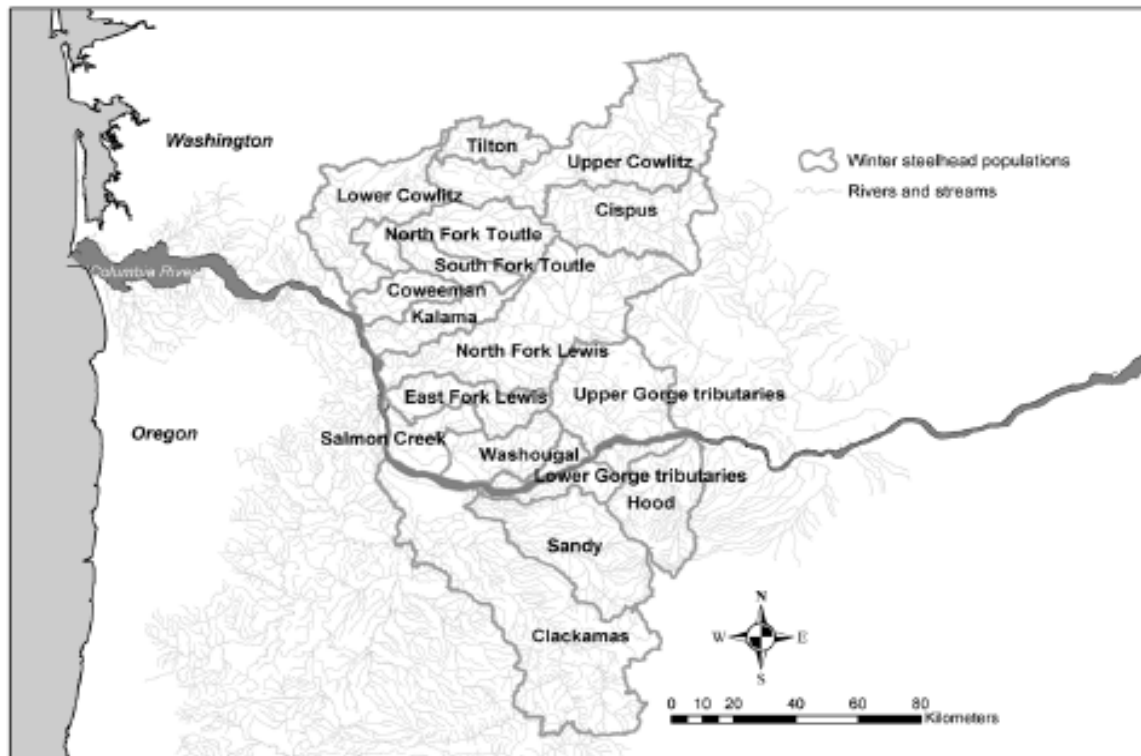


Figure 5. Historic Lower Columbia River winter steelhead populations (from Meyers et al. 2006).

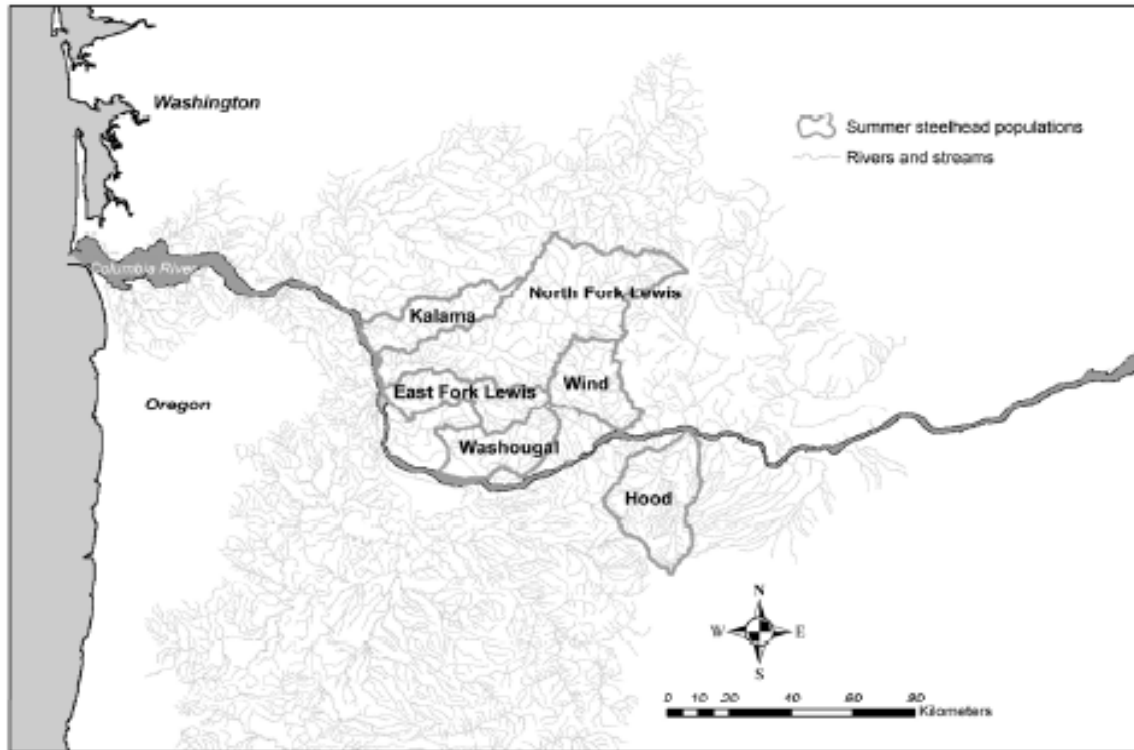


Figure 6. Historic Lower Columbia River summer steelhead populations (from Meyers et al. 2006).

3.3.3.1 Status and Trends

Ford (2011) concluded, consistent with previous evaluations that the DPS is currently at high risk of extinction. Of the 26 historical populations in the DPS, 17 are considered at high or very high risk. The Sandy River population is considered to be at high risk of extinction.

Table 3 provides escapement and hatchery proportion information for winter steelhead returning to the Sandy River. Prior to 2007, abundance estimates and the proportion of hatchery spawners were based on counts at Marmot Dam. Spawning surveys have been conducted to estimate abundance for the most recent years (2008 to 2010) and have included tributaries to the Sandy River below the former site of Marmot Dam. ODFW estimates that 70 percent of the spawning habitat for winter steelhead is located above the former Marmot Dam site in the Salmon River and its tributaries and in Still Creek. Spawning habitat is also present in Clear Creek, Clear Fork, Lost Creek, Horseshoe Creek, Zigzag River, and Camp Creek. Key steelhead reaches include: the lower end of Trout Creek; the mainstem Sandy River from the mouth of the Bull Run River to RM 24; the mainstem Sandy River from the former Marmot Dam site to mouth of the Salmon River and the lower end of Wildcat Creek; the mainstem Sandy River from Salmon River confluence to the mouth of the Zigzag River and the lower end of Clear Fork and Lost Creeks; the lower Little Sandy River; the Salmon River downstream of Boulder Creek and the lower ends of Boulder Creek, Sixes Creek, and South Fork Salmon River; and the lower 10 miles of Still Creek (NMFS 2008a).

Stream reaches that were accessible to anadromous salmon and steelhead were designated critical habitat in 2005 (Table 1). The habitat above the Sandy Hatchery and those areas above the dams on the Bull Run River were excluded. PCEs, and their associated physical and biological features, for winter steelhead are the same as those described for spring Chinook salmon in Subsection 3.2.1, Sandy River Spring Chinook Salmon. The specific PCEs that apply to winter steelhead in the action area are freshwater spawning, freshwater rearing, and freshwater migration.

Estimates of summer steelhead escapement are also found in Table 3. Releases of hatchery summer steelhead in the basin above Marmot Dam and at Marmot Dam ended with the 1996 release; since then, all releases have been into Cedar Creek after acclimation at the Sandy Hatchery.

3.3.3.2 Limiting Factors and Threats

The Recovery Plan (ODFW 2010) identified as key limiting factors for Sandy River winter steelhead, including reduced habitat complexity and diversity, including access to off-channel habitats; impacts on the estuary habitat from hydrosystem operations; and stray hatchery adults interbreeding with natural-origin adults. Impacts on the estuary habitat from hydrosystem operations occur outside the action area. A secondary limiting factor for winter steelhead adults in the Sandy River was habitat access, which was limited by the adult weir located at the Sandy Hatchery on Cedar Creek. The weir ~~is currently being~~ was modified in 2012 to ~~allow~~ improve passage, and now adult natural-origin winter steelhead are being passed above the weir into previously inaccessible habitat.

The recovery goal for the Sandy River population of winter steelhead, as described in the Recovery Plan (ODFW 2010), is for the population to be at very low risk of extinction (less than 1 percent probability) with an annual abundance of 1,519 natural-origin adults. Because summer steelhead are not native to the Sandy River, there is no recovery goal for these fish. ODFW (2010) observed that stray hatchery fish interbreeding with natural-origin adults was a limiting factor for Sandy River steelhead, and identified a number of recovery actions for the Sandy River winter steelhead hatchery program (Table 6). These actions are designed to reduce the proportion of hatchery winter steelhead spawning naturally with the goal of having the nine-year averaged proportion to be less than or equal to 10 percent (ODFW 2010). The hatchery stray rate target of 10 percent was identified as the level necessary to meet delisting goals for the naturally spawning population.

Actions specifically related to the steelhead program at Sandy Hatchery can be found in Table 9-3 of the Recovery Plan (ODFW 2010). Table 6 provides a list of the hatchery-related recovery actions. In addition, Table 9-3 in ODFW (2010) also includes ESU-wide actions that apply to all hatcheries in the Lower Columbia River tributaries in Oregon. Those hatchery recovery actions that apply to the winter and summer steelhead hatchery programs and have already been implemented (ODFW 2010).

Table 6. Sandy River Basin-specific Recovery Plan actions addressing the winter steelhead hatchery program (ODFW 2010).

Action ID	Action	Status in the Sandy Basin
219-SY	Provide / improve fish passage at Sandy Hatchery	In process of being implemented
241-SY	Implement a sliding scale for take of wild winter steelhead and spring Chinook broodstock for the integrated hatchery programs based on the forecasted total returns of wild fish to the population (less than 500: no take; 500 to 1000: reduced take); develop forecast model as necessary.	Action under review
242-SY	Eliminate the upper basin and Marmot Dam acclimation pond releases	Completed
243-SY	Explore adding a life-cycle monitoring site in the Sandy population on Cedar Creek or in the Sandy River	Action under review

3.3.4 Columbia River Chum Salmon

The chum salmon population in the Sandy River is part of the Columbia River Chum Salmon ESU. This ESU includes all naturally produced chum salmon populations that enter the Columbia River (Figure 7). Historically, chum salmon were abundant in the lower reaches of the Columbia River and may have spawned as far upstream as the Walla Walla River (Johnson et al. 1997). However, reductions in available habitat currently limit chum salmon in the Columbia River to tributaries below Bonneville Dam. The Upper Willamette/Lower Columbia River Technical Recovery Team has identified 16 historical populations in the ESU (Figure 7)(Myers et al. 2003). Populations outside the action area would not be affected by the Proposed Action, so no other populations will be considered in this assessment.

Chum salmon spend 2 to 5 years in the northeast Pacific Ocean feeding areas prior to migrating southward during the summer months as maturing adults along the coasts of Alaska and British Columbia in returning to their natal streams (WDFW/PNPTT 2000). Most chum salmon mature as 4-year-old adults (Johnson et al. 1997). Chum salmon usually spawn in the lower reaches of rivers, with redds usually dug in the mainstem or in side channels of rivers from just above tidal influence to nearly 100 km from the sea. Chum salmon, like pink salmon, usually spawn in coastal areas, and juveniles migrate to seawater almost immediately after emerging from the gravel that covers their redds (Salo 1991). This means survival and growth in juvenile chum salmon depends less on freshwater conditions and more on favorable estuarine and ocean conditions.

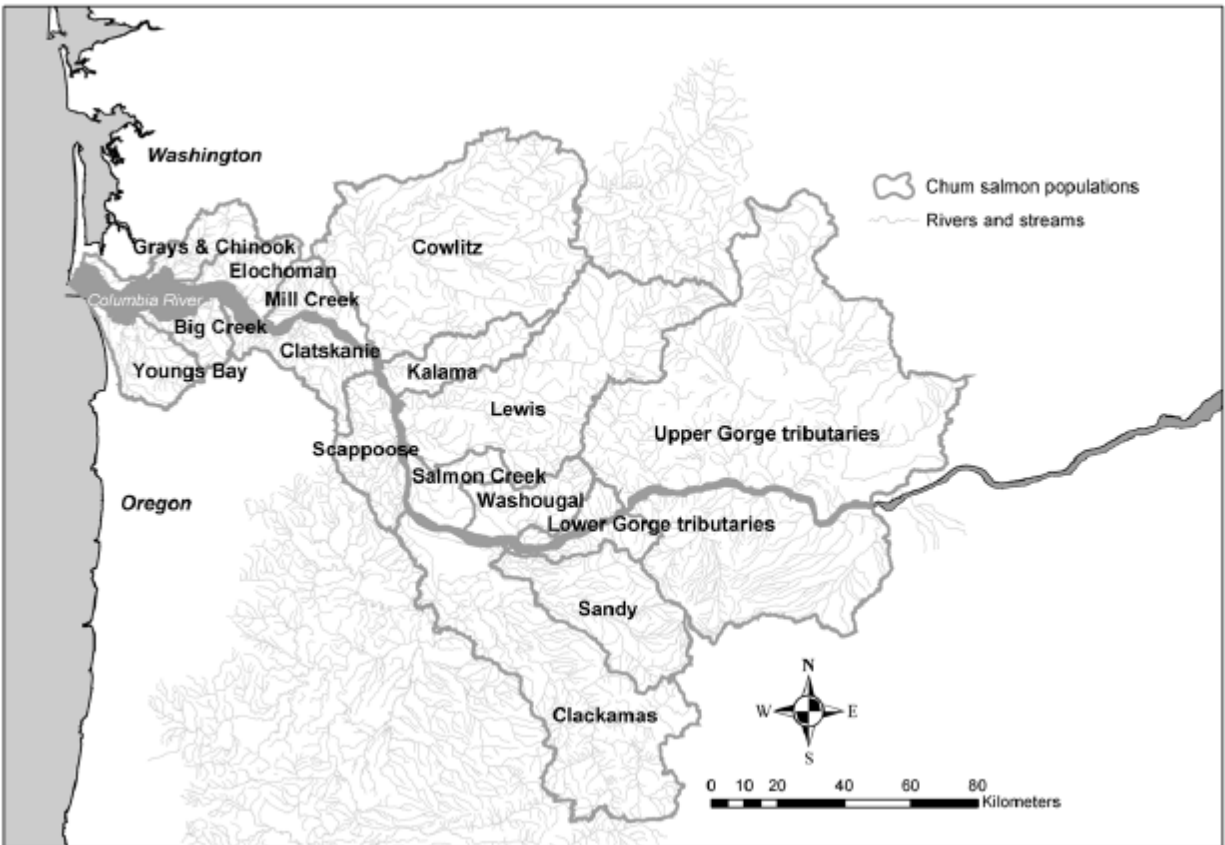


Figure 7. Historical Columbia River chum salmon populations (from Myers et al. 2006).

3.3.4.1 Status and Trends

Ford (2011) conclude, consistent with previous evaluations, that the majority (14 out of 17) chum salmon populations remain extirpated or nearly so. ODFW (2010) observed that, of the chum salmon populations identified in Figure 7, all of the populations that occurred in Oregon are considered extirpated or nearly so (McElhany et al. 2007); however, there are no data that lend themselves to a quantitative status assessment.

Chum salmon have not been routinely observed in recent years during spawning surveys conducted for coho and Chinook salmon in lower Columbia tributaries, including the Sandy River. This lack of chum salmon spawners indicates that the fish are no longer present. As a result, Oregon's Columbia River chum salmon populations are considered either extremely depressed or functionally extirpated. There is little information on the historical distribution of chum salmon in the Sandy River.

None of the Sandy River Basin was included as critical habitat for Columbia River chum salmon.

3.3.4.2 Limiting Factors and Threats

The Recovery Plan (ODFW 2010) did not identify any key limiting factors for Sandy River chum salmon except for those actions- that address impacts to the Columbia River estuary. As

described above, because chum salmon emigrate immediately after emerging from the gravel, habitat factors in the estuary and near ocean are more important to chum salmon survival than freshwater habitat in the tributaries. Estuary and ocean habitat actions occur outside the action area. Secondary limiting factors include impaired upstream passage; altered hydrology, and excessive fine sediment. Barriers at road crossings impede chum salmon passage in several lower Sandy River tributaries. Barriers to chum salmon passage in the action area include culverts on Beaver and Buck Creeks in the lower Sandy River watershed.

As with all of Oregon's Columbia River chum salmon populations, altered hydrologic processes and/or reduced water quantity due to land-use practices on upland slopes is a concern for chum salmon that may occur in the Sandy River Basin. Physical habitat structure in the tributary watersheds is defined largely by physical processes, including the movement of water and sediment within the channel and between uplands, floodplains, and the channel. The amount of surface and subsurface flow influences the peaks in a river's hydrograph as a response to storm events. Consequently, they can affect the flow regime, changing the established pattern of natural hydrologic variation and disturbance, thereby altering habitat dynamics (Poff et al. 1997). Altered flow regimes can reduce flows needed for migration, spawning or rearing. Low flows may also decrease chum salmon survival by limiting delivery of nutrients and dissolved oxygen to incubating eggs.

The recovery goal for the Sandy River population of chum salmon, as described in the Recovery Plan (ODFW 2010), is for the population to be at low risk of extinction (less than 5 percent probability). An annual abundance goal was not established for this population. There are no specific hatchery actions to address impacts of the Sandy River Hatchery programs on chum salmon, other than improving passage at the hatchery intake and adult weir on Cedar Creek. Table 9-3 of the Recovery Plan (ODFW 2010) includes other ESU-wide actions that apply to all hatcheries in the Lower Columbia River tributaries in Oregon. Those ESU-wide hatchery recovery actions that apply to the Sandy River hatchery programs and have already been implemented (ODFW 2010). These actions are designed to reduce potential impacts on chum salmon recovery.

3.3.5 Pacific Eulachon

On March 18, 2010, NMFS listed the southern DPS of Pacific Eulachon (*Thaleichthys pacificus*) as a threatened species (75 FR 13012). The eulachon spawning in the Sandy River are part of the southern DPS. The southern DPS extends from the Skeena River in British Columbia south to the Mad River in Northern California (inclusive) and, thus, all eulachon found within the action area are considered to be part of the threatened southern DPS of eulachon. Take prohibitions via section 4(d) of the ESA have not yet been promulgated.

Critical habitat was designated for the southern DPS (76 FR 65324, October 20, 2011); in the Sandy River Basin, the area designated as critical habitat is in the lower part of the basin, extending from the mouth of the Sandy River upstream to the confluence with Gordon Creek (RM 12.8). This area is considered to include physical and biological features essential to spawning and incubation.

Eulachon are endemic to the northeastern Pacific Ocean, ranging from northern California to southwest and south-central Alaska and into the southeastern Bering Sea. In the portion of the species' range that lies south of the United States–Canada border, most eulachon production originates in the Columbia River Basin. Within the Columbia River Basin, the major and most consistent spawning runs return to the mainstem of the Columbia River and the Cowlitz River. Spawning also occurs in the Grays, Elochoman, Kalama, Lewis, and Sandy Rivers. Adult eulachon have been recorded at several locations on the Washington and Oregon coasts, and they were previously common in Oregon's Umpqua River and the Klamath River in northern California. Runs occasionally occur in many other rivers and streams, although these tend to be erratic, appearing in some years but not others, and appearing only rarely in some river systems (Hay and McCarter 2000; Willson et al. 2006; Gustafson et al. 2010).

Eulachon in the Sandy River are generally typical of eulachon elsewhere. Eulachon generally spawn in rivers fed by either glaciers or snowpack and that experience spring freshets. It has been suggested that, because these freshets rapidly move eulachon eggs and larvae to estuaries, it is likely that eulachon imprint and home to an estuary into which several rivers drain rather than to individual spawning rivers (Hay and McCarter 2000). Eulachon typically enter the Columbia River system from December to May; adult eulachon return to the Sandy River to spawn generally from January to March, with emergence occurring 3 to 8 weeks later, depending on temperature (Gustafson et al. 2010). Eulachon eggs, averaging .04 inches in size, are broadcast over and attach to a variety of substrates from sand to pea-sized gravel. Newly hatched young, transparent and 0.16 to 0.27 inches in length, are carried to the sea with the current, which means they leave the Sandy River Basin immediately after hatching. After the yolk sac is depleted, eulachon feed on pelagic plankton. After 3 to 5 years at sea, they return as adults to spawn.

3.3.5.1 Status and Trends

There are few direct estimates of eulachon abundance. In some areas of the southern DPS where escapement counts or estimates of spawning stock biomass are unavailable, catch statistics are used to estimate relative abundance. However, inferring population status or even trends from yearly changes in catch statistics requires assumptions that are seldom met including similar fishing effort and efficiency, assumptions about the relationship of the harvested portion to the total portion of the stock, and statistical assumptions, such as random sampling. None of these assumptions can be verified. There are few fishery-independent sources of abundance data available for eulachon, and there is an absence of monitoring programs for them (in the United States). However, the combination of catch records and anecdotal information indicate that eulachon were present in large annual runs in the past, and that substantial declines in abundance have occurred. Eulachon numbers are at, or near, historically low levels throughout the range of the southern DPS, including the Sandy River (Gustafson et al. 2010).

Persistent low returns and landings of eulachon in the Columbia River from 1993 to 2000 prompted the States of Oregon and Washington to adopt a Joint State Eulachon Management Plan (Subsection 1.6, Relationship to Other Plans and Policies) (WDFW and ODFW 2001). All eulachon fisheries in Washington and Oregon were closed in 2011, and are expected to remain closed pending substantial increases in returns.

3.3.5.2 Limiting Factors and Threats

Climate change impacts on ocean habitat are the most serious threat to persistence of the southern DPS of eulachon (Gustafson et al. 2010). Other threats to the species include climate change impacts on freshwater habitat and habitat alteration and degradation from a variety of activities. All other factors limiting the southern DPS, such as bycatch in shrimp trawl fisheries, occur outside the action area or would not be affected by the proposed hatchery programs.

The release of hatchery juveniles was not identified as a limiting factor, but eulachon may be impacted by hatchery fish through competition for space, and possibly predation on eulachon by salmon and steelhead juveniles. Predation by hatchery salmon and steelhead juveniles on newly hatched juvenile eulachon is assumed to occur if hatchery salmonid juveniles overlap with juvenile eulachon emigrating from the upper areas of the Sandy River Basin. The actual level of predation and the effects of that predation on eulachon in the lower Sandy River Basin are unknown and were not considered substantive compared to other factors identified as limiting the recovery of eulachon in the Columbia River (Gustafson et al. 2010~~4~~).

3.3.6 Bull Trout

The U.S. Fish and Wildlife Service (USFWS) issued a final rule listing Columbia River DPS of bull trout (*Salvelinus confluentus*) as a threatened species under the ESA on June 10, 1998. At the time of listing the USFWS did not consider the Sandy River as bull trout habitat, and at that time there were no recent or historical accounts of bull trout occurring in the Sandy River (USFWS 2002). Since the listing bull trout have been sighted three times in the Sandy River (USFWS 2002). Anglers have caught and photographed two bull trout; one approximately 17 inches (43 cm) near the mouth of Gordon Creek in the vicinity of Oxbow County Park in November 1999, and another approximately 20 inches (51 cm) between Oxbow and Dodge Parks on January 23, 2002. The third observation was at the trap at Marmot Dam in May 2000 where a 18 inch (46 cm) fish was release upstream of the dam. The USFWS (2002) stated that bull trout have been observed at and below Bonneville Dam on the Columbia River below the Hood River confluence indicating the possibility that bull trout from the Hood River may be foraging and/or overwintering in the Columbia River. Further, three records of bull trout in the Sandy River indicate additional possibilities: (1) the Sandy River watershed supports a population of bull trout; or (2) bull trout foraging and/or overwintering in the Columbia River, possibly from the Hood River population, may occasionally be entering the Sandy River or other tributaries downstream of the Hood River Recovery Unit. Bull trout are known to prey on both juvenile and adult salmon carcasses, but tend to have different habitat requirements from the other salmonid species, preferring habitat with cold water temperatures (USFWS 2002).

The Hood River Recovery Unit includes the Hood River and Sandy River basins (USFWS 2002). The USFWS has identified one core area containing two populations in the Hood River and determined that the Sandy River contains core habitat, but presently there is insufficient information on bull trout distribution and use of the Sandy River to identify core area, however additional information on bull trout use of the Sandy River as well as the mainstem Columbia River are defined as primary research needs (USFWS 2002). The basic research would include knowing where the bull trout observed in the Sandy River came from (i.e., migrants from other basins or is there a small remnant population that has escaped detection?). This basin information

is needed before research can be conducted to identify limiting factors and habitat needs for bull trout in the Sandy River.

ODFW includes the Sandy River within its Hood River Species Management Unit, but state that a self-sustaining population does not currently exist in the Sandy River. However, but the recent bull trout sightings suggest that the Sandy River is a possible location for recovery (ODFW 2005). No bull trout have been observed in the action area since 2002 (City of Portland 2008), and the USFWS has not conducted any surveys in the Sandy River Basin and are of the opinion that the bull trout observed in the Sandy River were probably from the Hood River or Lewis River bull trout populations (Allen 2012).

3.4 Non-listed Fish

The non-listed species in the action area include native species from the families Salmonidae (resident rainbow trout, whitefish), Catostomidae (suckers), Cyprinidae (northern pikeminnow, chiselmouth), Cottidae (sculpins), Petromyzontidae (lamprey), and Acipenseridae (sturgeon) (NMFS 2008a). There are also a number of introduced species present though not abundant in the action area: Percidae (perch, walleye), Centrarchidae (bass, sunfish, crappie), Ictaluridae (catfish, bullhead), Cyprinidae (carp), Clupeidae (shad). Most of these species are found in the lower reaches of the Sandy River, below the locations of the proposed weirs and juvenile hatchery fish release locations, where water temperatures are more favorable (NMFS 2008a). Many of these species (e.g., northern pikeminnow, sculpins, walleye, bass, and crappie) prey on juvenile salmon and steelhead within the lower Sandy River.

Pacific lamprey (family Petromyzontidae) are a species of concern under the USFWS designation and are present in the action area; they currently occur in very small numbers. Pacific lamprey have not been captured or encountered during broodstock collection activities in the action area. Adult lamprey are parasitic on other fish, including salmon and steelhead.

Cutthroat trout (*Oncorhynchus clarki clarki*) are also a species of concern under the USFWS designation, and were historically found in the Sandy River. No cutthroat trout are found in the action area.

The abundance of whitefish (*Coregonus spp.*) in the Sandy River is unknown. Whitefish distribution overlaps with anadromous salmonids in the higher cool-water reaches on the basin and they can compete for food with juvenile salmon and steelhead. Because of this overlap in distribution, whitefish may be encountered at the proposed weirs in the upper basin.

The abundance of resident rainbow trout (*O. mykiss*) is unknown, but they are believed to be supplemented by winter steelhead juveniles that do not emigrate from the Sandy River. The magnitude of the supplementation by the anadromous *O. mykiss* (both hatchery and natural-origin) would be affected by a number of factors, such as instream habitat, food availability, juvenile growth, and ocean conditions. The distribution of rainbow trout would be similar to that of anadromous *O. mykiss*, and as a result they would compete with and prey on juvenile salmon and steelhead. Because of the similarity in distribution, resident rainbow trout may be encountered at the proposed weirs in the upper basin.

Recreational fisheries targeting most of these species occur in the Sandy River Basin and can overlap, in time and area, with fisheries targeting hatchery salmon and steelhead. Fisheries targeting warm-water species occur in the lower Sandy River Basin where water temperatures support those species. Fisheries for rainbow trout (resident *O. mykiss*) and whitefish occur in the basin but tend to be more restrictive, through season and area closures, size limits, and bag limits, to protect rearing and migrating juvenile salmon and steelhead. Fisheries in the Salmon River are limited to artificial flies and lures, and bait can be used in the mainstem Sandy River below the Salmon River confluence. Gear types and fishery methods for salmon and steelhead differ from those for warm-water species; however, though non-listed species may be encountered during salmon and steelhead fisheries, the incidence is very low.

3.5 Instream Fish Habitat

The Recovery Plan (ODFW 2010) identified the key limiting factors for Sandy River salmon and steelhead populations, including reduced habitat complexity and diversity and access to off-channel habitats. Reduced habitat quality and complexity, and connectivity with off-channel habitat were identified as key factors limiting juvenile fall, late-fall, and spring Chinook salmon viability in all population areas, including the Sandy River Basin (Subsection, 3.3.1, Sandy River Spring Chinook Salmon). These same factors were also found to be limiting coho salmon (Subsection, 3.3.2, Sandy River Coho Salmon), winter steelhead (Subsection, 3.3.3, Sandy River Winter Steelhead), and chum salmon (Subsection, 3.3.4, Columbia River Chum Salmon) abundance and productivity. Land use practices such as channelization, diking, wetland conversion, beaver dam removal, large woody debris removal, and gravel extraction have severed access to historically productive habitats, reduce the frequency of pools, simplified many remaining tributary habitats, and weakened the important watershed processes and functions that once created healthy ecosystems for salmon and steelhead production. The installation and operation of weirs, such as those installed in 2011 in Cedar Creek, Zigzag River, and Salmon River, can also reduce connectivity (Subsection 2.2.1, Sandy River Spring Chinook Salmon Program).

3.6 Wildlife

The Columbia white-tailed deer (*Odocoileus virginianus leucurus*) is listed as endangered and is present in Multnomah County, Oregon, but is not found in the Sandy River Basin (USFWS 2012a). The northern spotted owl (*Strix occidentalis caurina*) is listed as threatened, and is found in both Multnomah and Clackamas Counties, Oregon, and is present in the Sandy River Basin; its range is limited to the protected areas of the Bull Run River watershed, wilderness areas, and the upper reaches of the Salmon River outside semi-rural areas (USFWS 2011). Federal candidate species within Multnomah and Clackamas Counties include the North American wolverine (*Gulo gulo luscus*) and the streaked horned lark (*Eremophila alpestris strigata*). A small population of the latter was found near Estacada, Clackamas County, which is outside the Sandy River Basin; none are currently known to occur in the action area (USFWS 2012b). Wolverines are very rare, with only a few being spotted in Oregon since 1920. Wolverines are found in high-elevation forests in the high Cascades – if they occur in the Sandy River Basin, they would be restricted to the upper reaches of the Sandy River Basin outside semi-rural areas (USFWS 2012c).

Human activities, such as wildlife viewing, hiking, camping, fishing, and other shore-based activities (inside and outside the riparian areas), can impact wildlife through physical contact, disruption of habitat, or avoidance of areas where human activity is high. These types of human activities are common in the action area due to the close proximity to the major metro-population areas (Subsection 3.6, Socioeconomics; Subsection 3.7, Tourism and Recreation). Similarly, activities associated with the placement and maintenance of weirs, such as those in the Bull Run River, Zigzag River, and Salmon River, may disrupt wildlife habitat, and increase avoidance of the areas around the weirs (see Subsection 2.2.1, Sandy River Spring Chinook Salmon Program).

Within the action area, fish are an important part of the diets of a variety of wildlife species including birds and mammals, though none of these are wholly dependent on salmon or steelhead for survival. During salmonid freshwater rearing, various species of wildlife may consume eggs, juveniles, adults, and carcasses from both natural-origin and hatchery-origin salmon and steelhead (Cederholm et al. 1999; Helfield and Naiman 2001).

3.7 Socioeconomics

Prior to contact with European settlers, native peoples harvested fish from the Sandy and Columbia Rivers and hunted elk, deer, bear, and waterfowl. Salmon are culturally, economically, and symbolically important to the Pacific Northwest. Historically, natural resources have been the mainstay of the economies of the Native Americans in the Columbia Basin. Salmon were an important aspect of the cultural life and subsistence of the Indian tribes that occupied the Columbia Basin. Hunting, fishing, and gathering have been important to tribes for thousands of years.

The Sandy River flows through two counties, Multnomah and Clackamas Counties in Oregon. The Sandy River is within 50 miles of the top three most-populous counties in Oregon, and these counties make up what is referred to as the Portland Metro Area (Table 7). The populations in these counties are predominantly white and have relatively small Hispanic populations (with the exception of Washington County) and Native American populations (U.S. Census Bureau 2011) (Table 7).

Table 7. Demographic information regarding counties in the action area (U.S. Census Bureau 2011).

County	Population (2005)	Percent Hispanic Origin (percent)	Percent Native American (percent)
Multnomah	735,334	10.9	0.7
Clackamas	375,992	7.7	0.5
Washington	529,710	15.7	0.7

The median family income in these counties is higher than the median income for the state. The 2009 median family income in Multnomah County was \$62,435, in Clackamas County it was \$74,700, and in Washington County it was \$76,321; the statewide median family income was \$60,025 in Oregon (U.S. Census Bureau 2011). Runyan (2009) found that, for Oregon resident anglers, 13.4 percent had household incomes less than \$25,000, 27.6 percent had incomes from

1 \$25,000 to \$49,999, 25.5 percent had incomes from \$50,000 to \$74,999, and 33.5 percent had
2 incomes greater than \$75,000.

3
4 The annual state budget for the Sandy Hatchery for on station broodstock collection and rearing
5 is \$265,000; it is unknown how much of this is spent within the action area but the total includes
6 funding for three full-time ODFW employees that live at the hatchery. These employees would
7 have expenditures in the local economy for food, clothing, household items and for services. The
8 hatcheries would also have hatchery-related expenditures (e.g., equipment, maintenance, feed,
9 chemicals) that support local businesses in the action area.

10
11 Fisheries targeting salmon and steelhead associated with the Proposed Action could be
12 considered in the following section because they represent an important recreational activity.
13 However, the recreational fisheries are considered here, because they represent the largest impact
14 on socioeconomics resulting from the Proposed Action.

15
16 Recreational fisheries support economic activities throughout the state of Oregon and in the
17 action area. The economic impacts and effort of freshwater recreational fisheries statewide can
18 be found in Runyan (2009). In 2008, Oregon residents and nonresidents made three distinct
19 types of fish and wildlife recreation expenditures: (a) travel, (b) local recreation (less than 50
20 miles from home), and (c) equipment purchases (including boats and recreational vehicles).
21 When all three categories are combined, fish and wildlife recreation across the state resulted in
22 expenditures of \$2.5 billion in 2008. This is an increase from an estimated \$2.0 billion spent in
23 2006 (USDOJ et al. 2008).

24
25 Local recreation expenditures occurred most notably in travel regions with large urban-centered
26 populations (Willamette Valley, Portland Metro/Columbia, and Southern), with fishing, hunting,
27 and wildlife viewing representing the bulk of all local recreation expenditures made throughout
28 the state (Table 8). The Sandy Hatchery programs are now funded by the State of Oregon, but in
29 the past they were funded through Mitchell Act funds at levels currently described under the
30 Proposed Action. Mitchell Act funds currently support other hatchery programs at facilities that
31 also rear salmon and steelhead for programs under the Proposed Action. Wegge (2010)
32 conducted an economic analysis of Mitchell Act-funded hatchery production (which included the
33 Sandy Hatchery programs) and found that recreational fisheries for Mitchell Act-funded hatchery
34 fish lead to expenditures in the Lower Columbia River of over \$9.2 million, a direct and
35 secondary economic impact on income in the Lower Columbia River of almost \$17.3 million,
36 and contributed to an estimated 395 jobs.

37
38 Oregon residents and nonresidents who traveled overnight and on day trips of 50 or more miles
39 (one-way) from homemade travel-generated expenditures of \$862 million (Runyan 2009). Local
40 (trips within 50 miles of home) recreation fishing expenditures for the Portland Metro Area
41 totaled \$20.5 million (Table 8; Runyan 2009). It is unknown how this total is distributed within
42 the local economy, but it might be similar to those who travel to go fishing except for the
43 reduced need for accommodations. Local expenditures include food and beverage services, food
44 stores, ground transportation (fuel), retail purchases, outfitter/guide/charter fees, and equipment
45 (Runyan 2009). All of these expenditures would be expected to support local businesses, but it is
46 unknown how dependent these businesses are on fishing-related expenditures.

In 2008, the economic impact directly associated with freshwater fishing that included the Sandy River Basin was over \$40 million (total includes travel and local recreation expenditures) (Table 8) (Runyan 2009); this is primarily due to the basin being adjacent to and within the three highest populated counties in Oregon. The economic impact can also be explained by the high level of catch observed for the Sandy River Basin. ODFW recreational harvest records indicate that the Sandy River Basin has the highest catch rate for hatchery winter steelhead for all of the Columbia River tributaries in Oregon (ODFW 2012a2012b). The recreational catch card data shows that the Sandy River consistently ranks in the top five streams for spring Chinook salmon harvest and is second only to the Clackamas River basin for coho salmon harvest. The recreational harvest in the Sandy River has averaged 867 spring Chinook salmon, 4,295 coho salmon, 1,535 winter steelhead, and 851 summer steelhead over the past 5 years (Table 9).

Table 8. Expenditures by activity by county, 2008 (in thousands of dollars) (Runyan 2009).

County	Freshwater Fishing (\$000)	Hunting (\$000)	Wildlife Viewing (\$000)
Travel			
Multnomah	7,955	3,387	31,511
Clackamas	7,158	4,421	21,632
Washington	4,816	3,727	15,226
Subtotal	19,929	11,535	68,369
Local Recreation			
Multnomah	8,215	2,662	3,835
Clackamas	8,704	2,496	621
Washington	3,584	1,489	796
Subtotal	20,503	6,647	5,252
Total	\$40,432	\$18,182	\$73,621

Table 9. Sandy River recreational harvest from angler catch records (ODFW 2012ba).

Year	Spring Chinook	Coho	Winter Steelhead	Summer Steelhead
2005-06	1820	1729	1122	577
2006-07	914	2604	1077	1051
2007-08	389	2627	972	742
2008-09	866	8374	1985	1168
2009-10	347	6141	2517	716
Mean	867	4295	1535	851

The cost of being able to fish legally in Oregon in 2011 is described in ODFW (2011e). The maximum cost to participate in the salmon or steelhead fishery would occur if a person bought

an annual license and adult tag (for salmon and steelhead), which allows the person to fish in all Oregon rivers and lakes (Table 10) – the total annual cost for adult Oregon residents would be \$49.50, and for adult non-residents, \$122.25. The cost of fishing gear and tackle generally exceed the cost of the fishing license. Recreational anglers buy fishing licenses, which support fishery management and law enforcement activities. Anglers also pay a Federal excise tax on fishing gear, which is returned to the states to support fisheries research, development, and public information actions (ODFW 2011e).

Several hundred anglers have participated in the Sandy River fishery each year. In addition, there are employment opportunities in the sector that supports such tourism and recreational services or the government sector that employs recreational fishery-related staff.

Table 10. Oregon resident annual costs for licenses in 2011 (ODFW 2011e).

Angler Age Class	Annual Angling License (\$)	Cost of Hatchery Harvest (tag) (\$)	Total Cost to Participate In Fishery (\$)
Adult (Resident: 18 years of age and older) license	33.00	16.50	49.50
Adult (Non-Resident: 18 years of age and older) license	106.25	16.50	122.25
Juvenile (14 to 17 years of age)	9.00	16.50	24.75

3.8 Tourism and Recreation

Recreational activities in the Sandy River Basin include fishing, river rafting and kayaking, boating, hiking, hunting, picnicking, camping, and non-consumptive observation of wildlife and scenery (NMFS 2008a). There are numerous parks and campgrounds along the river as well. Table 11 summarizes popular recreation sites and dominant recreational uses in the Sandy River Basin (NMFS 2008a).

Fisheries in the Sandy River Basin supported by the hatchery programs were addressed in Subsection 3.7, Socioeconomics; however, they are part of the larger suite of outdoor recreational activities available to Oregon residents and non-residents. In 2008, nearly 2.8 million Oregon residents and non-residents participated in fishing, hunting, wildlife viewing, and shellfish harvesting in Oregon. Of the total number of participants, 631,000 fished, 282,000 hunted, 175,000 harvested shellfish, and 1.7 million participated in outdoor recreation where wildlife viewing was a planned activity. Local recreation expenditures of \$147 million were

1 made by Oregon residents while participating in these activities less than 50 miles from home
2 (Runyan 2009). State residents and non-residents also spent an additional \$1.5 billion on
3 specialty equipment and other activity-related purchases from retail establishments and suppliers
4 based in Oregon (Runyan 2009).

5
6 During 2008, travel-generated expenditures for fishing, hunting, wildlife viewing, and shellfish
7 harvesting activities amounted to over \$100 million in four of Oregon's eight travel regions
8 (North Coast - \$136 million, Central Coast - \$126 million, Central - \$110 million, and Eastern -
9 \$106 million) (Runyan 2009). In all nine travel regions, travel-generated expenditures for
10 wildlife viewing and fishing were exceeding \$462 million and \$264 million, respectively
11 (Runyan 2009). While travel-generated expenditures for hunting occurred in each of the nine
12 travel regions of the state, spending in the Eastern, Southern, and Willamette Valley travel
13 regions accounted for nearly two-thirds of the total expenditures related to travel for hunting
14 (Runyan 2009). Local recreation expenditures occurred most notably in travel regions with large
15 urban-centered populations (Willamette Valley, Portland Metro/Columbia, and Southern), with
16 fishing, hunting, and wildlife viewing representing the bulk of all local recreation expenditures
17 made throughout the state (Table 8).

18

1 Table 11. Dominant recreational uses in the Sandy River Basin (NMFS 2008a).

Basin Area	Dominant Recreational Uses	Popular Recreation Sites
Upper Sandy River	Hiking, fishing, developed site and dispersed camping, cross-country skiing, nature study, sightseeing, canoeing, kayaking, drift boating, and rafting	McNeal Campground, Riley Horse Camp, and Lost Creek Campground; trails (Top Spur, Pacific Crest, Bald Mountain, Ramona Falls, Yocum Ridge, Paradise Park Loop, Zigzag Mountain, Burnt Lake, Cast Creek, Horseshoe Creek, Sandy River, and McIntyre Ridge)
Middle Sandy River	Boating, fishing, picnicking, swimming, youth camps	Dodge Park, Barlow Trail County Park, Oral Hill Picnic Area, Camp Namanu
Lower Sandy River	Tube rafting, boating, fishing, picnicking, hiking, swimming, youth camps	Oxbow County Park, Dabney State Park, Lewis and Clark State Park, Camp Collins
Salmon River	Camping, fishing, hiking, snowmobiling, skiing, biking, and hunting	Trails (Old Salmon River Trail No. 742B and lower 2 mile of the Salmon River Trail No. 742), Timberline Lodge Area, Trillium Lake and Campground, Green Canyon Campground, Wildwood Recreation Site, Palmer Snowfield (provides year around skiing), Resort at the Mountain, Mt. Hood RV Village, bed and breakfast facilities, residential youth camps
Bull Run River	Fishing, swimming, kayaking below county bridge	Dodge Park (at mouth of river). No recreational use is permitted within the Bull Run Management Area.
Zigzag River	Nordic and alpine skiing, camping, hiking, biking, and sightseeing	Ski areas (Timberline Summit, and Ski Bowl), National Forest Campgrounds (Still Creek, Camp Creek, and Tollgate), six "organization camps," trails (Mirror Lake, the "mountaineering trail" above Timberline Lodge, Pacific Crest Trail, Pioneer Bridle Trail, Hunchback Trail from Knzel Lake to Devils Peak, Little Zigzag Falls Trail, Camptown and Crosstown trails, and Burnt Lake, Paradise Park,,and Hidden Lake Trails)

3.9 Environmental Justice

Executive Order 12898 (59 FR 7629) 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.

In the action area and the Portland Metro Area, there are minority and low-income populations to which this Executive Order could apply. The U.S. Census Bureau reported the race composition of the counties in 2010 (U.S. Census Bureau 2011) to be 76 to 88 percent White, 7 to 15 percent Hispanic, 3 to 11 percent Asian, 1 to 6 percent Black or African American, and 1 to 2 percent

Native American (Table 12). The composition of the angling public in Oregon (as reported in USDOJ et al. 2008) did not reflect participation by minority groups proportional to race composition in Portland Metro Area. However, this was likely due to a very small sample size for minority respondents to the survey, and it is believed that all ethnic groups do engage in recreational fishing, though whether that representation is in proportion to their representation in the general population in the Portland Metro Area is unknown.

Runyan (2009) estimated that 13.4 percent of the resident anglers in Oregon had incomes less than \$25,000, and that 27.6 percent of the anglers had incomes between \$25,000 and \$49,999.

Table 12. Ethnic composition of Multnomah, Clackamas, and Washington Counties (U.S.Census Bureau 2011).

County	Race				
	White (%)	Hispanic or Latin (%)	Native American or Alaskan Native (%)	Black or African-American (%)	Asian (%)
Multnomah	76.5	10.9	1.1	5.6	6.5
Clackamas	88.2	7.7	0.8	0.8	3.7
Washington	76.6	15.7	1.7	2.7	10.6
All Oregon	83.6	11.7	1.4	1.8	3.7

4 ENVIRONMENTAL CONSEQUENCES

This section of the assessment evaluates the potential effects of the alternatives on the biological, physical, and human environments described in Section 3, Affected Environment. No other resources were identified that could potentially be impacted by or benefit from any of the alternatives.

4.1 Potential Hatchery Effects

Hatchery programs rearing salmon or steelhead can impose risks upon ESA-listed salmonids. The following section summarizes how various aspects of hatchery programs can impact naturally produced salmonid populations, and what the potential effects of those impacts on ESA-listed species might be. NMFS has determined that, within the action area, ESA-listed species may be affected due to water withdrawals, facility structures, broodstock collection, outbreeding effects from hatchery salmon and steelhead, competition and predation as a result of the release of hatchery juveniles into the Sandy River, and the monitoring and evaluation activities; these categories will be described and their potential roles with respect to the Proposed Action described, below.

The NMFS (2007b) biological opinion on eight U.S. Fish and Wildlife Service (USFWS) hatchery programs refined a list of general types of adverse effects of hatchery operations and hatchery production on population viability that were developed through a number of salmon and steelhead hatchery consultations (NMFS 1995a; NMFS 1999; NMFS 2002a; NMFS 2002b;

1 NMFS 2003b) and from reviews of hatchery programs in the Columbia River Basin and the
2 Northwest. NMFS (2007b) identified the following general risks categories for hatchery
3 programs: (1) operation of hatchery facilities, (2) broodstock collection, (3) genetic
4 introgression, (4) disease, (5) competition/density-dependent effects, (6) predation, (7)
5 residualism, (8) nutrient cycling, (9) masking, (10) fisheries, and (11) monitoring and
6 evaluation/research (M&E). These general risk categories were further refined in 2011, based on
7 work done in the SCA (NMFS 2008c) and on recent published papers (NMFS 2011b; Kostow
8 2008; Araki et al. 2008; Naish et al. 2008 and references therein)(Table 13).

9
10 For the purposes of the present analysis, NMFS reviewed the categories and subcategories of
11 potential effects of hatchery facilities and hatchery production on listed species described in
12 NMFS (2011c) and determined that the effects of the proposed hatchery programs on listed
13 species would be limited to a specific number of categories and subcategories (Table 14). This
14 determination was based on the description of the hatchery programs in the HGMPs and
15 information regarding the potential effects of hatchery programs in NMFS (2011c).

16
17 NMFS has determined that, within the action area, ESA-listed species may be affected by water
18 withdrawals, facility structures, broodstock collection, outbreeding effects from stray program
19 hatchery salmon and steelhead, competition and predation as a result of the release of hatchery
20 juveniles into the Sandy River, and monitoring and evaluation activities (Table 14); these
21 categories are described below in the context of the Proposed Action. Potential effects of all
22 other risk categories would not be expected to occur under the alternatives, or would not be
23 measurable.
24

1 Table 13. General categories and subcategories of potential risks posed by hatchery
2 operations and hatchery production (NMFS 2011c).

Category	Subcategory	Description
Facility Effects		Impacts from existence and basic operation of the hatchery
	General facility failure	Impacts on listed fish in the hatchery and fish in natural-origin by electrical failure, flooding, fire, etc.
	Water intake	Impacts on environment from water withdrawal and to fish in stream from screening/impingement
	Effluent	Impacts on environment from water quality changes, and disease incidence caused by effluent
	Structures	Impacts on physical stream environment from physical existence of hatchery structures (e.g., gravel buildup from weirs) and fish movement blockages caused by structures
Fish Removal		Impacts on the target population and non-target population caused by removal of fish for culture (usually adults but could be juveniles or eggs)
	Collection	Injury and death to target and non-target individuals caused by collection (includes different collection methodologies)
	Demographic	Risk posed to natural-origin component from decreasing numbers due to taking fish into hatchery
Genetic		Losses of fitness and decreases in diversity caused by genetic mechanisms
	Loss of within-population diversity	Diversity/fitness loss caused by genetic drift, non-representative sampling, and inbreeding depression
	Outbreeding effects	Fitness/diversity change caused by gene flow from other populations (outbreeding depression and loss of among-population diversity)
	Domestication selection	Fitness loss and phenotypic change caused by differences between the hatchery and natural environment (includes intentional selection and relaxation of selection), and sampling “errors” during fish culture
Ecological Interactions		
	Disease	Disease risk to target and non-target populations from commingling with diseased hatchery fish
	Competition	Productivity loss in target and non-target populations from competition for limited resources caused by released hatchery fish (includes competition due to residualism)
	Predation	Productivity loss in target and non-target populations from predation by released hatchery fish (includes predation due to residualism)
	Marine-derived nutrients	Productivity decreases due to under- or over-abundance of Marine-Derived Nutrients from hatchery carcasses
Harvest		Mortalities in target and non-target populations due to harvest
Monitoring and Evaluation		
	Marking/masking	Loss of monitoring precision due to inadequate marking rate and type
	Methodology	Injury and death caused by monitoring activities
	Adequacy	Risk of undetected impacts from low statistical power or not monitoring all areas necessary (including inadequate equipment)
	Adaptive management	Decreased ability to respond in timely manner to new information on effectiveness of programs

Table 14. Risk categories and subcategories and a description of whether these risks should be considered when evaluating the effects of the proposed Sandy River hatchery programs on listed species in the action area (refer to the text for evaluation of risks). Highlighted sections identify risk categories considered further in this assessment.

Category	Subcategory	Sandy Hatchery Programs
Facility Effects	General Facility Failure	No listed fish are reared as part of these programs.
	Water Intake	Water intake at the hatchery and acclimation pond may impact juvenile salmon and steelhead and rearing habitat.
	Effluent	Impacts discussed in Subsection 4.1.2, Water Quality and Water Quantity.
	Structures	The intake structure at Sandy Hatchery may impact migration and rearing habitat.
Fish Removal	Collection	During broodstock collection, trapping of listed salmon and steelhead would occur.
	Demographic	No natural-origin fish are taken into the hatchery for broodstock.
Genetic	Loss of Within-population Diversity	These programs do not have an effect on listed salmon and steelhead under this subcategory.
	Outbreeding Effects	These programs may have an effect on listed salmon and steelhead under this subcategory due to naturally spawning hatchery adults spawning in natural spawning areas.
	Domestication Selection	No changes caused by the hatchery environment would occur because the programs are designed to segregate the hatchery populations from the naturally spawning populations.
Ecological Interactions	Disease	Program is intensively managed to prevent disease transmission and amplification; see Section 9.1.6 of the HGMPs.
	Competition	Competition may occur between listed juvenile salmon and steelhead and hatchery juveniles from these programs.
	Predation	Predation by hatchery juveniles on listed salmon and steelhead juveniles may occur.
	Marine-Derived Nutrients	Marine-derived nutrients from returning hatchery adults are expected to benefit listed salmon and steelhead (Subsection 4.1.2, Water Quality and Water Quantity).

Table 14, continued.

Category	Subcategory	Sandy Hatchery Programs
Harvest		Harvest impacts from these programs will be considered below in the (Subsection 4.7.2, Socioeconomic (see also NMFS 2008f).
Monitoring and Evaluation	Marking/Masking	All hatchery production would be internally or externally marked for monitoring so masking would not be expected to occur.
	Methodology	Proposed monitoring and evaluation activities may cause injury and death to listed salmon and steelhead.
	Adequacy	Proposed monitoring and evaluation activities are adequate to measure risks to listed salmon and steelhead.
	Adaptive Management	Proposed monitoring and evaluation activities and reporting would be provided in a timely manner necessary to evaluated program impacts on listed salmon and steelhead; see Section 11.1 of the HGMPs.

Facility Effects

Hatcheries can have physical effects on the environment through the removal of water from a stream, through a reduction in water quality as a result of returning effluent to the stream, by impeding migration with weirs, and by causing injury, death, or behavioral changes as a result of operations. Water withdrawals for hatcheries within spawning and rearing areas can diminish stream flow, impede migration, and affect the spawning behavior of listed fish. Water withdrawals may also affect other stream-dwelling organisms that serve as food for juvenile salmonids by reducing the amount or quality habitat and through displacement and physical injury. Hatchery intakes must be screened to prevent fish injury from impingement or permanent removal from streams. To prevent these outcomes, water rights issued for regional hatcheries are conditioned to prevent salmon migration, rearing, or spawning areas from becoming de-watered. The risks associated with water withdrawals can generally be minimized by complying with water right permits and meeting NMFS screening criteria (NMFS 2008b). These screening criteria for water withdrawal devices set forth conservative standards that help minimize the risk of harming naturally produced salmonids and other aquatic fauna. These risks can also be reduced or eliminated through the use of well water or non-fish bearing sources for the operation of all or portion of the facility production (NMFS 2011c).

Fish Removal

In the Sandy River, broodstock have been collected using a number of methods including fish-ladder traps, seines, weirs, hook and line, tangle-nets, and volunteers back to the hatchery. Impacts on target and non-target adults can occur during the collection of adults for broodstock. Impacts on adult salmonids can vary depending on the method of collection. Weirs or a fish ladder-trap combination associated with a barrier, such as a dam, are employed to effectively

1 block upstream migration and force returning adult fish to enter a trap and holding area. Trapped
2 fish are counted and either retained for use in the hatchery or released to spawn naturally.

3
4 The physical presence of a weir or trap can affect salmonids by:

- 5
- 6 • Delaying upstream migration
- 7 • Causing the fish to reject the weir or fishway structure, thus inducing spawning
- 8 downstream of the trap (displaced spawning)
- 9 • Contributing to fallback of fish that have passed above the weir
- 10 • Injuring or killing fish when they attempt to jump the barrier (Hevlin and Rainey 1993;
- 11 Spence et al. 1996).
- 12

13 Impacts associated with operating a weir or trap include:

- 14
- 15 • Physically harming the fish during their capture and retention
- 16 • Harming fish by holding them for long durations
- 17 • Physically harming fish during handling
- 18 • Increasing their susceptibility to displacement downstream and to predation during the
- 19 recovery period
- 20

21 The proper design and operation of weirs and traps can reduce many of their potential negative
22 impacts (Hevlin and Rainey 1993; NMFS 2008b). The potential impacts of weir rejection,
23 fallback, and injury from the operation of a weir or trap can be minimized by allowing
24 unimpeded passage for a period each week. Trained hatchery personnel can reduce the impacts
25 of weir or trap operation by removing debris, preventing poaching, and ensuring safe and proper
26 facility operation. Delay and handling stress may also be reduced by holding fish for the shortest
27 time possible (less than 24 hours), and by allowing any fish not needed for broodstock to recover
28 from handling and be immediately released upstream to spawn naturally (NMFS 2008b).

29
30 Beach seines, hook and line, gillnets, and snorkeling are other methods used to collect adult
31 broodstock for artificial production programs. All these methods can adversely affect listed fish
32 through injury, delaying their migration, changing their holding and spawning behavior, and
33 increasing their susceptibility to predation and poaching.

34 **Genetics Effects**

36 In the Sandy River, the interbreeding between hatchery and natural-origin spring Chinook
37 salmon, and between hatchery and natural-origin winter steelhead, is considered a limiting
38 factor; interbreeding between hatchery and natural-origin coho salmon is considered a concern
39 (ODFW 2010). It is widely acknowledged that gene flow occurs naturally among salmon and
40 steelhead populations, a process referred to as straying (Quinn 1993; Quinn 1997; Quinn 2005).
41 Straying is defined for the purposes of this discussion as a salmon or steelhead returning as an
42 adult to some area other than its home territory (typically its natal stream or hatchery). Straying
43 is only considered a risk when it occurs at non-historical levels or from unnatural sources.
44 Straying may serve a valuable purpose in nature in terms of reducing loss of diversity through
45 genetic drift and in recolonization of vacant habitat. Unfortunately, few empirical data exist that

1 quantify rates of straying among natural salmon populations (particularly ones that have not been
2 affected to some extent by hatchery programs), in part because of the substantial logistical
3 difficulties involved in capturing and tagging sufficient numbers of natural-origin juveniles to
4 provide the needed adult recovery data to reliably estimate the rate at which they return to non-
5 natal streams. Most studies of stray rates have involved tagging of hatchery-produced juveniles.
6 Nonetheless, Quinn (2005) does estimate that, generally, considering all species and regions,
7 between 1 percent and 5 percent of returning adult salmon can be expected to stray.

8
9 Fish produced in hatcheries may exhibit reduced homing fidelity relative to naturally spawned
10 fish (Grant 1997; Quinn 1997; Goodman 2005; Marshall et al. 2000; Jonsson et al. 2003),
11 resulting in straying and unnatural gene flow into recipient populations, either in terms of
12 sources or rates. Hatchery rearing and release practices, and ancestral origin of the hatchery
13 stock, can all play a role in straying of hatchery fish (Quinn 1997).

14
15 Stray rate can be defined in two ways – as the probability of straying, or as the proportion of
16 spawners composed of strays. In assessing risk and evaluating impacts of outbreeding⁴ (Table
17 13), it is the latter that needs to be considered – that is, how many of the spawners in a given area
18 come from a spawning aggregate that is not native to or genetically representative of that area.

19
20 Gene flow into a natural population from a non-local population (either out-of-basin or from in-
21 basin hatchery releases) or at unnatural levels can have two effects. While an influx of non-local
22 fish can, in fact, increase genetic diversity of an affected natural population (e.g., Ayllon et al.
23 2006), it would also alter established allele ⁵frequencies (and co-adapted gene complexes) and
24 potentially reduce the population's adaptive potential, a phenomenon called outbreeding
25 depression (Edmands 2007; McClelland and Naish 2007). As a general rule, the greater the
26 geographic or genetic separation between the source and recipient population, the greater the
27 genetic difference between the two populations would be (ICTRT 2007). Additionally,
28 exaggerated rates of straying of fish from a hatchery program to other populations within an
29 MPG or ESU can have a homogenizing effect, decreasing intra-population genetic variability
30 (e.g., Vasemagi et al. 2005), and increasing risk to population diversity, one of the four
31 parameters measured to determine population viability under the ESA.

32
33 Relatively speaking, estimation of the proportion of non-local strays in a population is
34 straightforward, and can be measured by alternative methods, e.g., interrogation of in-migrating
35 adults at a weir or as carcasses during spawning ground surveys, and identification of their out-
36 of-basin hatchery origin via marks (e.g., fin clips) or tags (PIT⁶, CWT, etc.). However, the
37 presence of strays within a population cannot directly be used to infer that interbreeding with the
38 natural population is occurring and is affecting a reduction in overall population fitness
39 (outbreeding depression). While studies of reproductive success of strays are few, there are

⁴ Outbreeding is the fitness/diversity change caused by gene flow from other populations causing outbreeding depression and loss of among-population diversity.

⁵ An allele is one member of a pair or series of genes that occupy a specific location on a specific chromosome.

⁶ Passive Integrated Transponder tag, used to identify individual fish without harming them.

several studies of populations in which hatchery strays did not successfully interbreed with the natural population, or, at least, not in a manner proportional to their presence in the population (e.g., Saisa et al. 2003; Blankenship et al. 2007). Reasons for poorer breeding success of strays are likely similar to reasons identified as responsible for reduced productivity of hatchery-origin fish, e.g., differences in run and spawn timing, and reduced survival of their progeny (e.g., Leider et al. 1990; Reisenbichler and McIntyre 1977; McLean et al. 2003 and 2004; Williamson et al. 2010).

A NMFS sponsored workshop in 1995, which focused on the biological consequences of hatchery fish straying into natural salmonid populations, addressed how much gene flow can occur and still remain compatible with the long-term conservation of local adaptations and genetic diversity (Grant 1997). Based on selection effects in other animals, a gene flow rate of greater than 5 percent between local and non-local populations would quickly lead to replacement of neutral and locally-adapted genes (Grant 1997). NMFS applies this same standard to strays into natural spawning populations from hatchery programs, with some additional flexibility depending on the purpose of the program and whether the program is locally derived and operated. NMFS notes that gene flow is expected to be less than 5 percent when the stray rate of non-local fish into a local population is at or below 5 percent because not all fish that stray spawn successfully. Thus, NMFS applies the Grant (1997) guideline that non-local hatchery stray rates should be managed such that less than 5 percent of the naturally spawning population consists of non-local strays. Furthermore, the number of non-local or hatchery-produced strays in a particular population should be as low as possible to minimize the potential for genetic introgression.

The Recovery Plan includes actions that are designed to reduce the proportion of hatchery spring Chinook salmon spawning naturally (Table 4), with the goal of having the nine-year averaged proportion less than or equal to 10 percent (ODFW 2010). The hatchery maximum stray rate target of 10 percent was identified as the level necessary to meet delisting goals for the naturally spawning population, and reflects the similarity between the hatchery and naturally produced spring Chinook salmon (ODFW 2010).

Ecological Interactions

Interactions between hatchery-origin and natural-origin juveniles can pose risks to natural populations in the Sandy River Basin, through such mechanisms as competition for resources, predation on natural-origin juveniles by hatchery-origin fish, and changes in natural behaviors. Competition occurs when the demand for a resource by two or more organisms exceeds the available supply. If the resource in question (e.g., food or space) is present in such abundance that it is not limiting, then competition is not occurring, even if both species are using the same resource. Adverse impacts of competition may result from direct interactions, whereby a hatchery-origin fish interferes with the accessibility to limited resources by naturally produced fish, or through indirect means, as when utilization of a limited resource by hatchery fish reduces the amount available for naturally produced fish (SIWG 1984; NMFS 2011c). In an assessment of the potential ecological impacts of hatchery fish production on naturally produced salmonids, the Species Interaction Work Group (SIWG 1984) concluded that naturally produced coho and Chinook salmon and steelhead are all potentially at “high risk” due to competition (both interspecific and intraspecific) from hatchery fish of any of these three species.

1
2 Newly released hatchery smolts may compete with naturally produced fish for food and space in
3 areas where they interact during downstream migration. Naturally produced fish may be
4 competitively displaced by hatchery fish early in life, especially when hatchery fish are more
5 numerous, of equal or greater size, and (if hatchery fish are released as non-migrants) the
6 hatchery fish have taken up residency before naturally produced fry emerge from the gravel after
7 hatching. A negative change in growth and condition of naturally produced fish through a change
8 in their diet or feeding habits could occur following the release of hatchery salmonids. Any
9 competitive impacts likely diminish as hatchery-produced fish disperse.

10
11 Hatchery fish might alter naturally produced salmon behavioral patterns and habitat use, making
12 them more susceptible to predators (Hillman and Mullan 1989; Steward and Bjornn 1990).
13 Hatchery-origin fish may also alter naturally produced salmonid migratory responses or
14 movement patterns, leading to a decrease in foraging success (Steward and Bjornn 1990;
15 Hillman and Mullan 1989). The potential for negative impacts on the behavior, and hence
16 survival, of naturally produced fish as a result of hatchery fish releases depends on the degree of
17 spatial and temporal overlap in occurrence of hatchery and naturally produced fish. The relative
18 size of affected naturally produced fish when compared to hatchery fish, as well as the
19 abundance of hatchery fish encountered, also determines the degree to which naturally produced
20 fish are displaced (Steward and Bjornn 1990). Actual impacts on naturally produced fish would
21 thus depend on the degree of dietary overlap, food availability, size-related differences in prey
22 selection, foraging tactics, and differences in microhabitat use (Steward and Bjornn 1990).

23
24 Juvenile coho salmon are apparently dominant in encounters with juveniles of other stream-
25 rearing salmonid species, including Chinook salmon, steelhead, and cutthroat trout (*O. clarki*),
26 and with wild-origin coho salmon (e.g., Stein et al. 1972; Allee 1974; Swain and Riddell 1990;
27 Taylor 1991) when placed in the same test habitat. However, there are substantial differences in
28 habitat preferences between older juveniles of the three species, in particular between coho
29 salmon and steelhead. Age-one and older steelhead prefer steeper gradient streams and riffle
30 habitat, while coho salmon favor lower gradient streams and pool habitat. Chinook salmon also
31 have habitat preferences different from those of coho salmon (Nilsson 1967; Lister and Genoe
32 1970; Taylor 1991). Along with the habitat differences exhibited by coho salmon and steelhead,
33 they also show differences in foraging behavior. Peterson (1966) and Johnston (1967) reported
34 that juvenile coho salmon are surface-oriented and feed primarily on drifting and flying insects,
35 while steelhead are bottom-oriented and feed largely on benthic insects. A net result of these
36 intrinsic habitat preference and feeding behavioral differences is that the incidence of
37 competitive interactions among coho and Chinook salmon and steelhead in natural streams is
38 much lower than interactions between members of the same species (intraspecific competition).

39
40 The risk of adverse competitive interactions can be minimized by:

- 41
42 • Releasing hatchery smolts that are physiologically ready to migrate. Hatchery fish
43 released as smolts emigrate seaward soon after liberation, minimizing the potential for
44 competition with juvenile naturally produced fish in freshwater (Steward and Bjornn
45 1990).

- Operating hatcheries such that hatchery fish are reared to sufficient size that nearly the entire population to be released is ready to outmigrate at the same time (Bugert et al. 1991).
- Releasing hatchery smolts in lower river areas, below areas used for stream-rearing naturally produced juveniles.
- Monitoring the incidence of non-migratory smolts (residuals) after release and adjusting rearing strategies, release location, and timing if substantial competition with naturally rearing juveniles is documented.

A variable proportion of the smolts released from a hatchery do not migrate to the ocean but rather set up stream residence in the vicinity of the release point – a response known as “residualism” (NMFS 2011c). This is an undesirable behavior because these non-migratory smolts (residuals) may directly compete for food and space with natural-origin juvenile salmonids of similar age. They also may prey on younger, smaller-sized juvenile salmonids. Although this behavior has been studied and observed most frequently in the case of hatchery steelhead, residualism has been reported as a potential issue for hatchery coho and Chinook salmon as well. The adverse impact of residual Chinook and coho hatchery salmon on naturally produced salmonids is generally a possibility, given that the number of smolts per release is generally higher than for steelhead, and that the issue of residualism for these species has not been as widely investigated compared to steelhead. Therefore, for all species, the monitoring of natural stream areas downstream of hatchery release points is necessary to determine the effect of hatchery smolt residualism on the natural-origin juvenile salmonids.

Risks to naturally produced salmonids attributable to direct predation (direct consumption) by hatchery fish or indirect predation (increases in predation by other predator species due to enhanced attraction) can result from hatchery salmonid releases. Hatchery-origin fish may prey upon juvenile naturally produced salmonids at several stages of their life history (SIWG 1984). Newly released hatchery smolts have the potential to prey on naturally produced fry and fingerlings that are encountered in freshwater during downstream migration (HSRG 2004). Hatchery smolts that do not emigrate and instead take up stream residence near the point of release (residuals) have the potential to prey on stream-rearing juveniles over a more prolonged period (NMFS 2011c). Hatchery salmonids planted as non-migrant fry or fingerlings also have the potential to prey upon natural-origin salmonids in the freshwater where they co-occur. In general, naturally produced salmonid populations would be most vulnerable to predation when naturally produced populations are depressed and predator abundance is high, in small streams, where migration distances are long, and when environmental conditions favor high visibility.

Predation impacts from hatchery practices can be minimized by:

- Releasing actively migrating smolts through volitional release practices
- Ensuring that a high proportion of the population have physiologically achieved full smolt status (juvenile salmon tend to migrate seaward rapidly when fully smolted,

1 limiting the duration of interaction between hatchery fish and naturally produced fish
2 present within, and downstream of, release areas)

- 3
- 4 • Releasing hatchery smolts in lower river areas, below upstream areas used for stream-
5 rearing young-of-the-year naturally produced salmon fry, thereby reducing the likelihood
6 for interaction between the hatchery and naturally produced fish
- 7
- 8 • Operating hatchery programs and releases to minimize the potential for residualism (see
9 previous discussion)
- 10

11 **Monitoring and Evaluation**

12 Monitoring of the natural-origin populations in the Sandy River Basin has been occurring and is
13 expected to continue to occur as part of the Bull Run Water Supply HCP (NMFS 2008a).

14 Monitoring and evaluation programs are necessary to determine the performance of hatchery
15 programs and the status of the natural populations. The Artificial Production Review (NPPC
16 1999) listed four criteria for evaluating both augmentation and mitigation programs:

- 17
- 18 • Has the hatchery achieved its objectives?
- 19 • Has the hatchery incurred costs to natural production?
- 20 • Are there genetic impacts associated with the hatchery production?
- 21 • Is the benefit greater than the cost?
- 22

23 Under the ESA, monitoring and evaluation programs for hatchery production are not only
24 necessary for adaptive management purposes but are required, to ensure that hatchery programs
25 do not limit the recovery of listed populations. Monitoring and evaluation of hatchery programs
26 are necessary to determine if management actions are adequate to reduce or minimize the
27 impacts of the general effects discussed previously (Table 13), and to determine if the hatchery is
28 meeting its performance goals. Monitoring and evaluation of hatcheries can include
29 measurements to evaluate hatchery production (e.g., survival, nutrition, size at age, condition,
30 disease prevention, genetic makeup, total released, percent smolted).

31

32 Monitoring and evaluation to determine impacts on listed fish of hatchery programs can
33 themselves have adverse impacts on listed fish in the hatchery through injuries incurred during
34 sampling and marking. Sampling within the hatchery can include direct mortalities (e.g., genetic
35 analysis, disease pathology, smolt condition) and incidental take (e.g., sorting, marking,
36 transfers). Marking of hatchery fish prior to release is required for all programs to monitor and
37 evaluate hatchery effects (positive and negative). Marking is necessary to evaluate a number of
38 objectives including selecting broodstock, determining hatchery stray rates and hatchery
39 contributions to fisheries, and for the implementation of selective fisheries that target hatchery
40 fish.

41

42 Monitoring and evaluating fish and fish assemblages in the natural environment is necessary to
43 determine any positive or negative effects the hatchery program is having on the natural
44 population. Genetic and life-history data may need to be collected from the natural population to
45 determine if the hatchery population has diverged from the natural population and if the natural

1 population has been altered by the incorporation of hatchery fish into the spawning population.
2 Sampling methods can include the use of weirs, electro-fishing, rotary screw traps, seines, hand
3 nets, spawning ground surveys, snorkeling, radio tagging, and carcass recovery. Each sampling
4 method can be used to collect a variety of information. Sample methods, like tagging methods,
5 can adversely impact listed fish, both those targeted for data collection and those taken
6 incidentally to the data collection.

7
8 NMFS has developed general guidelines to reduce impacts when collecting listed adult and
9 juvenile salmonids (NMFS 2000; NMFS 2008b), which have been incorporated as terms and
10 conditions into section 10 and section 7 permits for research and enhancement activities (e.g.,
11 NMFS 2007b). Though necessary to monitor and evaluate impacts on listed populations from
12 hatchery programs, monitoring and evaluation programs should be designed and coordinated
13 with other plans to maximize the data collection while minimizing take of listed fish.

14 15 **4.2 Effects on Water Quality and Water Quantity**

16 **4.2.1 Alternative 1 (No-action) – Do Not Approve the HGMPs under Limit 5 of the 4(d)** 17 **Rule**

18 Under this alternative, the four HGMPs would not be approved, likely due to the HGMPs not
19 meeting the criteria under limit 5 of the 4(d) Rule. NMFS treats this No-action Alternative as
20 resulting in the termination of the hatchery programs, including termination of the release of
21 hatchery fish into the Sandy River Basin.

22
23 The absence of the hatchery programs under the No-action Alternative would eliminate any
24 effects on water quality in Cedar Creek resulting from the Sandy Hatchery effluent, and on
25 instream flows (water quantity) that were identified in Subsection 3.2, Water Quality and Water
26 Quantity. The actual effect on water temperature would be expected to be minor because the
27 hatchery, when in operation, has not add to the thermal load on Cedar Creek's ambient water
28 temperatures. Because of this, for example, the two Clean Water Act temperature criteria that
29 were exceeded (see Subsection 3.2, Water Quality and Water Quantity) would likely still have
30 been exceeded in the absence of the hatchery programs, especially during the summer, low flow
31 months, so the same degree of impairment under section 303(d) of the Clean Water Act would
32 still occur under the No-action Alternative. Dissolved oxygen was not identified as a factor
33 limiting water quality (ODEQ 2006), and levels would not be expected to change under the No-
34 action Alternative.

35
36 Under the No-action Alternative, because the facility would not be operated, no effluent would
37 be released. However, the effects on total suspended solids and settleable solids (turbidity) under
38 the No-action Alternative would be minor, due to the current use of a pollution abatement pond
39 at the Sandy Hatchery that minimizes turbidity in Cedar Creek due to fish wastes and un-eaten
40 fish food. In general, turbidity would not be increased to any great extent if the hatchery
41 programs were in operation, and thus the No-action Alternative would not result in any great
42 reduction in turbidity from current levels. The lack of hatchery programs under the No-action
43 Alternative may lead to the removal of the intake structure and adult weir at the Sandy Hatchery.
44 This removal would be expected to increase in turbidity for a short period of time during
45 removal. The current NPDES permit for the Sandy Hatchery would not be needed under the No-

1 action Alternative and would not be expected to have an effect on the number or types of
2 NPDES permits that ODEQ would issue for the Sandy River Basin.

3
4 Under the No-action Alternative, water that is currently taken into the hatchery for rearing and
5 adult collection would remain in Cedar Creek, increasing flows (i.e., water quantity) between the
6 intake structure and the hatchery outfall. ~~There would be no dewatering during September.~~
7 Under the No-action Alternative, the acclimation pond at the Bull Run Powerhouse would not be
8 operated and thus would not have an impact on water quantity or water quality in the Bull Run
9 River. ~~The hatchery effluent may contain aquaculture drugs and chemicals (formalin), that may
10 impact fish present in Cedar Creek downstream from the hatchery outfall. These impacts are
11 expected to be minor because these drugs are strictly monitored and are prescribed by licensed
12 veterinarians to be effective in the treatment of the fish pathogen while meeting drug label
13 criteria for environmental exposure. The possible impacts from the exposure to these drugs under
14 the No-action Alternative would not be expected to occur because the hatchery programs would
15 not be operated.~~

16
17 With respect to the level of marine-derived nutrients delivered to the ecosystem by salmon and
18 steelhead, the absence of hatchery fish returning to the basin under the No-action Alternative
19 would be detrimental in the short-term and possibly beneficial in the long-term to the level of
20 marine-derived nutrients. The amount of nutrients under the No-action Alternative would
21 depend on the abundance of the natural populations. The effects on the overall ecosystem (e.g.,
22 aquatic productivity, riparian forests, large woody debris) of reducing the number of hatchery
23 fish would be detrimental until production of natural-origin salmon and steelhead adults exceeds
24 the current level of hatchery and natural-origin adults on the spawning grounds. Also lost to the
25 basin would be the hatchery carcasses that are currently outplanted into the basin for nutrient
26 enhancement. Some of the nutrients from outplanted carcasses could come from other hatcheries,
27 but concerns with disease transmission may prevent the outplanting of carcasses from other
28 basins. If the abundance of natural-origin adults increases after cessation of the hatchery
29 program, then the amount of marine-derived nutrients delivered to the ecosystem would also
30 increase, and this would have a positive effect on water quality under the No-action Alternative.
31 However, it is not certain if this gain in marine-derived nutrients would yield measurable
32 beneficial effects given habitat changes due to the other human activities, such as agricultural
33 practices, logging, irrigation, pollution, dams, and urban and industrial development, that are
34 unrelated to the proposed hatchery programs, but that would continue to affect water quality in
35 the action area.

36 37 **4.2.2 Alternative 2 (Proposed Action) – Approve the HGMPs under Limit 5 of the 4(d)** 38 **Rule**

39 Under the Proposed Action, the four programs would be approved under limit 5 of the 4(d) Rule,
40 and the hatchery programs and associated BMPs would be implemented as described in the four
41 HGMPs. As described in Subsection 3.1, Water Quality and Water Quantity, impacts on water
42 quality and water quantity from the continued operation of Sandy Hatchery under the Proposed
43 Action would accrue primarily in the areas of water temperature, available dissolved oxygen,
44 turbidity, and availability of nutrients.

1 The analysis completed by ODFW in 2006 to comply with the NPDES permit found that the
2 operation of the Sandy Hatchery, even during the months of July and August, only marginally
3 increase the ambient temperature of Cedar Creek in the mixing zone below the hatchery outfall.
4 Under the Proposed Action, the hatchery would ~~not~~ be operated during the summer months and
5 would ~~not~~ be expected to increase thermal loads in Cedar Creek during that time beyond what
6 would be seen under the No-action Alternative. It is likely that the two Clean Water Act 303(d)
7 temperature criteria that were exceeded, as described in Subsection 3.1, Water Quality and Water
8 Quantity, would still be exceeded, but not to a different degree than under the No-action
9 Alternative. Dissolved oxygen was not identified as a factor limiting water quality (ODEQ
10 2006). Regardless, levels would not be expected to change under the Proposed Action because
11 the dissolved oxygen levels in the hatchery effluent would be restored to ambient levels due to
12 mixing of the hatchery effluent water and water in the adult fish ladder prior to release into
13 Cedar Creek.

14
15 The Proposed Action is likely to have only small effects on turbidity. To meet the NPDES
16 permit standards for sediment (e.g., total suspended solids and settleable solids), ODFW
17 proposes to continue to treat hatchery effluents in a pollution abatement pond before effluent is
18 discharged into Cedar Creek (ODFW 2006). The abatement pond would be used to settle out fish
19 waste and fish food solids to prevent release of sediment into Cedar Creek and impacts would be
20 similar to what would be observed under the No-action Alternative. The Sandy Hatchery would
21 continue to operate under its NPDES permit and it is not expected that the continuation of this
22 permit would have any impact on ODEQ's issuance of other NPDES permits in the Sandy River
23 Basin. ~~The hatchery effluent may contain aquaculture drugs and chemicals (formalin), that may~~
24 ~~impact fish present in Cedar Creek downstream from the hatchery outfall. These impacts are~~
25 ~~expected to be minor because these drugs are strictly monitored and are prescribed by licensed~~
26 ~~veterinarians to be effective in the treatment of the fish pathogen while meeting drug label~~
27 ~~criteria for environmental exposure. The possible impacts from the exposure to these drugs under~~
28 ~~the Proposed Action Alternative would not be expected to occur under the No-action Alternative~~
29 ~~because the hatchery programs would not be operated.~~

30
31 Unlike the No-action Alternative, the Proposed Action would affect water quantity over a short
32 distance. The Sandy Hatchery would use water from Cedar Creek to collect and hold adults and
33 to rear juveniles ~~prior to release~~. During the spring, when acclimating and releasing juvenile fish
34 on-station, the hatchery removes up to 8,000 gpm, and during September, when coho salmon
35 broodstock collection begins, the hatchery uses around 1,732 gpm. ~~Flows in Cedar Creek are~~
36 ~~expected to exceed 3,600 gpm; 95 percent of the time, but low flows can occur during the~~
37 ~~September. Rearing the coho salmon at the Sandy Hatchery would require a minimum water~~
38 ~~withdrawal from Cedar Creek of 2,200 gpm-through August and 2,300 gpm through September.~~
39 ~~These withdrawals would be expected to leave between 1,300-1,400 gpm in Cedar Creek to~~
40 ~~provide for rearing and passage flows in the by-pass section. Minimum flow would be~~
41 ~~maintained in this section to allow for juvenile passage at the adult weir and intake structure.~~
42 ~~Prior to September, the water diversion would occur during flows that are high enough that the~~
43 ~~amount of water withdrawn would not adversely affect adult salmonid upstream passage,~~
44 ~~juvenile downstream passage, or other biological processes. Beginning in September, hatchery~~
45 ~~operations would be initiated by diverting water at the hatchery intake to attract coho salmon~~
46 ~~broodstock into the hatchery.~~ The removal of water at the intake would affect water quantity by

~~dewatering-reducing flow in~~ the 900 feet of stream between the intake structure and the Sandy Hatchery adult holding pond outfall ~~during broodstock collection activities for coho salmon.~~ Water quantity would be reduced to a degree that could reduce or prevent adult upstream passage through this section of the stream because natural flows in Cedar Creek are at a minimum during ~~the same time period~~ September. Flows in Cedar Creek would remain low until fall rains increase flows, at which point adult passage would again be possible. ~~This dewatering~~ The reduced flows ~~in-of-the this~~ section of stream beginning in September would not occur under the No-action Alternative.

The 450 to 600 gallons of water per minute withdrawn for the acclimation pond would not be expected to impact the flows within the Bull Run River because spring Chinook salmon would be acclimated in mid-March when flows in the Bull Run River are very high (NMFS 2008a); water used in the acclimation pond would return to the same pool, affecting only a very small area of the river. Impacts on water quality and quantity would be expected to be minimal, because only a small number of juveniles would be reared, and the outfall water would be released into the same pool as the water intake. The minor impacts on water quality from the feeding of spring Chinook salmon during acclimation and on water quantity from water withdrawal for the acclimation pond at the Bull Run Powerhouse that would occur under the Proposed Action would not occur under the No-action Alternative.

The Proposed Action is expected to result in greater availability of marine-derived nutrients than under the No-action Alternative in the near term, but an unknown effect on nutrients over the longer term. The continuation of the hatchery programs under the Proposed Action would result in the annual escapement of adult hatchery salmon and steelhead to the Sandy River Basin being similar to what has been observed recently. The proportion hatchery adults spawning in the wild would be expected to be reduced over the long term through their removal at weirs and traps (e.g., mouth of Cedar Creek) and through fisheries that target adults returning to the hatchery and to the Bull Run River acclimation site. The actual level of marine-derived nutrients is not expected to decline as a result of removal of hatchery-origin returns because hatchery carcasses would still be available for outplanting into the upper basin. The degree to which the Proposed Action increases the availability of marine-derived nutrients over the No-action Alternative depends upon the number of adult salmon and steelhead reaching the upper parts of the basin. In the near term, if more fish return to the Sandy River as a result of the hatchery program, it is likely that the number of carcasses in the upper basin (from natural-origin returns and outplanted hatchery-origin carcasses) would be somewhat higher than under the No-action Alternative. In the long term, if natural-origin salmon and steelhead production improves as impacts from hatchery produced salmon and steelhead are reduced, the actual level of marine-derived nutrients may increase.

4.3 Effects on Anadromous Fish Listed under the ESA

Anticipated changes in fish resources conditions compared to the affected environment are important to analyze in relation to identified risks to listed fish related to hatchery program operations. As such, effects on anadromous fish listed under the ESA are analyzed in comparison to affected environment information provided in Subsection 3.2, Anadromous Fish Listed under the ESA and in Subsection 4.1, Potential Hatchery Effects.

4.3.1 Alternative 1 (No-action) – Do Not Approve the HGMPs under Limit 5 of the 4(d) Rule

4.3.1.1 Sandy River Spring Chinook Salmon

Subsection 3.2.1, Sandy River Spring Chinook Salmon, describes populations that are part of the LCR Chinook Salmon ESU, including the three distinct Chinook salmon populations in the Sandy River (tule, late-fall, and spring-run). None of the Chinook salmon populations outside the action area, nor their associated habitat, would be affected under the No-action Alternative.

The lack of hatchery programs under the No-action Alternative would be expected to have an overall beneficial effect on the three Chinook populations in the Sandy River because any impacts of the hatchery programs currently operating in the basin would be eliminated. Impacts under the No-action Alternative on the tule and late-run fall Chinook salmon population life-histories would not be expected to change because there would be minimal, if any, effect on these run-types from the current hatchery programs (Subsection 3.2.1, Sandy River Spring Chinook Salmon). However, spring Chinook salmon life history characteristics may change under the No-action Alternative because naturally spawning hatchery spring Chinook salmon are having an impact on those life history characteristics – the change in life history characteristics under the No-action Alternative would be expected to be towards the natural characteristics. These impacts are expected to be small because the hatchery spring Chinook salmon were derived from the natural-origin Sandy River spring Chinook salmon population and the program has incorporated natural-origin spring Chinook salmon into the broodstock to maintain similarities between the hatchery and natural-origin spring Chinook salmon. To the extent that impacts on the life history have occurred, these would be expected to continue over the short term until all of the hatchery spring Chinook salmon released in the recent past have returned to the Sandy River. Once all of the Sandy River hatchery spring Chinook salmon have returned, then any impacts would diminish. However, spring Chinook, tule fall Chinook, and late-run fall Chinook salmon straying from outside the action area would increase under the No-action Alternative due to the removal of traps and trapping operations that currently make the removal of hatchery fish (including those from outside the Sandy River Basin) possible.

The biological risk categories identified in Ford (2011), concluded that the LCR Chinook Salmon ESU is at very high risk of extinction, however the Sandy River spring Chinook salmon population was considered to be at moderate risk of extinction and are not expected to change under the No-action Alternative, but there may be a beneficial effect because the current hatchery programs pose increased risks to these population. The recovery goal for the Sandy River population of spring Chinook salmon, as described the Recovery Plan (ODFW 2010)(Subsection 1.6, Relationship to Other Plans and Policies), is for the population to be at low risk of extinction (less than 5 percent probability of extinction) with an annual abundance of 1,230 natural-origin adults (Subsection 3.3.1, Sandy River Spring Chinook Salmon). Reducing the impacts from stray hatchery spring Chinook salmon interbreeding with natural-origin adults would address one of the limiting factors affecting the Sandy River spring Chinook salmon population, and this would be expected to work towards achieving the recovery goal for this population and increase escapement above current levels (Table 3). Under the No-action Alternative, recovery actions would be expected to continue, but actions specifically identified

1 for the Sandy Hatchery spring Chinook salmon program (Table 4) would not need to be
2 implemented because the hatchery program would no longer be operated.

3
4 Sandy River tule fall Chinook salmon were considered to be at high risk of extinction and are not
5 expected to change under the No-action Alternative because the current hatchery programs'
6 adverse effects on this population are small. The lack of hatchery programs under the No-action
7 Alternative in the Sandy River may reduce whatever impacts there may be on this population
8 from competition and predation.

9
10 The Sandy River late fall Chinook salmon were considered to be a low or very low risk of
11 extinction, and are not expected to change because the hatchery programs' adverse effects on this
12 population are small. The lack of hatchery programs in the Sandy River may reduce whatever
13 impacts there may be from competition and predation on this population, but these are thought to
14 be small and not limiting the population (ODFW 2010).

15
16 The Sandy River Working Group (2007; cited in NMFS 2008a) identified anchor habitats for the
17 spring Chinook salmon population in the Sandy River indicating that the majority of the
18 spawning and rearing habitat was above the former Marmot Dam (Figure 1). These anchor
19 habitats and the spawning areas for Sandy River spring Chinook salmon are not expected to
20 change under the No-action Alternative, because the lack of hatchery programs would not alter
21 factors limiting habitat for spring Chinook salmon in the Sandy River Basin.

22
23 Under the No-action Alternative, the essential physical and biological features affecting
24 freshwater spawning, freshwater rearing, and freshwater migration that were designated as
25 critical habitat for the LCR Chinook Salmon ESU in the action area would not be affected by
26 hatchery operations, weirs, or intake structures (Subsection 3.2.1, Sandy River Spring Chinook
27 Salmon). The lack of hatchery programs in the Sandy River under the No-action Alternative
28 would mean that limiting factors affecting critical habitat (e.g., habitat quality, reduce
29 complexity and diversity, access to off-channel habitats, gravel extraction) would also not be
30 affected by hatchery operations, weirs, or intake structures (Subsection 3.2.1, Sandy River
31 Spring Chinook Salmon). On-going land-use practices in the Sandy River Basin, such as
32 channelization, diking, wetland conversion, beaver dam removal, large woody debris removal,
33 and gravel extraction would be expected to continue to impact critical habitat under the No-
34 action Alternative (Subsection 3.2.1, Sandy River Spring Chinook Salmon).

35
36 NMFS identified a number of risks to natural populations from hatchery programs (Table 14). Of
37 these risks, NMFS has determined that, within the action area, ESA-listed species would be
38 affected by, and take would occur as a result of, the Proposed Action Alternative. Activities that
39 would affect listed species would include water withdrawals, facility structures, broodstock
40 collection, outbreeding effects from stray program hatchery salmon, competition and predation
41 as a result of the release of hatchery juveniles into the Sandy River, and monitoring and
42 evaluation activities (Table 14) – although these effects are related to implementation of the
43 Proposed Action, a comparative analysis under the No-action Alternative is provided below (see
44 also Subsection 4.1, Potential Hatchery Effects).

Facility Effects

Potential impacts from facility effects are described under Subsection 4.1, Potential Hatchery Effects. Any impacts of the operation of the Sandy Hatchery and the removal of water for the hatchery and the acclimation pond would be eliminated under the No-action Alternative. The impacts of water removal are described above in Subsection 4.1.2, Water Quality and Quantity. The removal of the weir and intake structure at the Sandy Hatchery on Cedar Creek would eliminate any potential impacts of passage delay of adults and juvenile salmon and impingement by juvenile fish. However, no benefit would be expected for spring Chinook salmon because Cedar Creek does not contain spring Chinook salmon spawning or rearing habitat.

Fish Removal

Potential impacts from fish removal are described under Subsection 4.1, Potential Hatchery Effects. Under the No-action Alternative, natural-origin Chinook salmon and hatchery spring Chinook salmon would not be removed from the spawning population. This would differ from current practices where hatchery fish are removed, but, with cessation of the program, the increased number of hatchery fish reaching the spawning grounds would be a transitory effect, and would decrease to essentially zero after the last hatchery fish have returned. Impacts from the use of seines and from the physical presence and operation of the weirs **such as passage delay and changes in spawning distribution** would not occur under the No-action Alternative because the weirs and seines would no longer be used to collect adults. Other methods to collect broodstock such as hook-and-line, tangle-nets, and snorkeling would not be used under the No-action Alternative and, thus, impacts from these activities would not occur.

Genetics

Potential impacts from genetic effects are described under Subsection 4.1, Potential Hatchery Effects. The elimination of the proposed spring Chinook salmon program under the No-action Alternative would eventually reduce the number of hatchery adults that could potentially interbreed with natural-origin adults, reducing or eliminating genetic impacts on the natural spring Chinook salmon population in the Sandy River. If the spring Chinook salmon hatchery is eliminated, as would occur under the No-action Alternative, hatchery adults that are still out in the marine environment would be expected to return over 2 to 5 years, contributing to the number of hatchery adults that could potentially interbreed with the natural-origin spring Chinook salmon population in the Sandy River. This interbreeding was identified as a limiting factor for the spring Chinook salmon population in the Sandy River (Subsection 3.3.2, Sandy River Spring Chinook Salmon) (ODFW 2010). Straying of hatchery adults from other programs could still occur, as observed for the tule fall Chinook salmon population in the Sandy River, but would be expected to be at levels below the 10 percent goal established in the conservation and the Recovery Plan (ODFW 2010), and probably less than the 5 percent proportion that was identified as having no effect by Grant (1997) (Subsection 4.1, Potential Hatchery Effects).

Ecological Interactions

Potential impacts from ecological interactions are described under Subsection 4.1, Potential Hatchery Effects. Impacts would occur where hatchery smolts interact with natural-origin

juveniles during the downstream migration, and if hatchery juveniles residualize and do not emigrate. The potential impacts from competition between hatchery juveniles and natural-origin juveniles in the action area would not be expected to occur under the No-action Alternative because hatchery juveniles would no longer be released into the Sandy River Basin, and juvenile fish from outside the action area would not be expected to move into the Sandy River Basin.

The release of hatchery smolts into areas that contain natural-origin juveniles could lead to direct predation (direct consumption) or indirect predation (increases in predation by other predator species due to enhanced attraction). In general, naturally produced salmonid populations would be most vulnerable to predation from hatchery juveniles when naturally produced populations are depressed and predator abundance is high, in small streams, where migration distances are long, and when environmental conditions favor high visibility. Predation by hatchery juveniles on listed juveniles would not be expected to occur under the No-action Alternative because hatchery juveniles would no longer be released into the Sandy River Basin.

Monitoring and Evaluation

Potential impacts from monitoring and evaluation are described under Subsection 4.1, Potential Hatchery Effects. Monitoring and evaluation activities to determine impacts on listed fish from hatchery programs can themselves have potential adverse impacts on listed fish through injuries incurred during sampling and marking (Subsection 4.1, Potential Hatchery Effects). Under the No-action Alternative, monitoring the effects of the hatchery programs on the natural populations would not occur because the hatchery programs would not be operated. However, monitoring and evaluation activities (e.g., spawning ground surveys) would be expected to continue in the Sandy River Basin to monitor the status and recovery of the listed populations in the basin (Subsection 2.2.1, Spring Chinook Salmon Program) and as part of the Bull Run Water Supply HCP (Subsection 1.6, Relationship to Other Plans and Policies) (NMFS 2008a). These monitoring and evaluations activities would continue to impact listed species due to the handling of listed adults and juveniles and from the operation of a screw trap in Cedar Creek to monitor the recolonization of habitat above the Sandy Hatchery. All of these activities would be consistent with the general guidelines developed by NMFS to reduce impacts when collecting adults and juveniles, but impacts would still be expected occur under the No-action Alternative.

4.3.1.2 Sandy River Coho Salmon

Subsection 3.2.2, Sandy River Coho Salmon, describes populations that are part of the LCR Coho salmon ESU including the Sandy River coho salmon population. All of the other coho salmon populations and their associated habitat reside outside the action area and would not be affected under the No-action Alternative.

The lack of hatchery programs under the No-action alternative would be expected to have a beneficial effect on the natural-origin coho salmon population in the Sandy River because any impacts from the hatchery programs currently operating in the basin would be eliminated. Impacts on the return timing of the naturally spawning coho salmon population may change under the No-action Alternative to the extent that naturally spawning hatchery coho salmon are having an impact on the run-timing of the natural-origin population. These impacts are expected to be small because the Sandy Hatchery coho salmon program originated from natural-origin

1 Sandy River coho salmon and only a small proportion of the natural spawning population
2 consists of hatchery adults. Under the No-action Alternative, these impacts would be expected to
3 continue to occur over a short period until all of the hatchery fish in ocean return to the Sandy
4 River. Impacts on the run-timing of the Sandy River coho population may still occur after the
5 termination of the hatchery programs due to hatchery and natural-origin coho salmon from
6 outside the action area straying to the Sandy River Basin.

7
8 The biological risk categories identified in Ford (2011), concluded that the LCR Coho Salmon
9 ESU is at very high risk of extinction, however the Sandy River coho salmon population was
10 considered to be at high to moderate risk of extinction and are not expected to change under the
11 No-action Alternative, but there may be a beneficial effect because the current hatchery
12 programs are increasing risks to this population to a small extent. To the extent that impacts are
13 reduced, escapement would be expected to increase above current levels (Table 3).

14
15 Anchor habitats and spawning areas (above the former Marmot Dam site, in the Salmon River
16 and its tributaries below Final Falls, and in Still Creek (Figure 1)) would not be expected to
17 change under the No-action Alternative. The lack of hatchery programs would not be expected
18 to have any effect on the limiting factors affecting habitat (e.g., habitat quality, reduced
19 complexity and diversity, access to off-channel habitats, gravel extraction) or the consumptive
20 fisheries, because the hatchery programs do not directly impact habitat or fisheries (Subsection
21 3.3.2, Sandy River Coho Salmon). However, the secondary limiting factor regarding limited
22 access due to the adult weir at the Sandy Hatchery would be expected to change under the No-
23 action Alternative. Access to habitat in Cedar Creek above the Sandy Hatchery has been
24 provided to coho salmon addressing this limiting factor, and access would be expected to
25 continue under the No-action Alternative.

26
27 The recovery goal for the Sandy River population of coho salmon, as described in the Recovery
28 Plan (ODFW 2010), is for the population to be at low risk of extinction (less than 5 percent
29 probability of extinction) with an annual abundance of 5,685 natural-origin adults. Under the No-
30 action Alternative, recovery actions would be expected to continue but actions specifically
31 identified for the Sandy Hatchery the coho salmon program (Table 5) would not need to be
32 implemented because the hatchery program would no longer be operated. There would be little
33 change from current conditions because the hatchery recovery action has already been
34 implemented (Table 5).

35
36 NMFS identified a number of risks to natural populations from hatchery programs (Table 14).
37 Of the risks, NMFS determined that, within the action area, ESA-listed coho salmon would be
38 affected by, and take would occur due to, water withdrawals, facility structures, broodstock
39 collection, outbreeding effects from stray program hatchery salmon and steelhead, competition
40 and predation as a result of the release of hatchery juveniles into the Sandy River, and from
41 monitoring and evaluation activities (Table 14). Although these effects are related to the
42 implementation of the Proposed Action, a comparative analysis under the No-action Alternative
43 is provided below.

Facility Effects

Potential impacts from facility effects are described under Subsection 4.1, Potential Hatchery Effects. Any impacts from the operation of the Sandy Hatchery and the removal of water for the hatchery and the acclimation pond would be eliminated under the No-action Alternative because the hatchery facilities would not be operated. Impacts of water removal are described above in Subsection 4.1.2, Water Quality and Water Quantity. ~~The removal of the weir and intake structure at the Sandy Hatchery on Cedar Creek would eliminate any potential impacts from facility effects due to passage delay of adults and juvenile salmon and impingement by juvenile fish.~~ Under the No-action Alternative, the coho salmon hatchery program would no longer be operated, and there would not be a need for the adult weir and intake structure at the Sandy Hatchery on Cedar Creek. The removal of these structures would be expected to provide a benefit to coho salmon because the adult coho salmon destined for Cedar Creek would not be delayed by the adult weir and intake structure and juvenile coho salmon would not be potentially harmed by the intake screen (Subsection 4.1, Effects on Water Quality and Water Quantity). Impacts on the overall Sandy River coho salmon population would be minimal because coho salmon spawning and rearing in Cedar Creek is only a small proportion of the larger Sandy River population. However, this might change over time if the Cedar Creek proportion of the population increases to fully utilize the available habitat in Cedar Creek.

Fish Removal

Potential impacts from fish removal are described under Subsection 4.1, Potential Hatchery Effects. Broodstock for the coho salmon program are currently collected from coho salmon voluntarily entering the Sandy Hatchery. Impacts from the collection and handling of natural-origin coho salmon that volunteer into the Sandy Hatchery would not occur under the No-action Alternative because coho salmon would not be collected for broodstock at the Sandy Hatchery – any coho salmon arriving at the hatchery location would be able to pass unhandled.

Genetics

Potential impacts from genetic effects are described under Subsection 4.1, Potential Hatchery Effects. Under the No-action Alternative, the elimination of the proposed hatchery coho salmon program would remove one potential source of stray hatchery coho salmon that could interbreed with the natural-origin coho salmon population in the Sandy River Basin. The impacts from hatchery coho salmon interbreeding with the natural population in the Sandy River was not considered a limiting factor for the Sandy River coho salmon population (ODFW 2010). The elimination of the hatchery coho salmon program under the No-action Alternative would be expected to have little impact on the natural-origin population because the proportion of hatchery coho salmon spawning naturally has been low, and the hatchery coho salmon were derived from the natural population in the Sandy River. Straying of hatchery adult coho salmon from outside the action area may still occur but would be expected to be at levels below the 10 percent goal established in the Recovery Plan (ODFW 2010) and probably less than the 5 percent proportion that was identified as having no effect by Grant (1997).

Ecological Interactions

Potential impacts from ecological interactions are described under Subsection 4.1, Potential Hatchery Effects. No impacts of competition between hatchery juveniles and natural-origin juveniles in the action area would be expected to occur under the No-action Alternative because hatchery juveniles would no longer be released into the Sandy River Basin.

No predation by hatchery juveniles on listed juveniles would be expected to occur under the No-action Alternative because hatchery juveniles would no longer be released into the Sandy River Basin.

Monitoring and Evaluation

Potential impacts from monitoring and evaluation are described under Subsection 4.1, Potential Hatchery Effects. Under the No-action Alternative, monitoring the effects of the hatchery program on the natural populations would not occur because the hatchery programs would not be operated. However, monitoring and evaluation activities (e.g., spawning ground surveys) would be expected to continue in the Sandy River Basin to monitor the status and recovery of the listed populations in the basin (Subsection 2.2.2, Sandy Coho Salmon Program) and as part of the Bull Run Water Supply HCP (Subsection 1.6, Relationship to Other Plans and Policies) (NMFS 2008a). These monitoring and evaluations activities would continue to impact listed species due to the handling of listed adults and juveniles and from the operation of a screw trap in Cedar Creek to monitor the recolonization of habitat above the Sandy Hatchery. All of these activities would be consistent with the general guidelines developed by NMFS to reduce impacts when collecting adults and juveniles, but impacts would still be expected occur under the No-action Alternative.

4.3.1.3 Sandy River Winter Steelhead

The lack of hatchery programs under the No-action Alternative would be expected to have a beneficial effect on the winter steelhead population in the Sandy River because any impacts from the hatchery programs currently operating in the basin would be eliminated. Impacts on the return timing of the naturally spawning winter steelhead population may change under the No-action Alternative because naturally spawning hatchery winter steelhead or summer steelhead are having an impact on the run-timing of the natural-origin population – the change would be in the direction of the natural population’s characteristics. These impacts are expected to be small because the Sandy Hatchery winter steelhead program originated from natural-origin Sandy River winter steelhead and have incorporated natural-origin winter steelhead into the broodstock to maintain similarities between the hatchery and natural-origin winter steelhead. In addition, only a small proportion of the natural spawning population consists of hatchery adults, and so impacts on return timing from the hatchery summer steelhead program are expected to be low. Under the No-action Alternative, these low impacts would be expected to continue to occur over a short period until all of the hatchery fish in ocean return to the Sandy River. Impacts on the run-timing of the Sandy River winter steelhead population may still occur after the termination of the hatchery programs due to hatchery and natural-origin steelhead from outside the action area straying to the Sandy River Basin (Subsection 4.1, Potential Hatchery Effects).

1 The biological risk categories identified in Ford (2011) concluded that the LCR Steelhead DPS is
2 at high risk of extinction, and the Sandy River winter steelhead population was considered to be
3 at high risk of extinction. These risks are not expected to change under the No-action
4 Alternative, but there may be a beneficial effect because the current hatchery programs are
5 increasing risks to these populations, though these impacts are small. To the extent that impacts
6 are reduced, then escapement would be expected to increase above current levels (Table 3).

8 Under the No-action Alternative, the essential physical and biological features affecting
9 freshwater spawning, freshwater rearing, and freshwater migration that were designated as
10 critical habitat for the LCR Steelhead DPS in the action area would not be affected. Key habitat
11 reaches for winter steelhead in the Sandy River Basin, the majority located above the former
12 Marmot Dam site in the Salmon River and its tributaries and in Still Creek, and in Clear Creek,
13 Clear Fork, Lost Creek, Horseshoe Creek, Zigzag River, and in Camp Creek, are not expected to
14 change under the No-action Alternative because the lack of hatchery programs would not be
15 expected to have any effect on the limiting factors affecting habitat (e.g., habitat complexity and
16 diversity, including access to off-channel habitats)(Subsection 3.3.3, Sandy River Winter
17 Steelhead); the hatchery programs would not directly impact habitat, but would have an effect on
18 stray hatchery fish interbreeding with natural-origin adults. The adult weir impeding migration
19 past the Sandy Hatchery would be removed, so migration and connectivity to other habitats
20 would improve; this effect, however, would be relatively small, since access to habitat in Cedar
21 Creek above the Sandy Hatchery has been provided to winter steelhead.

23 The recovery goal for the Sandy River population of winter steelhead, as described in the
24 Recovery Plan (Subsection 1.6, Relationship to Other Plans and Policies) (ODFW 2010), is for
25 the population to be at very low risk of extinction (less than 1 percent probability) with an annual
26 abundance of 1,519 natural-origin adults. Reducing the impacts from stray hatchery winter
27 steelhead interbreeding with natural-origin adults would address one limiting factor affecting the
28 Sandy River winter steelhead population and this would be expected to work towards achieving
29 the recovery goal for this population. Under the No-action Alternative, recovery actions would
30 be expected to continue but actions specifically identified for the Sandy Hatchery winter
31 steelhead and summer steelhead programs (Table 6) would not need to be implemented because
32 the hatchery programs would no longer be operated.

34 NMFS identified a number of risks to natural populations from hatchery programs (Table 14). Of
35 the risks, NMFS determined that, within the action area, ESA-listed steelhead would be affected
36 by, and take would occur due to, water withdrawals, facility structures, broodstock collection,
37 outbreeding effects from stray program hatchery salmon and steelhead, competition and
38 predation as a result of the release of hatchery juveniles into the Sandy River, and from
39 monitoring and evaluation activities (Table 14). Although these effects are related to the
40 implementation of the Proposed Action, a comparative analysis under the No-action Alternative
41 is provided below.

43 **Facility Effects**

44 Potential impacts from facility effects are described under Subsection 4.1, Potential Hatchery
45 Effects. Any impacts of the operation of the Sandy Hatchery and the removal of water for the
46 hatchery and the acclimation pond would be eliminated under the No-action Alternative. The

removal of the weir and intake structure at the Sandy Hatchery on Cedar Creek would eliminate any potential impacts of facility effects due to passage delay of adults and juvenile salmonids and impingement by juvenile fish. Under the No-action Alternative, the hatchery winter steelhead and summer steelhead programs would no longer be operated, and there would not be a need for the adult weir and intake structure at the Sandy Hatchery on Cedar Creek. The removal of these structures would be expected to provide a benefit to winter steelhead because the adult winter steelhead destined for Cedar Creek would not be delayed by the adult weir and intake structure and juvenile winter steelhead would not be potentially harmed by the intake screen. Impacts on the overall Sandy River winter steelhead population would be minimal because winter steelhead spawning and rearing in Cedar Creek is only a small proportion of the larger Sandy River population.

Fish Removal

Potential impacts from fish removal are described under Subsection 4.1, Potential Hatchery Effects. Impacts from the collection and handling of natural-origin winter steelhead that volunteer into the Sandy Hatchery would not occur under the No-action Alternative because winter steelhead would not be collected for broodstock at the Sandy Hatchery. Cessation of the summer steelhead program would not affect how summer steelhead broodstock would be collected outside the action area.

Genetics

Potential impacts from genetic effects are described under Subsection 4.1, Potential Hatchery Effects. The elimination of the proposed winter steelhead and summer steelhead programs under the No-action Alternative would eventually reduce the number of hatchery steelhead that could potentially interbreed with natural-origin adults, reducing or eliminating genetic impacts on the natural winter steelhead population in the Sandy River. If the winter steelhead and the summer steelhead hatchery programs were eliminated, as would occur under the No-action Alternative, hatchery adults still in the marine environment would be expected to return over a number of years, contributing to the number of hatchery steelhead that could potentially interbreed with the natural-origin winter steelhead population in the Sandy River for several years; after those adults have returned, there would be no more impacts from the adults of this program. Impacts from interbreeding was identified as a limiting factor for the winter steelhead population in the Sandy River (ODFW 2010)(Subsection 3.3.3, Sandy River Winter Steelhead), but these impacts are currently at levels lower than the 10 percent goal identified in the Recovery Plan (ODFW 2010). This low level of impact would be eliminated under the No-action Alternative. Straying of hatchery steelhead from other programs from outside the action area still may occur, but would be expected to be at levels below the 10 percent goal (ODFW 2010) and probably less than the 5 percent proportion that was identified as having no effect by Grant (1997) (Subsection 4.1, Potential Hatchery Effects,).

Ecological Interactions

Potential impacts from ecological interactions are described under Subsection 4.1, Potential Hatchery Effects. No effects of competition between hatchery juveniles and natural-origin juveniles in the action area would be expected under the No-action Alternative because hatchery

juveniles would no longer be released into the Sandy River Basin. Competition may still occur between natural-origin winter steelhead and naturally produced summer steelhead juveniles in the Sandy River Basin, because summer steelhead spawn prior to winter steelhead spawning and, as a result, summer steelhead juveniles have a size advantage over winter steelhead juveniles. This size advantage would be expected to impact the natural-origin winter steelhead juveniles, though this impact would be expected to be small. To the extent that the release of hatchery summer steelhead contributes to this natural production of summer steelhead, then the elimination of that program under the No-action Alternative would be expected to reduce impacts on winter steelhead due to competition.

No effects of predation by hatchery juveniles on listed juveniles would be expected under the No-action Alternative because hatchery juveniles would no longer be released into the Sandy River Basin.

Monitoring and Evaluation

Potential impacts from monitoring and evaluation are described under Subsection 4.1, Potential Hatchery Effects. Under the No-action Alternative, monitoring the effects of the hatchery program on the natural populations would not occur because the hatchery programs would not be operated. However, monitoring and evaluation activities (e.g., spawning ground surveys) would be expected to continue in the Sandy River Basin to monitor the status and recovery of the listed populations in the basin (Subsection 2.2.3, Sandy River Winter Steelhead Program) and as part of the Bull Run Water Supply HCP (Subsection 1.6, Relationship to Other Plans and Policies) (NMFS 2008a). These monitoring and evaluations activities would continue to impact listed species due to the handling of listed adults and juveniles and from the operation of a screw trap in Cedar Creek to monitor the recolonization of habitat above the Sandy Hatchery. All of these activities would be consistent with the general guidelines developed by NMFS to reduce impacts when collecting adults and juveniles.

4.3.1.4 Columbia River Chum Salmon

The lack of hatchery programs under the No-action Alternative would be expected to have no effect on Sandy River chum salmon because they are not currently present in the Sandy River. Future reintroduction or recolonization of the Sandy River by chum salmon might be benefited by the absence of hatchery programs currently operating in the Sandy River, eliminated under the No-action Alternative. However, this effect would be small, if at all measurable; as described in Subsection 3.3.4, Columbia River Chum Salmon, the survival and growth of juvenile chum salmon depends less on freshwater conditions than on favorable estuarine and ocean conditions (Subsection 3.3.4, Columbia River Chum Salmon). These factors occur outside the action area and would not be affected under the No-action Alternative.

The cessation of hatchery operations under the No-action Alternative would have no effect on the extirpation of the chum salmon from the Sandy River, because chum salmon are already extirpated in the Sandy River. The cessation of hatchery operations under the No-action Alternative would have little or no effect on critical habitat because it occurs outside the action area. The Recovery Plan (ODFW 2010) did not identified any key limiting factors for Sandy River chum salmon other than those associated with the Columbia River estuary, which is

outside the action area (Subsection 1.6, Relationship to Other Plans and Policies). Secondary limiting factors affecting habitat include impaired upstream passage, altered hydrologic process and/or reduce water quantity, and excessive fine sediment, none of which would be reduced by the closure of hatchery programs. Barriers at road crossings would continue to impede chum salmon passage in several lower Sandy River tributaries, including culverts on Beaver and Buck Creeks in the lower Sandy watershed. Altered hydrologic process and/or reduced water quantity due to land use practices on upland slopes would remain a concern for all Columbia River chum salmon populations. Passage impediments due to the hatchery intake structure and adult weir would be removed, thus potentially improving the likelihood of success of re-introduction of, or re-colonization by, the Sandy River chum salmon population.

The recovery goal for the Sandy River population of chum salmon, as described in the Recovery Plan (Subsection 1.6, Relationship to Other Plans and Policies) (ODFW 2010), is for the population to be at a low risk of extinction (less than 5 percent probability). An abundance goal was not established for this population. The Recovery Plan did not identify any hatchery recovery actions for the Sandy River chum salmon population other than improving passage at the Sandy Hatchery intake and adult weir on Cedar Creek (ODFW 2010). Under the No-action Alternative impacts would be expected to be reduced (if chum salmon are present in Cedar Creek), because the adult weir and intake structures would not be operated. Even without the hatchery programs under the No-action Alternative, the reduction in impacts are not likely to affect the possibility of recovering chum salmon in the Sandy River Basin. The Sandy River chum salmon population would remain extremely depressed or functionally extirpated under the No-action Alternative.

4.3.1.5 Pacific Eulachon

The cessation of the proposed hatchery programs would result in a reduction in the risk of predation and competition on eulachon by hatchery salmon and steelhead in the Sandy River, at least over the near term. With the elimination of the hatchery programs under the No-action Alternative, impacts of hatchery-origin salmon on eulachon would decline and gradually disappear with the elimination of returning adults from the programs, but, over the long term, the effects of natural-origin salmon and steelhead on eulachon would be expected to continue (Subsection 3.3.5, Pacific Eulachon), and the overall adverse impact may increase because the hatchery programs are limiting the natural production of salmon and steelhead.

Under the No-action Alternative, the essential physical and biological features affecting spawning and incubation in the lower Sandy River Basin below Gordon Creek (RM 12.8) that were designated as critical habitat for the southern DPS would not be affected. The lack of hatchery programs in the Sandy River under the No-action Alternative would not be expected to have any effect on factors impacting the southern eulachon DPS, such as bycatch in shrimp trawl fisheries, climate change, or actions by the Oregon and Washington Joint State Eulachon Management Plan (Subsection 1.6, Relationship to Other Plans and Policies-) (WDFW and ODFW 2001). Because eulachon life histories are typically lived out in areas of the Sandy River Basin downstream of the structures associated with the Proposed Action (Subsection 2.2.1, Sandy River Spring Chinook Salmon Program), eulachon would not benefit from any improvements to habitat and migratory access that might accrue as a result of the absence of those structures under the No-action Alternative.

4.3.1.6 Bull Trout

The lack of hatchery programs under the No-action Alternative would be expected to have no effect on Sandy River bull trout because they are not currently present in the Sandy River. Impacts from the lack of hatchery programs on the future introduction or recolonization of the Sandy River by bull trout may be detrimental because hatchery juveniles and hatchery adult carcasses are prey to bull trout (USWFS 2002). The impacts are expected to be minor because natural-origin salmon and steelhead would be available as prey. Hatchery salmon and steelhead may also compete with bull trout juveniles, but this is expected to be minor due to habitat preferences between the different species. Further these interactions would not occur under the No-action Alternative. Under the No-action Alternative the lack of hatchery programs would not be expected to limit research needed to determine bull trout distribution, limiting factors, or habitat needs in the Sandy River (Subsection 3.3.6, Bull Trout).

4.3.2 Alternative 2 (Proposed Action) – Approve the HGMPs under limit 5 of the 4(d) Rule

4.3.2.1 Sandy River Spring Chinook Salmon

Impacts on the life history characteristics of the three Chinook salmon populations in the Sandy River would not be expected to change under the Proposed Action. For the tule fall Chinook salmon and late-fall Chinook salmon populations, impacts on life history characteristics would be similar to the No-action Alternative. The spring Chinook salmon program may impact the life history characteristics of the natural-origin spring Chinook salmon population, but these impacts are expected to be minimal because the hatchery spring Chinook salmon were derived from the natural-origin Sandy River spring Chinook salmon population, and the program has incorporated natural-origin spring Chinook salmon into the broodstock to maintain similarities between the hatchery and natural-origin spring Chinook salmon. However, over the long term, the spring Chinook salmon program under the Proposed Action may impact the life history characteristics of the natural-origin spring Chinook salmon population because natural-origin spring Chinook salmon are no longer used for broodstock and as a result of the hatchery spring Chinook salmon continuing to interbreed with the natural population.

The listing status and risk categories for the three Chinook salmon populations in the action area (Table 1) are not expected to change under the Proposed Action, and there may be a benefit under this alternative because the proposed hatchery programs are increasing risks to these populations. Under the Proposed Action the impacts of the proposed hatchery programs would not be expected to change the risk categories for the tule fall Chinook salmon population or the late-fall Chinook salmon population because impacts from the proposed hatchery programs would be minor, and the majority of the limiting factors for these populations would not be affected by the proposed hatchery programs. However, the spring Chinook salmon program would be expected to have a beneficial impact on the natural-origin Sandy River spring Chinook salmon population relative to current impacts if the proposed actions for the spring Chinook salmon hatchery program are successful in reducing the proportion of hatchery spring Chinook spawning naturally, thus reducing impacts on the natural population (Subsection 4.1, Potential

1 Hatchery Effects). To the extent that the impacts on the natural-origin population are reduced,
2 then escapement would be expected to increase over current levels (Table 3).

3
4 The operation of the hatchery programs under the Proposed Action would not be expected to
5 have any impact on the anchor habitat or spawning areas for the Sandy River spring Chinook
6 salmon because ~~the hatchery programs would not affect habitat in the action area~~except for the
7 installation and operation of the proposed weirs. The weirs would be expected to have a minor
8 impact on the habitat because they are temporary, disturb a limited area, and are operated to
9 minimize delay in migration. In contrast, these impacts would not be expected to occur under
10 the No-action Alternative. As described under the No-action Alternative, there are a number of
11 key limiting factors affecting designated critical habitat for the spring Chinook salmon
12 population in the Sandy River. Impacts on these limiting factors would be expected to be the
13 same under the Proposed Action as under the No-action Alternative, because the proposed
14 hatchery programs would not directly impact habitat. However, hatchery spring Chinook salmon
15 interbreeding with natural-origin spring Chinook salmon in the Sandy River was identified as a
16 limiting factor and is directly related to the operation of the proposed spring Chinook salmon
17 program under the Proposed Action. Under the Proposed Action, the proportion of hatchery
18 spring Chinook salmon that could potentially interbreed with the natural-origin adults would be
19 reduced thus reducing impact associated with this limiting factor. Under the Proposed Action,
20 the proposed spring Chinook salmon program includes measures that are designed to reduce the
21 proportion of hatchery spring Chinook salmon that could spawn naturally and thus would be
22 expected to have impacts similar to those for the No-action Alternative.

23
24 The recovery goal for the Sandy River spring Chinook population would not change under the
25 Proposed Action (Subsection 1.6, Relationship to Other Plans and Policies) (ODFW 2010), and
26 recovery actions would continue to be implemented similar to what would be expected under the
27 No-action Alternative. The difference between the two alternatives would be that the hatchery
28 recovery actions related to the Sandy River spring Chinook salmon program (Table 4) that would
29 not need to be implemented under the No-action Alternative would, however, need to be
30 implemented under the Proposed Action.

31
32 Two of the five hatchery related recovery actions in Table 4 have already been implemented, one
33 is under review, one addresses illegal diversions in Cedar Creek impacting Cedar Creek, and one
34 would be implemented as part of the Proposed Action. Under the Proposed Action the hatchery
35 recovery actions would be expected to reduce impacts to Sandy River spring Chinook salmon but
36 these impacts would not be expected to occur under the No-action Alternative.

37
38 As described in Subsection 4.1, Potential Hatchery Effects, NMFS identified a number risks to
39 natural populations from hatchery programs (Table 14). Out of all of these risks, NMFS has
40 determined that, within the action area, ESA-listed species would be affected and take would
41 occur as a result of the Proposed Action due to water withdrawals, facility structures, broodstock
42 collection, outbreeding effects from stray program hatchery salmon and steelhead, competition
43 and predation as a result of the release of hatchery juveniles into the Sandy River, and from
44 monitoring and evaluation activities (Table 14).

Facility Effects

Potential impacts from facility effects are described under Subsection 4.1, Potential Hatchery Effects. Hatchery intakes would be screened to prevent fish injury from impingement or permanent removal from streams. The impacts of water removal on water quality and water quantity are described above in Subsection 4.2.2, Water Quality and Water Quantity. The operation of the adult weir and intake structure at the Sandy Hatchery on Cedar Creek would not be expected to impact natural-origin spring Chinook salmon because Cedar Creek does not contain spring Chinook salmon spawning or rearing habitat and thus the impacts would be the same as those under the No-action Alternative.

Under the Proposed Action, the only impacts from the operation of the acclimation pond at the former Bull Run Powerhouse would be from the pumping of approximately 450 to 600 gallons of water per minute to rear the juvenile hatchery spring Chinook salmon during acclimation. The impacts of this pumping are expected to be minor because the pump would be screened to meet NMFS criteria, the water would be returned to the same pool where it was removed, and the pond would be operated during periods of high flows in the Bull Run River. The impacts from the operation of the acclimation pond are discussed above in Subsection 4.2.2, Water Quality and Water Quantity, and are expected to be minimal but would be an impact that would not occur under the No-action Alternative.

Fish Removal

Potential impacts from fish removal are described under Subsection 4.1, Potential Hatchery Effects. Under the Proposed Action the primary method for spring Chinook salmon broodstock collection and adult management (i.e., the removal of adult hatchery fish to control the proportion of hatchery adults spawning naturally) would be through the use of weirs, and from volunteers back to the Sandy Hatchery, though seines may be employed as well. It is not anticipated that other methods (e.g., hook and line, gillnets or snorkeling) would be used in the future to collect spring Chinook salmon adults, the collection of broodstock would not occur under the No-action Alternative.

Under the Proposed Action, weirs would be installed at the mouth of Cedar Creek, in the Zigzag River, the Salmon River, and the Bull Run River. These weirs would be installed and generally operated annually from early June to the end of September. These weirs would be operated to collect spring Chinook salmon broodstock and to control the proportion of hatchery spring Chinook salmon spawning naturally.

The affects and impacts of weirs and operation described under Subsection 4.1, Potential Hatchery Effects, would occur at the proposed weir locations in the action area. However, during trapping operations at weirs in 2011, no direct mortalities, of those natural-origin adults handled at the weirs, were observed (Zweifel 2011a).

Affects associated with weirs (Subsection 4.1, Potential Hatchery Effects) such as passage delay and changes in spawning distribution are expected to be mitigated through proper weir design, the use of trained personnel, and operations that minimize the time spring Chinook salmon are held or delayed at the weirs (Subsection 2.2.1, Sandy River Spring Chinook Salmon Program).

1 Monitoring associated with spawning ground surveys would be used to determine if the presence
2 of the weirs were causing natural-origin spring Chinook salmon to spawn downstream of the
3 weirs (Subsection 2.2.1, Sandy River Spring Chinook Program).

4
5 Under the Proposed Action, the installation of the weirs in Cedar Creek, the Zigzag River, the
6 Salmon River, and the Bull Run River in early June could potentially lead to the handling of the
7 majority of natural-origin spring Chinook salmon returning to the Sandy River Basin. Indications
8 that the handling of natural-origin adults at the weirs could contribute to pre-spawning mortality
9 would be observed through the evaluation of carcasses recovered during spawning ground
10 surveys (Schroeder et al. 2008). ODFW estimates that if all of the weirs were operated, up to
11 2,750 natural-origin spring Chinook salmon could be handled (Alsbury 2011; ODFW 2011a).
12 The estimated number of natural-origin spring Chinook salmon that could be handled is
13 conservative and assumes that the natural-origin population has exceeded its recovery abundance
14 goal of 1,230 adults (ODFW 2010), but does reflect the large return of natural-origin adults seen
15 in 2008 (Table 3). ODFW (2011a) conservatively estimates that less than 1 percent of these
16 spring Chinook salmon would be indirect mortalities. However, even with this level of handling,
17 the operation of the weirs would contribute to an increase in delayed mortality and a
18 corresponding reduction in the total number of natural-origin adults spawning naturally
19 compared to the No-action Alternative.

20
21 Under the Proposed Action, seining may be used to augment the collection of hatchery spring
22 Chinook salmon that would occur at the proposed weirs. Delay and handling impacts would be
23 expected from seining, but are expected to be similar to what has been observed in the past, which
24 was consistently a minor level of impact resulting from seining (Schroeder 2008; Straw 2010;
25 Alsbury 2011; Zweifel 2011b; Alsbury 2012). These impacts would not be expected to occur
26 under the No-action Alternative because the seines and weirs would not be needed to collect
27 broodstock or remove hatchery adults. Additionally, to minimize the handling of natural-origin
28 spring Chinook salmon, ODFW has also proposed to not biologically sample (e.g., mark, tag,
29 collect tissues samples) natural-origin spring Chinook salmon handled at the weirs (Subsection
30 2.2.1, Sandy River Spring Chinook Salmon Program).

31
32 The level of impacts on natural-origin spring Chinook salmon from the operation of the weirs
33 and the use of seines would be expected to be lower than that observed for past adult handling at
34 Marmot Dam (pre-2007), and less than the number of natural-origin adults that were removed
35 annually for broodstock. The actual number of mortalities from the operation of all the weirs
36 under the Proposed Action, though unknown, would be expected to be low, but still would be
37 more than what would be observed under the No-action Alternative.

38
39 Under the Proposed Action, adult spring Chinook salmon would also be collected at the Sandy
40 Hatchery for broodstock. During broodstock collection activities at the Sandy Hatchery, ODFW
41 estimates that potentially up to 50 natural-origin (un-marked) spring Chinook salmon would be
42 handled during broodstock collection activities. These adults would be transported and released
43 in the upper Sandy River Basin because there is no suitable habitat for spring Chinook salmon in
44 Cedar Creek. Impacts from the handling and transport of these natural-origin spring Chinook
45 salmon would be similar to those for spring Chinook salmon collected at the weirs (e.g., delayed

migration, handling, pre-spawning mortality) and these impacts would not occur under the No-action Alternative.

Genetics

Potential impacts from genetic effects are described under Subsection 4.1, Potential Hatchery Effects. The relatively high proportion of hatchery produced spring Chinook salmon spawning naturally was identified as a limiting factor for the Sandy River spring Chinook salmon population in the Recovery Plan (ODFW 2010)(see Subsection 1.6, Relationship to Other Plans and Policies). To achieve delisting goals for this population, the proportion of hatchery spring Chinook spawning naturally would need to be less than 10 percent of the all the spring Chinook salmon spawning naturally. NMFS generally applies the Grant (1997) guideline that hatchery strays should be managed such that less than 5 percent of the naturally spawning population consists of non-local hatchery fish. The hatchery proportion of less than 10 percent, identified as necessary to meet delisting goals for the naturally spawning population (ODFW 2010), reflects the similarity between the hatchery and natural-origin spring Chinook salmon in the Sandy River.

Under the Proposed Action, a number of actions would be implemented to minimize the potential genetic effects of hatchery spring Chinook salmon interbreeding with the natural-origin population in the Sandy River, these effects would not be expected to occur under the No-action Alternative because hatchery spring Chinook salmon would not be produced. In the past, the proportion of hatchery adults that could potentially spawn naturally was controlled through the removal of hatchery adults at Marmot Dam until the dam's removal in 2007. Since that time, the proportion of hatchery spring Chinook salmon spawning naturally has reached nearly 80 percent (Table 3). After the removal of Marmot Dam, seining activities were implemented with the twin goals of collecting adults for broodstock and to reduce the proportion of hatchery spring Chinook salmon spawning naturally. Under the Proposed Action, broodstock collection and removal of hatchery adults to reduce impacts from interbreeding, which would not occur under the No-action Alternative, would be achieved through the use of weirs in Cedar Creek, the Zigzag River, the Salmon River, and the Bull Run River.

The timing and operation of the weirs in 2011 have shown that they were successful in collecting and removing hatchery adults (Zweifel 2011a). In 2011, ODFW-operated weirs collected 420 hatchery adult spring Chinook salmon that could have spawned naturally. The total number of spring Chinook salmon collected occurred over a reduced period, with the weirs operating from August 1 to September 20 in the Zigzag, from September 14 to September 20 in the Salmon River, and July 20 to September 7 (this weir was moved from Cedar Creek to the Salmon River). Under the Proposed Action, these weirs would be installed as early as June 1 and operate until the end of September or when natural-origin coho salmon return. In addition to these weirs, ODFW is proposing to annually install and operate a weir in the Bull Run River. The goal for all of these weirs would be to remove enough of the returning hatchery adults that are not harvested in the recreational fisheries, to achieve the less than 10 percent hatchery-origin spring Chinook salmon in the spawning population (ODFW 2010). The collection of 420 hatchery spring Chinook salmon adults using weirs in 2011 is more than double the 192 collected in 2010 using seines alone. However, even with the removal of hatchery spring Chinook salmon in 2011, the proportion of hatchery spring Chinook salmon in the naturally spawning population was

1 estimated to be 61 percent (Alsbury 2012). This estimate is a decline from the proportion of
2 hatchery spring Chinook salmon estimated in 2010 (75.7 percent), but is well above the
3 Recovery Plan goal of 10 percent.

4
5 The acclimation of spring Chinook salmon smolts prior to release would be another activity,
6 under the Proposed Action, that is designed to increase homing (relating to the ability to return
7 home after travelling great distances) back to the release location reducing the potential for
8 hatchery spring Chinook salmon to stray. As described for the Proposed Action (Subsection
9 2.2.1, Sandy River Spring Chinook Salmon Program), ODFW ~~proposes to would~~ release all
10 ~~proportion~~ of the spring Chinook salmon production from ~~a-the~~ temporary acclimation pond at
11 the old Bull Run Powerhouse. The goal ~~for this release~~ would be to have these fish home back to,
12 and stay in, the Bull Run River. The Bull Run River would be expected to have flows and cooler
13 water temperatures during the summer months to attract and hold the hatchery spring Chinook
14 salmon, ~~exposing them to greater harvest, and~~ reducing their inclination to migrate up into the
15 natural spawning areas in the upper Sandy River Basin. This was also the reason why hatchery
16 spring Chinook salmon were acclimated at the Sandy Hatchery; however, when the adults return
17 to the Sandy Hatchery, flows in Cedar Creek are not enough to keep hatchery spring Chinook
18 salmon from migrating into the upper Sandy River Basin. ~~It is expected to take at least 2 years~~
19 ~~after the first release of smolts to see if there is an increase in the proportion of hatchery spring~~
20 ~~Chinook salmon returning to the Bull Run River. The weir in the Bull Run River would be~~
21 ~~installed in 2013 to intercept and trap these returning hatchery spring Chinook salmon.~~

22
23 Genetic impacts under the Proposed Action would be expected to decrease over time if the above
24 actions to reduce the proportion of hatchery spring Chinook salmon spawning naturally are
25 successful. Genetic impacts under the Proposed Action would be expected to be slightly greater
26 than those under the No-action Alternative and lower than those that ~~what has~~ been
27 observed recently. It would take a number of years to determine whether the acclimation and
28 release of hatchery spring Chinook salmon at the Bull Run acclimation pond would reduce the
29 proportion of hatchery spring Chinook salmon reaching the primary spawning areas in the upper
30 Sandy River Basin. It is also uncertain whether the installation and operation of the weirs under
31 the Proposed Action would be enough to reduce the number of hatchery spring Chinook salmon
32 that could potentially spawn naturally to achieve the less than 10 percent hatchery spawner goal.
33 It would be expected that, if the goal is not achieved under the Proposed Action, or if impacts
34 from the handling of natural-origin spring Chinook salmon causes increased pre-spawning
35 mortality, then additional actions would be needed, such as ~~releasing more juveniles at the Bull~~
36 ~~Run acclimation pond or~~ reducing the total number of hatchery spring Chinook salmon released
37 into the basin. These additional actions may be able to achieve genetic impacts similar to those
38 under the No-action Alternative.

39 40 **Ecological Interactions**

41 Potential impacts from ecological interactions are described under Subsection 4.1, Potential
42 Hatchery Effects. The Proposed Action attempts to minimize competitive interactions and
43 predation through the following steps:

- 44
45 • All hatchery salmon and steelhead would be released into Cedar Creek or at the Bull Run
46 acclimation pond (for spring Chinook salmon), where it is believed there would be minimal

1 overlap with natural-origin juvenile winter steelhead, coho salmon, and spring Chinook
2 salmon rearing habitat.

- 3
- 4 • All hatchery salmon and steelhead smolts would be reared to and released at a size that is
5 optimal for rapid emigration from Cedar Creek and the Sandy River.
- 6
- 7 • All hatchery salmon and steelhead would be acclimated for a minimum 2 to 3 week period to
8 promote adult homing and improved emigration.
- 9
- 10 • All hatchery salmon and steelhead would be released downstream of the primary natural
11 production areas.
- 12

13 As described above, hatchery salmon and steelhead would typically be released from the holding
14 ponds by removing the screens and lowering the water level to facilitate a gradual release and
15 dispersed downstream migration of smolts. Fish would be allowed to volitionally migrate from
16 the pond for a 24-hour period. After 24 hours, water levels in the pond would be gradually
17 dropped further to promote migration. After 48 hours, water levels would be dropped fully and
18 any remaining fish are transported to Cedar Creek. These operations would reduce the risks that
19 may result from releasing all the hatchery production at one time, spreading out the release over
20 a longer period than if the fish were forced out of the hatchery all at once. Observations show
21 that the salmon and steelhead smolts are ready to actively migrate, with 80 to 90 percent of the
22 smolts volitionally migrating in the first 24 hours and the majority of the remainder by the end of
23 the 48 hours (ODFW 2011c). Generally, fewer than 1,000 smolts remain after 48 hours. ODFW
24 proposes to investigate retaining the juvenile summer and winter steelhead that do not emigrate
25 and using these to support trout fisheries in standing water bodies. This approach would reduce
26 the potential for these fish to residualize and adversely interact with natural-origin juveniles in
27 the lower Sandy River. Even with these actions to reduce the potential for competition between
28 hatchery juveniles and natural-origin Chinook salmon under the Proposed Action, these impacts
29 (which would not occur under the No-action Alternative) would still occur, though such impacts
30 would be small.

31

32 The release of hatchery smolts into areas that contain natural-origin juveniles would lead to
33 direct predation (direct consumption) or indirect predation (increases in predation by other
34 predator species due to enhanced attraction). In general, naturally produced salmonid
35 populations would be most vulnerable to predation from hatchery juveniles when naturally
36 produced populations are depressed and predator abundance is high, in small streams, where
37 migration distances are long, and when environmental conditions favor high visibility.

38

39 Under the Proposed Action, hatchery spring Chinook salmon smolts would continue to be
40 released in March, winter and summer steelhead smolts by the end of April, and coho salmon
41 smolts by the middle of May. Coho salmon and steelhead smolt releases in April and May would
42 possibly overlap with fall Chinook salmon fry emerging and rearing in the lower Sandy River.
43 The actual level of predation of natural-origin juveniles by hatchery smolts is unknown;
44 however, the activities described under the Proposed Action, including producing hatchery fish
45 that are at a size and condition to be fully smolted, acclimating the fish prior to release, and
46 allowing the fish to volitionally emigrate would be expected to reduce the potential for

1 interactions and predation on natural-origin juveniles in the lower Sandy River. Predation and
2 competition between hatchery smolts and naturally rearing juveniles would be further reduced
3 through the natural separation between the two groups due to differences in habitat preferences
4 because full smolted hatchery juveniles tend to migrate in the deeper, faster-moving water while
5 the naturally rearing juveniles would be found in the shallower stream margins. Even with these
6 measures, predation would be expected to occur but at a low level under the Proposed Action,
7 these impacts would not be expected to occur under the No-action Alternative.
8

9 **Monitoring and Evaluation**

10 Potential impacts from monitoring and evaluation are described under Subsection 4.1, Potential
11 Hatchery Effects. Monitoring and evaluation activities to determine impacts on listed fish from
12 hatchery programs can themselves have potential adverse impacts on listed fish through injuries
13 incurred during sampling and marking. The discussion in Subsection 4.1, Potential Hatchery
14 Effects, describes the criteria used to evaluate hatchery programs, and to determine if
15 management actions are adequate to reduce or minimize impacts on listed populations. Under
16 the Proposed Action, monitoring the effects of the hatchery programs on the natural populations
17 would be expected to occur. **The monitoring of impacts from hatchery spring Chinook salmon**
18 **spawning naturally and from the operation of weirs would be used to determine what changes, if**
19 **necessary, to the hatchery program could be implemented as part of the adaptive management**
20 **actions identified in the HGMP.** As described under the No-action Alternative, monitoring and
21 evaluation activities (e.g., **spawning ground surveys**) would be expected to continue in the Sandy
22 River Basin to monitor the status and recovery of the listed populations in the basin (**Subsection**
23 **2.2.1, Sandy River Spring Salmon Program**) and as part of the Bull Run Water Supply HCP
24 (Subsection 1.6, Relationship to Other Plans and Policies) (NMFS 2008a). These monitoring and
25 evaluations activities would continue to impact listed species due to the handling of listed adults
26 and juveniles and from the operation of a screw trap in Cedar Creek to monitor the
27 recolonization of habitat above the Sandy Hatchery. All of these activities would be consistent
28 with the general guidelines developed by NMFS to reduce impacts when collecting adults and
29 juveniles, but impacts would still be expected to occur under the Proposed Action and would be
30 the same as under the No-action Alternative.
31

Summary of Risk Effects

Based on the discussion above, under the Proposed Action, the release of hatchery salmon and steelhead would be expected to have impacts on listed salmon and steelhead in the Sandy River Basin. Impacts on spring Chinook salmon would occur from the collection of broodstock and the removal hatchery adults, which may handle a substantial proportion of the natural-origin adults returning to the basin. Impacts from handling at weirs are expected to be low based on past observed mortalities and spawning ground surveys, and these spawning ground surveys are expected to continue to monitor the effects of weir operation on natural-origin spring Chinook salmon. Genetic impacts from naturally spawning hatchery spring Chinook salmon would be expected to decrease as more of the hatchery spring Chinook salmon are removed at the weirs and more fish return to the Bull Run River. The release of hatchery coho salmon and steelhead may contribute to predation prey on emergent and rearing fall Chinook salmon in the lower Sandy River; however, it is expected that this impact would be low because of the actions taken to produce smolts that emigrate rapidly from the basin, minimizing the encounter rates, and because the smolts and juvenile salmon occupy non-overlapping habitats in the lower mainstem Sandy River. Impacts on Chinook salmon are expected to be low, if the removal of hatchery spring Chinook salmon is successful and impacts from the handling of adult spring Chinook salmon remain low. The impacts are expected to be lower than what is currently observed, but would still be greater than what would occur under the No-action Alternative. Under the Proposed Action, reduced impacts may contribute to lowering the risk of extinction for the Sandy River spring Chinook salmon population but would not be expected to have an effect on the very high risk of extinction for the LCR Chinook Salmon ESU as a whole because of factors affecting the ESU outside the action area.

4.3.2.2 Sandy River Coho Salmon

Impacts on the life history characteristics of the coho salmon population in the Sandy River would not be expected to change under the Proposed Action compared to the No-action Alternative. The proposed coho salmon program could impact the life history characteristics of the natural-origin coho salmon population, but these impacts are expected to be minimal over the near term because the hatchery coho salmon were derived from the natural-origin Sandy River coho salmon population. However, over the long term, the coho salmon program under the Proposed Action may adversely impact the life history characteristics of the natural-origin coho salmon population because natural-origin coho salmon have not been used for broodstock, and hatchery coho salmon may interbreed with the natural population. These are impacts that would not be expected to occur under the No-action Alternative.

The biological risk categories identified in Ford (2011) concluded that the LCR Coho Salmon ESU is at very high risk of extinction, however the Sandy River coho salmon population was considered to be at high to moderate risk of extinction. These risks are not expected to change under the Proposed Action, but there may be an impact because the current hatchery programs are increasing risks to the Sandy River population, though these are small. To the extent that impacts under the Proposed Action are reduced, then escapement would be expected to increase above current levels (Table 3).

1 The operation of the hatchery programs under the Proposed Action would not be expected to
2 have any impact on the anchor habitat or spawning areas for the Sandy River coho salmon
3 because the hatchery programs do not affect habitat. The operation of the adult weir located on
4 Cedar Creek at the Sandy Hatchery limited access above the weir in the past. Access to habitat in
5 Cedar Creek above the Sandy Hatchery has been provided to coho salmon addressing this
6 limiting factor, and access would be expected to continue under the Proposed Action. Impacts
7 on key limiting factors, such as reduced habitat complexity and diversity, and access to off-
8 channel habitats (Subsection 3.3.2, Sandy River Coho Salmon), would be expected to continue
9 due to factors not associated with the Proposed Action, as would be expected under the No-
10 action Alternative.

11
12 The recovery goal for the Sandy River population of coho salmon, as described in the Recovery
13 Plan (Subsection 1.6, Relationship to Other Plans and Policies) (ODFW 2010), is for the
14 population to be at low risk of extinction (less than 5 percent probability of extinction) with an
15 annual abundance of 5,685 natural-origin adults. Under the Proposed Action recovery actions
16 described in the Recovery Plan (ODFW 2010) would be expected to continue and the actions
17 specifically identified for the Sandy Hatchery the coho salmon program (Table 5) would be
18 implemented. The difference between the two alternatives would be that the hatchery recovery
19 actions related to the Sandy River coho salmon program (Table 5) that would not need to be
20 implemented under the No-action Alternative would need to be implemented under the Proposed
21 Action. However, there would be little difference between the two alternatives because the
22 hatchery recovery action for the Sandy Hatchery coho salmon program has already been
23 implemented (Table 5).

24
25 As described in Subsection 4.1, Potential Hatchery Effects, NMFS identified a number risks to
26 natural populations from hatchery programs (Table 14). Out of all of these risks, NMFS has
27 determined that, within the action area, ESA-listed species would be affected by, and take would
28 occur as a result of, the Proposed Action due to water withdrawals, facility structures, broodstock
29 collection, outbreeding effects from stray program hatchery salmon and steelhead, competition
30 and predation as a result of the release of hatchery juveniles into the Sandy River, and from
31 monitoring and evaluation activities (Table 14) – the potential effects of these activities are
32 discussed below.

33 34 **Facility Effects**

35 Potential impacts from facility effects are described under Subsection 4.1, Potential Hatchery
36 Effects. As described in the HGMPs and Subsection 2.2.2, Sandy River Coho Salmon Program,
37 the Sandy Hatchery intake on Cedar Creek ~~did not~~ ~~currently~~ meet NMFS guidelines (NMFS
38 2008b) for adult and juvenile passage. This would impact natural-origin coho salmon juveniles
39 produced in Cedar Creek from the release of unmarked coho salmon into upper Cedar Creek that
40 began in 2010. These juveniles would be expected to emigrate as smolts in the spring of 2012.
41 As described above in Subsection 4.2.1, Water Quality and Water Quantity, water quality and
42 quantity are not expected to be adversely affected by the operation of the hatchery intake, which
43 would be operated during a period of high flow when the smolts would be emigrating. However,
44 a small proportion of the natural-origin juveniles could impinge upon the intake screen ~~but~~ ~~–The~~
45 ~~potential for impingement~~ would only occur in 2012. Under the Proposed Action, construction,
46 that ~~is expected to be~~ ~~was~~ completed in 2012, ~~would have~~ upgraded the intake to meet current

NMFS ~~passage-screening~~ criteria. The upgrade ~~would-has~~ also included upstream and downstream passage facilities for both juvenile and adult coho salmon at the intake, further reducing potential impacts.

Under the Proposed Action, impacts on juvenile coho salmon would occur when the ~~water from flow in Cedar Creek is removed-reduced to provide water to rear the coho salmon at the Sandy Hatchery. These impacts would be expected to be the greatest during in-September-to begin coho salmon broodstock collection activities. During~~ September, when water flows in Cedar Creek ~~could be~~ tend to be at their lowest. Water ~~and water withdrawals-withdrawals~~ for the hatchery maybe limited to achieve minimum flows that would maintain juvenile passage through ~~could dewater~~ the section of Cedar Creek from the intake structure to the outfall at the adult trap. ~~This section of Cedar Creek would remain dewatered until rain events increase flows that exceed the quantity needed to operate the hatchery (approximately 1,700 gpm).~~ Juvenile coho salmon that may be present in ~~the dewatered~~ the by-pass section of Cedar Creek would be affected. Juvenile coho salmon abundance in this ~~dewatered~~ section would be expected to be low because water temperatures in that area become elevated during the summer months. ~~Monitoring of the dewater section to collect and remove stranded juvenile coho salmon would be expected to minimize any impacts on natural origin coho salmon juveniles.~~ Impacts from minimum flows would be expected to be temporary and would continue to occur until fall rain events increase flows in the ~~dewatered-by-pass~~ section of Cedar Creek. These impacts on juvenile coho salmon would be expected to be small because of the ~~measures-maintenance of minimum flows~~ to minimize impacts and due to the absence of coho salmon juveniles due to the elevated water temperatures in Cedar Creek below the intake structure. These impacts would not be expected to occur under the No-action Alternative because water would not need to be removed from Cedar Creek to operate the hatchery.

Fish Removal

Potential impacts from fish removal are described under Subsection 4.1, Potential Hatchery Effects. Under the Proposed Action, broodstock for the coho salmon program would be collected from volunteers back to the Sandy Hatchery. As described in Subsection 2.2.2, Sandy River Coho Salmon Program, water would be diverted from Cedar Creek into the hatchery beginning in September, dewatering the section of Cedar Creek from the intake structure to the adult holding pond outfall. This section of Cedar Creek would remain dewatered until rain events increase flows that exceed the quantity needed for the hatchery. Under the Proposed Action all coho salmon migrating up Cedar Creek would be diverted by the adult weir at the adult holding pond outfall, into the hatchery to allow for the collection of broodstock and to remove hatchery adults. Impacts would occur to natural-origin coho salmon due to handling when sorting hatchery and natural-origin adults. Additional impacts would be expected from transporting natural-origin coho salmon above the hatchery intake structure and the dewatered section. Under the Proposed Action these handling and transportation impacts would be expected to be minor because the natural-origin coho salmon are only held for a short time before being transported and the distance transported is small. Furthermore, impacts would be further reduced after water flows increase in Cedar Creek enough to allow for the release of natural-origin coho salmon directly into Cedar Creek above the adult weir. During broodstock collection activities at the Sandy Hatchery for coho salmon, ODFW estimates that potentially up to 600 natural-origin coho

salmon could be handled. ODFW (2011b) estimates that indirect mortality would result in a loss of up to 2 percent of the fish handled and transported during broodstock collection activities. This represents 12 more natural-origin coho salmon mortalities of the Sandy River coho salmon population in Cedar Creek than would occur under the No-action Alternative; the overall impact on the natural-origin population in the Sandy River would be small.

Under the Proposed Action, there would be the potential that, during the operation of the weirs to collect spring Chinook salmon broodstock, coho salmon could be handled. Impacts on coho salmon would occur on that proportion of the adult returns that enters the upper Sandy River prior to the end of September and prior to the removal of the weirs. ODFW proposes to use the observed presence of coho salmon as an indicator as to when to remove the weirs for the season. Impacts are expected to be low because very few coho salmon would be handled. For example, in 2011, one natural-origin coho salmon male was handled at the Zigzag weir, and one natural-origin coho salmon female at the Salmon River weir – both of these were released unharmed (Zweifel 2011a). No coho salmon were handled in 2010 during seining operations. These impacts from handling natural-origin coho salmon at the weirs during spring Chinook salmon broodstock collection activities would not be expected to occur under the No-action Alternative.

Genetics

Potential impacts from genetic effects are described under Subsection 4.1, Potential Hatchery Effects. Hatchery fish that stray into and successfully interbreed with a natural population would be expected to impact the natural population depending on the source of the strays and the proportion of the strays in the naturally spawning population. Natural spawning by hatchery coho salmon was not considered a limiting factor for the Sandy River coho salmon (ODFW 2010). Hatchery coho salmon were rarely observed above Marmot Dam and during spawning ground surveys (Table 3; ODFW 2011b); however, recent basin-wide surveys have observed hatchery coho salmon in the lower river tributaries of Gordon, Trout, and Beaver Creeks and below the hatchery in Cedar Creek. In 2010, spawning ground surveys estimated that the proportion of hatchery coho salmon in the naturally spawning population increased to 2412.4.2 percent (ODFW 2011b; Lewis et al. 2010); however, this may be an artifact of the assumptions used when estimating abundance from spawning ground surveys and may not represent the entire Sandy River population as a whole. The proportion of hatchery origin coho salmon in the naturally spawning population, as determined by spawning ground surveys, has been highly variable ranging from 0 to 2412.4.2 percent from 2008 to 2010 (Lewis et al. 2009; 2010; 2011). Preliminary estimates for 2011 indicate that the proportion of hatchery coho salmon spawning naturally declined to 5.9 percent (E. Brown, pers. comm., ODFW, February 6, 2012). The 45-year average (2008-2010) for the proportion of hatchery coho salmon spawning naturally as estimated from spawning ground surveys was 10.16.3 percent, and does not quite which achieves the Recovery Plan goal of less than 10 percent on the spawning grounds (Subsection 1.6, Relationship to Other Plans and Policies) (ODFW 2010). Because the proportion of hatchery coho salmon estimated to be spawning naturally is highly variable, monitoring and evaluation activities would be expected to continue (Subsection 2.2.2. Sandy River Coho Salmon Program) to determine if genetic impacts on the naturally spawning coho salmon population are at levels that meet the recovery goals for the Sandy River coho salmon population. If the recovery goals are achieved, then it can be expected that the impacts from the

coho salmon program under the Proposed Action would be low, but still greater than under the No-action Alternative.

Ecological Interactions

Potential impacts from ecological interactions are described under Subsection 4.1, Potential Hatchery Effects. The Proposed Action attempts to minimize competitive interactions and predation through the following steps:

- All hatchery salmon and steelhead would be released into Cedar Creek or at the Bull Run acclimation pond (for spring Chinook salmon), where it is believed there would be minimal overlap with natural-origin juvenile winter steelhead, coho salmon, and spring Chinook salmon rearing habitat.
- All hatchery salmon and steelhead smolts would be reared to and released at a size that is optimal for rapid emigration from Cedar Creek and the Sandy River.
- All hatchery salmon and steelhead would be acclimated for a minimum 2 to 3 week period to promote adult homing and improved emigration.
- All hatchery salmon and steelhead would be released downstream of the primary natural production areas.

As described above, the hatchery salmon and steelhead are typically released from the holding ponds by removing the screens and lowering the water level to facilitate a gradual release and dispersed downstream migration of smolts. Fish would be allowed to volitionally migrate from the pond for a 24-hour period. After 24 hours, water levels in the pond would be gradually dropped further to promote migration. After 48 hours, water levels would be dropped fully and any remaining fish are transported to Cedar Creek. These operations reduce the risks that would result from releasing all the hatchery production at one time, spreading out the release over a longer period than if the fish were forced out of the hatchery all at once. Observations show that the salmon and steelhead smolts are ready to actively migrate, with 80-90 percent of the smolts volitionally migrating in the first 24 hours and the majority of the remainder by the end of the 48 hours. Generally, fewer than 1,000 smolts remain after 48 hours. ODFW proposes to investigate retaining the juvenile summer and winter steelhead that do not emigrate and using these to support trout fisheries in standing water bodies. This approach would reduce the potential for these fish to residualize and adversely interact with natural-origin juveniles in the lower Sandy River. Even with these actions to reduce the potential for competition between hatchery juveniles and natural-origin coho salmon under the Proposed Action, impacts would still occur, and these impacts even though small would not be expected to occur under the No-action Alternative.

The release of hatchery smolts into areas that contain natural-origin juveniles would lead to direct predation (direct consumption) or indirect predation (increases in predation by other predator species due to enhanced attraction). In general, naturally produced salmonid populations would be most vulnerable to predation from hatchery juveniles when naturally

1 produced populations are depressed and predator abundance would be high, in small streams,
2 where migration distances are long, and when environmental conditions favor high visibility.

3
4 Under the Proposed Action, hatchery spring Chinook salmon smolts would continue to be
5 released in March, winter and summer steelhead smolts by the end of April, and coho salmon
6 smolts by the middle of May. The actual level of predation of natural-origin juveniles by
7 hatchery smolts is unknown; however, the actions described in the Proposed Action, including
8 producing hatchery fish that are at a size and condition to be fully smolted, acclimating the fish
9 prior to release, and allowing the fish to volitionally emigrate would be expected to reduce the
10 potential for interactions and predation on natural-origin juveniles in the lower Sandy River.
11 Predation and competition between hatchery smolts and naturally rearing juveniles would be
12 further reduced through the natural separation between the two groups due to differences in
13 habitat preferences because full smolted hatchery juveniles tend to migrate in the deeper, faster-
14 moving water while the naturally rearing juveniles would be found in the shallower stream
15 margins (Subsection 4.1, Potential Hatchery Effects). Even with these measures, predation
16 would be expected to occur, but at a low level under the Proposed Action, not much above what
17 would be expected to occur under the No-action Alternative.

18 19 **Monitoring and Evaluation**

20 Potential impacts from monitoring and evaluation are described under Subsection 4.1, Potential
21 Hatchery Effects. Under the Proposed Action, monitoring effects of hatchery programs on the
22 natural populations would be expected to occur. **The monitoring of impacts from hatchery coho**
23 **salmon spawning naturally would be used to determine what changes, if necessary, to the**
24 **hatchery program could be implemented as part of the adaptive management actions identified in**
25 **the HGMP.** Monitoring and evaluation activities (e.g., spawning ground surveys) would be
26 expected to continue in the Sandy River Basin to monitor the status and recovery of the listed
27 populations in the basin **(Subsection 2.2.2., Sandy River Coho Salmon Program)** and as part of
28 the Bull Run Water Supply HCP (Subsection 1.6, Relationship to Other Plans and Policies)
29 (NMFS 2008a). These monitoring and evaluations activities would continue to impact listed
30 species due to the handling of listed adults and juveniles **and these impacts would similar to**
31 **those observed under the No-action Alternative.**

32
33 Monitoring and evaluation activities in Cedar Creek would occur under the Proposed Action as
34 well as under the No-action Alternative. ODFW proposes to operate a 5-foot screw trap (migrant
35 trap) in Cedar Creek above the Sandy Hatchery to monitor recolonization by coho salmon and
36 winter steelhead. The screw trap operation in Cedar Creek would be part of a larger effort to
37 monitor juvenile salmonid production in the Sandy River Basin and the Cedar Creek weir would
38 be operated annually even under the No-action Alternative. The screw trap would be operated
39 from March to June and would potentially handle up to 5,000 coho salmon smolts annually.
40 Mortality associated with screw trapping operations are generally under 3 percent, which would
41 be the maximum generally permitted for ESA 4(d) Rule research authorizations. The actual
42 reported levels of mortality from other screw trap operations in the Sandy River Basin were
43 generally around 1 percent. Potentially up to 150 juvenile coho salmon could be lost due to the
44 operation of the screw trap. This level of mortality would be expected to have a minor effect and
45 impacts would be limited to coho salmon in Cedar Creek. All of these monitoring and evaluation
46 activities would be consistent with the general guidelines developed by NMFS to reduce impacts

when collecting adults and juveniles, but impacts would still be expected occur under the Proposed Action and would be the same as under the No-action Alternative.

Summary of Risk Effects

Based on the discussion above, under the Proposed Action, the release of hatchery salmon and steelhead would be expected to have impacts on listed salmon and steelhead in the Sandy River Basin. Under the Proposed Action, the ~~rearing of coho salmon on-station would dewatering reduce flows in the of a~~ section of Cedar Creek ~~between the intake structure and the hatchery outfall during the first part of the coho salmon run~~ would impact a few juvenile coho salmon present in this section ~~of the creek affected~~, but the numbers affected, if any, would be expected to be small, and ODFW would ~~monitor the dewatered~~ maintain minimum flows that would provide for ~~section to rescue any~~ juvenile passage. ~~s present, and the effect would be minimal because it would only impact those few fish present in that section of Cedar Creek.~~ Impacts would be expected to be temporary and only last until fall rains increase flows in Cedar Creek. ~~These impacts would not be expected to occur under the No-action Alternative.~~

Impacts on coho salmon would occur from the collection of broodstock, which may handle a proportion of the natural-origin adults returning to Cedar Creek. Impacts from handling at the hatchery are expected to be low. Coho salmon are expected to benefit from improved adult and juvenile passage improvements at the Sandy Hatchery intake and adult weir. But impacts would still occur during September when flow would be reduced between the intake and hatchery outfall.

Coho salmon may be impacted from naturally spawning hatchery coho salmon. Basin-wide spawning surveys have observed that the proportion of hatchery coho salmon ~~has been~~ can be greater than the 10 percent goal established in the Recovery Plan (ODFW 2010), but the level of impact may not be as great as indicated because ~~it may be due to the assumptions associated with the sampling methods and~~ it does not take into account the sorting of coho salmon at the Sandy Hatchery, which reduces the number of hatchery coho salmon spawning in Cedar Creek.

The release of hatchery salmon and steelhead may prey on juvenile coho salmon in the lower Sandy River below the Sandy Hatchery however, this impact would be expected to be low because of the actions taken to produce smolts that emigrate rapidly from the basin, minimizing the encounter rates, and because the smolts and juvenile salmon occupy non-overlapping habitats in the lower mainstem Sandy River.

Spawning ground surveys would continue to be used to ~~determine abundance and to~~ evaluate the potential genetic impacts from hatchery coho salmon spawning naturally. Impacts on natural-origin coho salmon from the operation of the screw trap in Cedar Creek would be expected to be low with less than 2 percent of the juveniles being lost. Data collected from the operation of the screw trap would be used to evaluate the recolonization of the habitat in Cedar Creek and contribute to determining the overall status of these species in the Sandy River Basin. The level of impacts, under the Proposed Action, on natural-origin coho salmon is unknown but would be expected to be low, and even reduced from levels currently observed; however, these impacts would be expected to be greater than what might be observed under the No-action Alternative.

Impacts on coho salmon are expected to be low, similar to what is currently observed, but would still be greater than what would occur under the No-action Alternative. Under the Proposed Action, reduced impacts may contribute to lowering the risk of extinction for the Sandy River coho salmon population, especially that proportion in Cedar Creek, but would not be expected to have an effect on the very high risk of extinction for the LCR Coho Salmon ESU as a whole because of limiting factors affecting the ESU outside the action area.

4.3.2.3 Sandy River Winter Steelhead

Subsection 3.3.3, Sandy River Steelhead, describes populations that are included as part of the LCR Steelhead DPS including the Sandy River winter steelhead population. All of the other LCR steelhead populations and their associated habitat reside outside the action area and would not be affected under the Proposed Action. In the Sandy River only the winter steelhead population is listed as threatened under the ESA. The naturally spawning summer steelhead, present in the Sandy River, are due to past hatchery releases of summer steelhead and are not considered part of the LCR Steelhead DPS.

Impacts on the return timing of the naturally spawning winter steelhead population would be expected to change under the Proposed Action because naturally spawning hatchery winter steelhead and summer steelhead impact the run-timing of the natural-origin population. These impacts are expected to be small because the Sandy Hatchery winter steelhead program originated from natural-origin Sandy River winter steelhead. The program has incorporated natural-origin winter steelhead into the broodstock in the past to maintain similarities between the hatchery and natural-origin winter steelhead. Impacts from naturally spawning hatchery summer steelhead are expected to be small because summer steelhead spawning tends to be temporally separated from natural-origin winter steelhead. However, over the long term, the winter steelhead program under the Proposed Action would impact the life history characteristics of the natural-origin winter steelhead population because natural-origin winter steelhead are no longer used for broodstock and because the hatchery winter steelhead would interbreed with the natural population. These potential impacts would not be expected to occur under the No-action Alternative because hatchery steelhead would no longer be released into the Sandy River. Impacts on the return timing of winter steelhead from the hatchery summer steelhead program would be expected to be low because the two spawning populations would be expected to be temporally separated in the Sandy River.

In the recent status review by Ford (2011), the LCR Steelhead DPS was identified as being at very high risk of extinction, and that the new information that was reviewed did not change that conclusion. The Sandy River winter steelhead population was considered to be at high risk. The overall biological risk category would not be expected to change under the Proposed Action, but there may be a benefit because the proposed hatchery programs are increasing risks to this population. Under the Proposed Action, the risk category for the Sandy River winter steelhead population would be expected to be reduced to the extent that the proposed winter and summer steelhead programs reduce the proportion of hatchery steelhead spawning naturally (see hatchery effects discussion below). These improvements in risk category would be similar to what would be expected under the No-action Alternative. To the extent that the Proposed Action can reduce impacts, then the natural-origin population would be expected to increase over current levels (Table 3).

1
2 The operation of the hatchery programs under the Proposed Action would not be expected to
3 have any impact on the spawning areas or key reaches for the Sandy River winter steelhead
4 because the hatchery programs would not affect habitat in the action area. As described under the
5 No-action Alternative, there are a number of key limiting factors affecting designated critical
6 habitat for the winter steelhead population in the Sandy River that includes the physical and
7 biological features associated with freshwater spawning, freshwater rearing, and freshwater
8 migration (Subsection 3.3.1, Sandy River Spring Chinook Salmon). Impacts on these features
9 would be expected to be the same under the Proposed Action as under the No-action Alternative
10 because the proposed hatchery programs would not directly impact habitat.

11
12 As described under the No-action Alternative, there are a number of key limiting factors
13 affecting habitat for the winter steelhead population in the Sandy River (Subsection 3.3.3. Sandy
14 River Winter Steelhead). Impacts on these limiting factors would be expected to be the same
15 under the Proposed Action as under the No-action Alternative because the proposed hatchery
16 programs would not directly impact habitat. However, one of the secondary limiting factors for
17 Sandy River winter steelhead, habitat access, has been addressed and would continue to provide
18 a benefit under the Proposed Action. Habitat access above the Sandy Hatchery was limited by
19 the operation of the adult weir located at the Sandy Hatchery on Cedar Creek. Access to habitat
20 in Cedar Creek above the Sandy Hatchery has been provided to winter steelhead, addressing this
21 limiting factor, and access would be expected to continue under the Proposed Action. Another
22 limiting factor, impacts from stray hatchery steelhead interbreeding with natural-origin adults,
23 identified in the Recovery Plan (ODFW 2010) (Subsection 1.6, Relationship to Other Plans and
24 Policies), would be expected to be reduced under the Proposed Action, though not to the extent
25 that would occur under the No-action Alternative.

26
27 The recovery goal for the Sandy River population of winter steelhead, as described in the
28 Recovery Plan (Subsection 1.6, Relationship to Other Plans and Policies) (ODFW 2010), is for
29 the population to be at very low risk of extinction (less than 1 percent probability) with an annual
30 abundance of 1,519 natural-origin adults. Under the Proposed Action recovery actions would be
31 expected to continue similar to what would be expected under the No-action Alternative. The
32 difference between the two alternatives would be that the actions specifically identified for the
33 Sandy Hatchery the steelhead programs (Table 6) that would not need to be implemented under
34 the No-action Alternative would need to be implemented under the Proposed Action. However,
35 there would be little difference between the two alternatives because out of the four hatchery
36 recovery actions, all are have been implemented or are under review (Table 6).

37
38 As described in Subsection 4.1, Potential Hatchery Effects, NMFS identified a number risks to
39 natural populations from hatchery programs (Table 14). Out of all of these risks, NMFS has
40 determined that, within the action area, ESA-listed species would be affected and take would
41 occur due to water withdrawals, facility structures, broodstock collection, outbreeding effects
42 from stray program hatchery salmon and steelhead, competition and predation as a result of the
43 release of hatchery juveniles into the Sandy River, and from monitoring and evaluation activities
44 (Table 14).

Facility Effects

Potential impacts from facility effects are described under Subsection 4.1, Potential Hatchery Effects. Facility effects on Sandy River winter steelhead under the Proposed Action would be the same as those described under the Proposed Action analyses for Sandy River Coho Salmon (Subsection 4.2.2.2, Sandy River Coho Salmon).

Fish Removal

Potential impacts from fish removal are described under Subsection 4.1, Potential Hatchery Effects. Under the Proposed Action, broodstock for the winter steelhead program would be collected from volunteers back to the Sandy Hatchery. Under the Proposed Action all steelhead migrating up Cedar Creek would be diverted by the adult weir into the hatchery to allow for the collection of broodstock and to remove hatchery adults. Impacts would occur to natural-origin winter steelhead due to handling when sorting hatchery and natural-origin adults. Additional impacts would also be expected from transporting natural-origin winter steelhead above the hatchery intake structure. Transportation and release of natural-origin winter steelhead adults above the Sandy Hatchery intake structure would not be needed after 2012, because Under the Proposed Action, construction of the new intake structure would include adult passage. When the proposed construction is completed in 2012, natural-origin winter steelhead would be released back into Cedar Creek directly above the adult weir and would not need to be transported and released. Under the Proposed Action, these handling impacts would be expected to be minor because the natural-origin winter steelhead are only held for a short time before being released. During broodstock collection activities at the Sandy Hatchery for winter steelhead, ODFW estimates that up to 250 natural-origin winter steelhead could be handled. ODFW (2011b) estimates that indirect mortality would result in a loss of up to 2 percent of the fish handled and transported during broodstock collection activities. This represents 5 more natural-origin winter steelhead mortalities of the Sandy River winter steelhead population in Cedar Creek than would be expected to occur under the No-action Alternative.

Under the Proposed Action, there would be the potential that, during the operation of the weirs, winter steelhead would be handled. The weirs, if installed by the first of June, may encounter winter steelhead kelts (fish that have already spawned) migrating out of the basin. The actual number of kelts encountered is unknown but expected to be low because winter steelhead spawning is usually completed by early May, reducing the potential for kelts to be present when the weirs are installed. Adult winter steelhead would not be expected to be encountered during weir operations because they return after the weirs are removed and before the weirs are installed. To the extent that these impacts on winter steelhead kelts would occur under the Proposed Action, this effect would be slightly higher than would be expected to occur under the No-action Alternative.

Genetics

Potential impacts from genetic effects are described under Subsection 4.1, Potential Hatchery Effects. The relatively high proportion of hatchery produced steelhead spawning naturally was identified as limiting factor for the Sandy River winter steelhead population in the Recovery Plan (ODFW 2010). To achieve delisting goals for this population, the proportion of hatchery

1 steelhead spawning naturally would need to be less than 10 percent of the all the winter steelhead
2 spawning naturally. NMFS generally applies the Grant (1997) guideline that hatchery strays
3 should be managed such that less than 5 percent of the naturally spawning population consists of
4 non-local hatchery fish (Subsection 4.1, Potential Hatchery Effects). **This 5 percent goal would**
5 **apply to hatchery summer steelhead spawning naturally because they are derived from non-local**
6 **broodstock.** The hatchery proportion of less than 10 percent identified as necessary to meet
7 delisting goals for the naturally spawning population reflects the similarity between the hatchery
8 and natural-origin winter steelhead in the Sandy River (Subsection 1.6, Relationship to Other
9 Plans and Policies)(ODFW 2010). Recent spawning ground survey data estimates that the
10 proportion of hatchery steelhead spawning naturally is less than 5 percent (ODFW 2011c). If the
11 proportion of hatchery steelhead spawning naturally remains at the current low levels then
12 genetic impacts on the natural-origin winter steelhead population under the Proposed Action
13 would be similar to impacts under the No-action Alternative.

14
15 **Under the Proposed Action Alternative, hatchery winter steelhead would be released above the**
16 **Sandy Hatchery into Cedar Creek to spawn naturally. In this section of habitat the escapement**
17 **goal is 300 adults and would consist of hatchery winter steelhead because less than 25 natural-**
18 **origin winter steelhead are trapped annually at the Sandy Hatchery. To minimize demographic**
19 **effects (spawners not being able to find mates, and low effective population size) hatchery adults**
20 **would continue to be released above the hatchery until such time as natural-origin winter**
21 **steelhead abundance equals the escapement goal. Even with the large proportion of hatchery**
22 **winter steelhead spawning in Cedar Creek the proportion of hatchery winter steelhead spawning**
23 **naturally in the Sandy River would be expected to be less than 10 percent.**

24
25 **Monitoring of juvenile smolts produced above the Sandy Hatchery would be evaluated to**
26 **determine the effects of releasing hatchery winter steelhead to support the reintroduction of**
27 **winter steelhead into Cedar Creek. Impacts from the release of hatchery winter steelhead into**
28 **Cedar Creek as proposed under the Proposed Action Alternative would not be expected to occur**
29 **under the No-action Alternative but the recolonization of the winter steelhead in Cedar Creek**
30 **may not succeed with less than 25 natural-origin adults returning each year.**

31 32 **Ecological Interactions**

33 Potential impacts from ecological interactions are described under Subsection 4.1, Potential
34 Hatchery Effects. The Proposed Action attempts to minimize competitive interactions and
35 predation through the following steps:

- 36
- 37 • All hatchery salmon and steelhead would be released into Cedar Creek or at the Bull Run
38 acclimation pond (for spring Chinook salmon), where it is believed there would be minimal
39 overlap with natural-origin juvenile winter steelhead, coho salmon, and spring Chinook
40 salmon rearing habitat.
 - 41
 - 42 • All hatchery salmon and steelhead smolts would be reared to and released at a size that is
43 optimal for rapid emigration from Cedar Creek and the Sandy River.
 - 44

- All hatchery salmon and steelhead would be acclimated for a minimum 2 to 3 week period to promote adult homing and improved emigration.
- All hatchery salmon and steelhead would be released downstream of the primary natural production areas.

As described above, the hatchery salmon and steelhead would typically be released from the holding ponds by removing the screens and lowering the water level to facilitate a gradual release and dispersed downstream migration of smolts. Fish would be allowed to volitionally migrate from the pond for a 24-hour period. After 24 hours, water levels in the pond would be gradually dropped further to promote migration. After 48 hours, water levels would be dropped fully and any remaining fish are transported to Cedar Creek. These operations would be expected to reduce the risks that may result from releasing all the hatchery production at once, spreading out the release over a long period. Observations show that the salmon and steelhead smolts are ready to actively migrate, with 80 to 90 percent of the smolts volitionally migrating in the first 24 hours and the majority of the remainder by the end of the 48 hours. Generally, fewer than 1,000 smolts remain after 48 hours. ODFW proposes to investigate retaining the juvenile summer and winter steelhead that do not emigrate and using these to support trout fisheries in standing water bodies. This approach would reduce the potential for these fish to residualize and adversely interact with natural-origin juveniles in the lower Sandy River. Even with these actions to reduce the potential for competition between hatchery juveniles and natural-origin winter steelhead under the Proposed Action, impacts would still occur and these impacts, even though small, would not be expected to occur under the No-action Alternative.

The release of hatchery smolts into areas that contain natural-origin juveniles would lead to direct predation (direct consumption) or indirect predation (increases in predation by other predator species due to enhanced attraction). In general, naturally produced salmonid populations would be most vulnerable to predation from hatchery juveniles when naturally produced populations are depressed and predator abundance would be high, in small streams, where migration distances are long, and when environmental conditions favor high visibility.

Under the Proposed Action, hatchery spring Chinook salmon smolts would continue to be released in March, winter and summer steelhead smolts by the end of April, and coho salmon smolts by the middle of May. The actual level of predation of natural-origin juveniles by hatchery smolts is unknown; however, the actions described in the Proposed Action, including producing hatchery fish that are at a size and condition to be fully smolted, acclimating the fish prior to release, and allowing the fish to volitionally emigrate would be expected to reduce the potential for interactions and predation on natural-origin juveniles in the lower Sandy River. Predation and competition between hatchery smolts and naturally rearing juveniles would be further reduced through the natural separation between the two groups due to differences in habitat preferences because full smolted hatchery juveniles tend to migrate in the deeper, faster-moving water while the naturally rearing juveniles would be found in the shallower stream margins (Subsection 4.1, Potential Hatchery Effects). Even with these measures, predation would be expected to occur but at a low level under the Proposed Action, these impacts would not be expected to occur under the No-action Alternative.

Monitoring and Evaluation

Potential impacts from monitoring and evaluation are described under Subsection 4.1, Potential Hatchery Effects. Under the Proposed Action, monitoring the effects of the hatchery programs on the natural populations would be expected to occur. The monitoring of impacts from hatchery steelhead spawning naturally would be used to determine what changes, if necessary, to the hatchery program, could be implemented as part of the adaptive management actions identified in the HGMP. The monitoring and evaluation activities (e.g., spawning ground surveys) would be expected to continue in the Sandy River Basin to monitor the status (Subsection 2.2.3, Sandy River Winter Steelhead Program) and recovery of the listed populations in the basin and as part of the Bull Run Water Supply HCP (Subsection 1.6, Relationship to Other Plans and Policies) (NMFS 2008a). These monitoring and evaluations activities would continue to impact listed species due to the handling of listed adults and juveniles.

Monitoring and evaluation activities in Cedar Creek would occur under the Proposed Action. ODFW proposes to operate a 5-foot screw trap (migrant trap) in Cedar Creek above the Sandy Hatchery to monitor recolonization by coho salmon and winter steelhead. The screw trap operation in Cedar Creek would be part of a larger effort to monitor juvenile salmonid production in the Sandy River Basin and the Cedar Creek weir would be operated annually even under the No-action Alternative. The screw trap would be operated from March to June and would potentially handle 3,500 winter steelhead smolts annually. Mortality associated with screw trapping operations are generally under 3 percent, which is the maximum generally permitted for ESA 4(d) Rule research authorizations. The actual reported levels of mortality from other screw trap operations in the Sandy River Basin were generally around 1 percent. Potentially, up to 105 juvenile steelhead could be lost due to the operation of the screw trap. This level of mortality would be expected to have a minor effect and impacts would be limited to winter steelhead in Cedar Creek. The operation of the screw trap would probably occur under both the No-action Alternative and the Proposed Action and impacts would be the same under either alternative. All of these monitoring and evaluation activities would be consistent with the general guidelines developed by NMFS to reduce impacts when collecting adults and juveniles, but impacts would still be expected occur under the Proposed Action and would be the same as under the No-action Alternative.

Summary of Risk Factors

Under the Proposed Action, the dewatering of a section of Cedar Creek during the first part of the coho salmon run would impact a few juvenile winter steelhead present in the section of the creek affected, but the numbers affected, if any, would be expected to be small and ODFW would monitor the dewatered section to rescue any juveniles present. The impacts would be expected to be temporary and only last until fall rains increase flows in Cedar Creek. Winter steelhead may be impacted from naturally spawning hatchery steelhead. Basinwide spawning surveys have observed that the proportion of hatchery winter steelhead has been below the 10 percent goal established in the Recovery Plan (Subsection 1.6, Relationship to Other Plans and Policies) (ODFW 2010). Genetic impacts on the winter steelhead would be expected to remain low though they would increase for those fish spawning in Cedar Creek. Spawning ground surveys would continue to be used to evaluate the potential genetic impacts from hatchery steelhead spawning naturally. Impacts on natural-origin winter steelhead from the operation of

the screw trap in Cedar Creek would be expected to be low with less than 2 percent of the juveniles being lost. Data collected from the operation of the screw trap would be used to evaluate the recolonization of the habitat in Cedar Creek and contribute to determining the overall status of natural-origin winter steelhead in the Sandy River Basin. The level of impacts, under the Proposed Action, on natural-origin winter steelhead is unknown but would be expected to be low, and even reduced from levels currently observed; however, these impacts would be expected to be greater than what might be observed under the No-action Alternative.

Impacts on winter steelhead are expected to be low, similar to what is currently observed, but would still be greater than what would occur under the No-action Alternative. Under the Proposed Action, reduced impacts may contribute to lowering the risk of extinction for the Sandy River winter steelhead population, especially that portion in Cedar Creek, but would not be expected to have an effect on the very high risk of extinction for the LCR Steelhead DPS overall because of limiting factors affecting the ESU outside the action area.

4.3.2.4 Columbia River Chum Salmon

The presence of hatchery programs under the Proposed Action would be expected to have no effect on Sandy River chum salmon because chum salmon are not currently present in the Sandy River. In the future, if chum salmon are reintroduced or recolonize habitat in the Sandy River, impacts from the hatchery programs currently operating in the Sandy River, under the Proposed Action would be expected to impact chum salmon, these potential impacts would not occur under the No-action Alternative because the hatchery programs would not be operated. As described in Subsection 3.3.4, Columbia River Chum Salmon, the survival and growth in juvenile chum salmon depends less on freshwater conditions than on favorable estuarine and ocean conditions. These factors occur outside the action area and would not be affected by the hatchery programs under the Proposed Action.

The hatchery operations under the Proposed Action would have the same effect as the No-action Alternative on the extirpation of the chum salmon from the Sandy River, because chum salmon are already extirpated in the Sandy River. Secondary limiting factors for habitat, as identified in the by ODFW (2010), include impaired upstream passage; altered hydrology, and excessive fine sediment. Barriers at road crossings impede chum salmon passage in several lower Sandy River tributaries. Barriers to chum salmon passage include culverts on Beaver and Buck Creeks in the lower Sandy watershed. Altered hydrologic process and/or reduced water quantity due to land use practices on upland slopes would remain a concern for the Sandy River Basin's chum salmon population. Steps taken under the Proposed Action would be expected to correct passage impediments at the hatchery intake and adult weir on Cedar Creek identified by ODFW (2010) but this would be expected to have no effect because chum salmon are not present in the Sandy River.

Chum salmon would not be handled during the operation of the weirs to collect Spring Chinook salmon broodstock because chum salmon have not been observed in the Sandy River, and their assumed return timing (in November, typical for other Columbia River chum salmon populations) is outside the period during which the weirs would be in place. The potential effect would not occur under the No-action Alternative because the weirs would not be operated.

Under the Proposed Action, only steelhead, which would be released by the end of April, and coho salmon smolts, which would be released by the middle of May, would be likely to overlap with chum salmon fry (if present) emerging and rearing in the lower Sandy River. The actual level of predation of natural-origin juveniles by hatchery smolts is unknown; however, the actions described in the Proposed Action, including producing hatchery fish that would be at a size and condition to be fully smolted, acclimating the fish prior to release, and allowing the fish to volitionally emigrate, would be expected to reduce the potential for interactions and predation on natural-origin juveniles in the lower Sandy River. Predation and competition between hatchery smolts and naturally rearing juveniles would be further reduced because fully smolted hatchery juveniles tend to migrate in the deeper, faster-moving water while the naturally produced chum salmon juveniles emigrate quickly after emerging from the gravel. Even with these measures, competition and predation would be expected to occur under the Proposed Action at a level somewhat greater than under the No-action Alternative, but not to a degree likely to affect the possibility of recovering chum salmon in the Sandy River Basin. The Sandy River chum salmon population would remain extremely depressed or functionally extirpated under the Proposed Action.

4.3.2.5 Pacific Eulachon

The presence of hatchery programs under the Proposed Action would be expected to have an impact on eulachon in the Sandy River, but this impact would likely be small. Eulachon numbers are at, or near, historically low levels throughout their range, including the Sandy River (Subsection 3.3.5, Pacific Eulachon).

Under the Proposed Action, designated critical habitat in the action area would not likely be affected any differently than under the No-action Alternative. Because eulachon life histories are typically lived out in areas of the Sandy River Basin downstream of the structures associated with the Proposed Action, eulachon habitat and migratory access would not be affected by the presence of those structures. All other effects, such as bycatch in shrimp trawl fisheries, climate change impacts on freshwater habitat, and other sources of habitat alteration and degradation, would continue as under the No-action Alternative, as would actions under the Oregon and Washington Joint State Eulachon Management Plan (Subsection 1.6, Relationship to Other Plans and Policies) (WDFW and ODFW 2001).

Because of the overlap in the lower Sandy River Basin between the emergence of juvenile eulachon in January through March and the release of hatchery juveniles from March through May, there would be a potential for predation on and competition with eulachon by hatchery salmonids juveniles. Presently, information regarding the predation on juvenile eulachon by juvenile salmonids is non-existent. Predation by juvenile salmonids may occur, but would be limited by hatchery actions designed to produce actively migrating smolts and by the small size and transparency of the emergent eulachon fry, their distribution in the water column, and their rapid emigration from the lower Sandy River (generally downstream of Gordon Creek at RM 12.8) (Gustafson et al. 2010) – for these same reasons, competition would not be expected.

Competition between adult eulachon and juvenile salmonids may occur when food preferences overlap in the estuary and ocean environment but impacts are expected to be very small. There would be the potential for salmonids to prey on adult eulachon, but data on impacts is non-

1 existent, and predation by salmonids was not considered to be a limiting factor (Gustafson et al.
2 2010). Further impacts on eulachon under the Proposed Action would only be somewhat, if at all
3 measurably, greater than under the No-action Alternative.

4 5 **4.3.2.6 Bull Trout**

6 The presence of hatchery programs under the Proposed Action Alternative would be expected to
7 have no effect on Sandy River bull trout because they are not currently present in the Sandy
8 River (Subsection 3.3.6, Bull Trout). Impacts from the presence of hatchery programs on the
9 future introduction or recolonization of the Sandy River by bull trout may be beneficial because
10 hatchery juveniles and hatchery adult carcasses are prey for bull trout and would be more
11 abundant than under the No-action Alternative. Similar to the No-action Alternative, the
12 presence of hatchery programs would not be expected to limit research needed to determine bull
13 trout distribution, limiting factors, or habitat needs in the Sandy River.

14 15 **4.4 Effects on Non-listed Fish**

16 **4.4.1 Alternative 1 (No-action) – Do not approve the HGMPs under limit 5 of the 4(d)** 17 **Rule**

18 The absence of hatchery releases in the action area under the No-action Alternative may result in
19 an increase or a decrease in the abundance of non-listed fish, native and introduced, compared to
20 current conditions. If non-listed fish are potentially harvested by ongoing fisheries targeting
21 returning hatchery fish, even if at very low levels, the absence of hatchery fish under the No-
22 action Alternative could result in an increase in abundance for non-listed fish if it leads to a
23 reduction in fisheries intended to target those hatchery fish. However, if the loss of fisheries
24 targeting salmon and steelhead results in a shift of at least some of that fishing effort to non-
25 listed fish, then the result could be a small increase in fishery impacts on non-listed fish. In
26 either case, the increase or decrease in impacts on non-listed fish, while unknown, would be
27 expected to be small, if at all measurable.

28
29 Because lamprey are parasitic on other fish, it is possible that eliminating the hatchery programs
30 could reduce the number of host fish available (Subsection 3.4, Non-listed Fish). However, the
31 fact that lamprey have not been encountered during broodstock collection activities, and no other
32 evidence of lamprey presence in the action area exists, the utilization of salmon and steelhead by
33 lamprey in the Sandy River Basin is extremely low if it occurs at all, and so removing that source
34 of potential hosts would have very little effect, if any.

35
36 There is no indication that the hatchery programs have contributed to the absence of cutthroat
37 trout in the Sandy River Basin, so no increases in cutthroat trout abundance would be expected
38 under the No-action Alternative. The abundance of whitefish and resident rainbow trout in the
39 Sandy River Basin may increase because hatchery-produced salmon and steelhead are having
40 adverse impacts through competition, but these impacts would be expected to be small and
41 would not be expected to occur under the No-action Alternative. The abundance of resident
42 rainbow trout would also be expected to increase if the natural population of winter steelhead
43 increases under the No-action Alternative, though this change, if it occurs, would be expected to
44 be small. Factors affecting the abundance of *O. mykiss* (resident and anadromous steelhead),

1 such as instream habitat, food availability, juvenile growth, and ocean conditions that are not
2 affected by the hatchery programs, would not change under the No-action Alternative.

3
4 To the extent that the impacts from the current hatchery programs are impeding natural salmon
5 and steelhead productivity in the basin, then predation on rainbow trout, whitefish, suckers, and
6 sculpins would increase under the No-action Alternative, though these increases would be small.
7 The No-action Alternative would not be expected to result in any changes in the abundances of
8 the other non-listed species, which are not prey items for salmon and steelhead. To the extent
9 that the impacts from the current hatchery programs are impeding natural salmon and steelhead
10 productivity in the basin, then those species that prey on juvenile salmon and steelhead would be
11 expected to see an increase or no change as natural production replaces hatchery juvenile salmon
12 and steelhead releases that would be eliminated under the No-action Alternative.

13
14 The non-ESA-listed fish found in the Sandy River Basin would be impacted by fisheries that
15 target these species as well as fisheries targeting returning hatchery adults (Subsection 3.4, Non-
16 listed Fish). Impacts under the No-action Alternative would not be expected to change
17 substantially from current levels because fisheries that target the non-listed fish would continue
18 to occur, though there would likely be some reduction in the level of fishery effort due to the fact
19 that fisheries targeting hatchery-origin fish from the Sandy River programs would not occur.
20 However, that reduction could also be offset by increases in fishery efforts on the non-listed fish,
21 so the overall change in fishery effort potentially affecting non-listed fish is unknown but likely
22 small. Impacts on non-listed fish from competition with and predation by the released hatchery
23 salmon and steelhead would be expected to be small.

24 25 **4.4.2 Alternative 2 (Proposed Action) – Approve the HGMPs under limit 5 of the 4(d)** 26 **Rule**

27 Unlike the No-action Alternative, the Proposed Action would affect non-listed fish in the Sandy
28 River Basin in three ways: through obstruction or other behavioral effects of the structures
29 required by the proposed programs, through incidental impacts in fisheries targeting fish
30 returning to the proposed programs, and through ecological interactions with fish returning to the
31 proposed programs.

32
33 Similar to the No-action Alternative, releases of hatchery salmon and steelhead under the
34 Proposed Action would be expected to have either a detrimental or a beneficial effect on non-
35 listed fish in the Sandy River. Hatchery salmon and steelhead would be expected to adversely
36 impact non-listed fish through competition effects and through predation, but the actions to
37 produce actively migrating hatchery smolts that exit rapidly out of the Sandy River would be
38 expected to minimize competition with non-listed fish under the Proposed Action. The release of
39 hatchery salmon and steelhead would be expected to provide a benefit by providing prey for the
40 non-listed fish. The release of hatchery salmon and steelhead in the Sandy River under the
41 Proposed Action could likely result in a slightly negative or slightly positive, if at all
42 measureable, biological or ecological effect on non-listed fish species as compared to the No-
43 action Alternative.

44
45 It is possible that lamprey, if they occur in the Sandy River Basin, might benefit from the
46 additional salmon and steelhead hosts made available by the proposed programs, which would

1 not occur under the No-action Alternative, However, such benefit would likely be small, if at all
2 measurable, due to the low abundance (if any) of lamprey in the basin.

3
4 Non-listed rainbow trout and whitefish may be impacted by the installation and operation of the
5 weirs under the Proposed Action, which would not occur under the No-action Alternative. Adult
6 rainbow trout and whitefish that are too large to pass through the pickets of the weirs would be
7 impacted by delayed migration, or handling, if they enter the trap. The abundance of rainbow
8 trout and whitefish in the Sandy River is unknown, but low (Subsection 3.4. Non-listed Fish),
9 and they would not be expected to be present at the weirs in any substantial numbers. Other non-
10 listed species in the action area tend to be found in the lower Sandy River Basin, below the
11 locations proposed for the weirs and juvenile hatchery fish release locations and thus the
12 hatchery operations under the Proposed Action would not be expected to impact these species,
13 similar to conditions under the No-action Alternative.

14
15 The operation of the hatchery programs would not expected to make re-colonization or re-
16 introduction of cutthroat trout any less likely. As under the No-action Alternative, cutthroat trout
17 are still not expected to occur in the Sandy River Basin under the Proposed Action.

18
19 The abundance of resident rainbow trout, whitefish, suckers, and sculpins in the Sandy River
20 Basin would change from conditions under the No-action Alternative to the extent that hatchery
21 salmon and steelhead produced under the Proposed Action are impacting these species. These
22 impacts, if any, are expected to be small because resident rainbow trout and whitefish tend to be
23 in the upper Sandy River Basin above the locations where hatchery juvenile salmon and
24 steelhead are released, and the hatchery juveniles are released in such a way that they are
25 expected to move out of the basin quickly. The abundance of resident rainbow trout might also
26 be expected to change or remain the same because hatchery winter steelhead are contributing to
27 the abundance of resident rainbow trout, though this contribution would be expected to be small.
28 The magnitude of the benefit that may accrue to the resident rainbow trout population as a result
29 of supplementation by the anadromous *O. mykiss* (both hatchery and natural-origin) would be
30 affected by a number of factors such as instream habitat, food availability, juvenile growth, and
31 ocean conditions that are not affected by the proposed hatchery programs, which would continue
32 to apply in a manner identical to that which would occur under the No-action Alternative.

33
34 Under the Proposed Action, fisheries targeting hatchery salmon and steelhead would continue,
35 and these fisheries would impact non-listed fish. Because of the gear types and fishing methods
36 used in salmon and steelhead fisheries, these fisheries are relatively unlikely to impact non-
37 salmonids to any degree, so the impact of these fisheries would only be slightly higher than
38 under the No-action Alternative. In addition, some of the fishing effort on non-listed fish would
39 likely shift to salmon and steelhead, slightly reducing the fishing impact on non-listed fish.
40 Fisheries specifically targeting non-listed fish would be expected to continue in a manner
41 essentially identical to that which would occur under the No-action Alternative.

4.5 Effects on Instream Fish Habitat

4.5.1 Alternative 1 (No-action) – Do not Approve the HGMPs under the limit 5 of the 4(d) Rule

The lack of the hatchery programs would be expected to have a minor beneficial effect on fish passage in Cedar Creek through the removal or modification to the adult weir at the outfall to the adult holding pond, and the removal of the passage barrier at the hatchery water intake structure (Subsection 2.2.2, Sandy River Coho Program). Under the No-action Alternative, the proposed weirs would not be installed, removing these sources of adverse impact on habitat connectivity and access.

The effects of past removal of beaver dams and large woody debris from stream channels that contributed to poor quality and reduced frequency of pools throughout the subbasins in the action area would continue under the No-action Alternative. Additionally, the effects of other human land use activities (e.g., channelization, diking, wetland conversion, and gravel extraction) on instream fish habitat would be expected to continue under the No-action Alternative, with continued negative effects.

4.5.2 Alternative 2 (Proposed Action) – Approve the HGMPs under limit 5 of the 4(d) Rule

Unlike the No-action Alternative, the potential effects on instream fish habitat under the Proposed Action would be related to the annual installation of the temporary weirs. Under the Proposed Action, the weirs would be installed by hand with limited manipulation of the channel, with the exception of the hand movement of small boulders/cobble along the base of the picket fence (Subsection 2.2.1, Sandy River Spring Chinook Salmon Program). The weirs would be fixed to the shore using ropes tied to trees or boulders of sufficient size to prevent movement of the weir and trap. These would be temporary weirs that would be operated during the summer during low-flow periods – any instream habitat alterations would be expected to be minor and temporary, and would be erased during the first high water flow event.

Passage barriers in Cedar Creek currently impact fish habitat by impeding natural migration past the hatchery. Adult salmon and steelhead are diverted into the adult holding pond for collection and sorting. Under the Proposed Action, this barrier would be modified to allow passage during periods when adult broodstock collection and hatchery adult management would not be needed (Subsection 2.2.2, Sandy River Coho Salmon Program; Subsection 2.2.3, Sandy River Winter Steelhead Program). ~~In addition, under the Proposed Action, the hatchery intake structure would be modified to allow for adult and juvenile salmonid upstream and downstream passage. This work would be expected to occur in 2012.~~

Impacts on instream habitat would also occur because of the presence of the hatchery intake and a reduction in flows, which would potentially impede or slow migration compared to the No-action Alternative. However, with the upgrades to these facilities, water flow through the section of stream between the hatchery intake and the outfall would not be reduced to near zero as in the past, and so restrictions of migratory access through this stream section would be transitory and

of low effect. These impacts would be an improvement over current impacts, and would be similar to impacts under the No-action Alternative.

Similar to the No-action Alternative, the effects of past removal of beaver dams and large woody debris from stream channels contributed to poor quality habitat and reduced frequency of pools throughout the subbasins in the action area would continue under the Proposed Action. Additionally, the effects of other human land use activities (e.g., channelization, diking, wetland conversion, and gravel extraction) on instream fish habitat would be expected to continue under the Proposed Action, with continued negative effects in a manner identical to that which would occur under the No-action Alternative.

4.6 Effects on Wildlife

4.6.1 Alternative 1 (No-action) – Do not approve the HGMPs under limit 5 of the 4(d) Rule

Because the hatchery releases would end, the No-action Alternative would be expected to reduce the number of hatchery juveniles and adults available to wildlife species, including eggs and carcasses. Because none of the wildlife species are thought to be wholly dependent on salmon and steelhead for survival, the effect, if any, of removing those food sources would be expected to be small (Subsection 3.6, Wildlife). However, over the long term (greater than 10 years), because the hatchery programs have been impacting the natural salmon and steelhead populations, the reduction in fish from the hatchery programs would be expected to be replaced by natural-origin fish as the Sandy River salmon and steelhead populations recover.

Under the No-action Alternative, weirs would not be installed to collect broodstock and remove hatchery spring Chinook salmon. This would be expected to eliminate any interactions with wildlife species at these locations. Columbia white-tailed deer and the streaked horned lark are not found in the Sandy River Basin and thus would not be affected by the lack of hatchery programs under the No-action Alternative. Northern spotted owls and wolverines, which are present in the Sandy River Basin, would possibly benefit from the cessation of activities near the current hatchery and weir locations, but, because of their current low abundances and distribution, and the very small proportional area of their potential ranges occupied by the hatchery and weir structures, any such effect would be small if any.

Under the No-action Alternative, it would be expected that, because fisheries would not occur in the Sandy River, none of the human activities associated with the fisheries targeting salmon and steelhead in the action area would occur. Under the No-action Alternative, there would be no new construction of fishery access points, roads, permanent camping sites, or any long-lasting habitat alterations of any kind related to salmon and steelhead fisheries access. However, other fishing activities would continue, in the riparian areas, essentially using the same roads and camping sites, so no substantial decrease, if any, in effects on wildlife from fishing activities would be expected. Impacts on wildlife habitat from hiking, camping, wildlife viewing, and other shore-based activities would continue and may increase under the No-action Alternative because these would be an alternative to fishing activities and would not be impacted by the lack of hatchery programs in the Sandy River. Therefore, the beneficial effects, if any, on important habitats for a variety of wildlife species would be small.

4.6.2 Alternative 2 (Proposed Action) – Approve the HGMPs under limit 5 of the 4(d) Rule

Under the Proposed Action, the hatcheries would continue to release juvenile salmon and steelhead into the action area at levels seen in the past and, therefore, would continue to provide fish to wildlife that consume salmonid eggs, juveniles, adults, and carcasses. This would potentially provide a benefit to wildlife compared to the No-action Alternative. Wildlife that targets adult salmonids may be impacted because the number of hatchery adults in the action area would be expected to decrease from current levels and be lower than under the No-action Alternative due to their removal at the weirs.

The removal of adult hatchery spring Chinook salmon would increase under the Proposed Action, while hatchery coho salmon and steelhead proportions on the spawning grounds would remain at their current low levels but higher than under the No-action Alternative. The reduction in adult spring Chinook salmon available to wildlife species would not be expected to adversely impact wildlife species because all of the hatchery spring Chinook salmon that would be collected (except for those used for broodstock, sold, or provided to food banks) would be returned to the action area as carcasses for nutrient enhancement, thus making them available to the ecosystem. Furthermore, if the natural population of spring Chinook salmon recovers as a result of the improved management of adult hatchery fish, the abundance of these fish would be expected to increase as well, eventually replacing those spring Chinook salmon removed at the weirs. Because of these actions and the expected recovery of the natural-origin populations of salmon and steelhead, the abundance of juvenile and adult salmon and steelhead would be expected to be similar to or somewhat greater than those levels found under the No-action Alternative.

Columbia white-tailed deer and the streaked horned lark are not found in the Sandy River Basin and thus would not be affected by the hatchery programs under the Proposed Action.

Installation and operation of the weirs under the Proposed Action to collect spring Chinook salmon broodstock and to remove hatchery adults might cause interactions with wildlife species, causing changes in migration and feeding behavior. The actual effect of these interactions would be small because the weirs would be located on tributaries located in semi-rural habitat where human activity already occurs, the weirs would be temporary and would affect the wildlife species for a limited amount of time each year, and the weirs would only disturb small reaches of each of the tributaries. Impacts on northern spotted owls and wolverines, which are present in the Sandy River Basin, would be expected to be minor because these species are not found in the areas where the weirs and hatchery facilities are operated.

Fisheries that target the fish produced by the Proposed Action would reflect current impacts on wildlife and wildlife habitat in riparian areas adjacent to the streams where fisheries occur. The effect of the Proposed Action on wildlife results from the presence and activity of anglers in riparian areas. Fisheries for other species would continue to occur in the action area, the addition of salmon and steelhead fisheries, as would occur under the Proposed Action, would be expected to only increase the amount of fishing effort. While the fishing effort directed at salmon and steelhead is relatively large in the action area, the additional effect of this effort on wildlife or

wildlife habitat would not likely be substantially greater than under the No-action Alternative, because these fisheries, and the associated use of access points and roads, would overlap with fisheries targeting other species. The overall effect would be expected to be low when compared to the No-action Alternative as other shore-based activities, such as hiking, camping, and wildlife viewing would continue to occur in conjunction with other, ongoing fishing activities.

4.7 Effects on Socioeconomics

4.7.1 Alternative 1 (No-action) – Do not approve the HGMPs under limit 5 of the 4(d) Rule

The effects of recreational fisheries targeting hatchery salmon and steelhead produced under the Proposed Action and considered here under the No-action Alternative could be included in the Section 4.7, Tourism and Recreation, but, due to their impact on socioeconomics, will be considered in this section.

The cessation of the proposed hatchery programs would have relatively substantial effects on socioeconomics in the action area because the lack of hatchery salmon and steelhead production would be expected to preclude recreational fishing opportunities for salmon and steelhead in the Sandy River Basin for Portland Metro Area residents, resulting in a reduction of visitors to this basin engaging in recreational fishing. This reduction could also result in reduced expenditures for fishing and camping gear, gasoline and supplies, food, and lodging.

It is not clear what effect this reduced expenditure may have on the median income in the three large metropolitan counties adjacent to and included in the action area as a whole, but a reduction in activities that use locally owned or operated businesses would be expected to have an adverse impact on the incomes of persons employed by those businesses. In the context of the \$2.5 billion spent annually on hunting and fishing activities in Oregon (Subsection 3.7, Socioeconomics), such an effect would likely be small, but the effect becomes larger when considered from the perspective of expenditures in the \$20.5 million spent in the Portland Metro Area on fishing activities. It is unknown how much of the \$20.5 million in expenditures would be lost if the Sandy River salmon and steelhead fisheries are closed, but some reduction of that amount would occur.

Runyan (2009) provides economic estimates for freshwater fisheries for the action area (Table 8). In the absence of the hatchery programs and the resulting elimination of hatchery fish available for harvest, the potential reduction of direct expenditures by freshwater anglers would be some portion of the \$40 million (fishing and fishing-related travel) currently expended in the three Metro area counties (Table 8). While this proportion is unknown, it would not likely be a substantial proportion of the total expenditures, due to the fact that while the Sandy River is an important fishing destination, it is not the only or most important fishery in the area, so fishing effort lost to the Sandy River would be expected to move, in some part, to other nearby areas. Therefore, some portion of the economic benefits of other tourism and recreational activities (e.g., travel, local recreation, equipment purchases) in the action area would still continue to be realized. The economic benefit of travel, local recreation, and equipment purchases would be reduced somewhat from the approximately \$40 million under the No-action Alternative (Subsection 3.7, Socioeconomics).

1
2 In addition, hatchery-related expenditures (e.g., equipment, maintenance, feed, chemicals) would
3 be eliminated as well and might adversely impact some local businesses in the action area.
4 Expenditures in the local economy for food, clothing, household items, and for services from the
5 three full-time ODFW employees who are residents at the hatchery would also be eliminated and
6 negatively impact local businesses. These impacts are probably small in the Portland Metro
7 Area because businesses are not wholly dependent on the hatchery programs for income.
8 Furthermore, the annual state funds of \$265,000 currently spent on the proposed hatchery
9 programs (Subsection 3.6, Socioeconomics) would likely be spent to support hatchery programs
10 in other areas of Oregon and possibly in the Portland Metro Area.

11
12 Table 9 provides estimates of the number of hatchery salmon and steelhead that have been
13 harvested in the Sandy River in recent years. If recreational fisheries are precluded in the Sandy
14 River, a potential loss of a harvest of 867 spring Chinook salmon, 4,295 coho salmon, 1,535
15 winter steelhead, and 851 summer steelhead would result. The harvest of these fish may provide
16 supplemental nutritional resources for the residents of the Portland Metro Area that otherwise
17 would not be available without the fisheries in the Sandy River. The actual socioeconomic
18 impacts on the residents in the action area from the loss of these fish may not be as great in the
19 Portland Metro area because incomes in this area tend to be higher than state averages.

20
21 Under the No-action Alternative, the cost of fishing licenses would not be expected to change,
22 and the number of anglers fishing in the action area would be reduced or eliminated; however,
23 the impacts on those license holders would be small because they could fish in basins outside the
24 action area. The expected revenue, from the sale of fishing licenses, to support fishery
25 management and law enforcement activities would be expected to decrease under the No-action
26 Alternative if there is a decrease in purchases of fishing licenses. The Federal tax to support
27 fisheries research, development, and public information actions that results from the sale of
28 fishing tackle could increase as a result of a decrease of purchases of fishing gear compared
29 under the No-action Alternative, but the decrease would not be substantial because other
30 fisheries in Oregon that are not affected by the No-action Alternative would continue to generate
31 tax revenues.

32
33 Additional negative impacts could occur from the No-action Alternative in the employment
34 sector that supports such tourism and recreational services or the government sector that employs
35 recreational fishery-related staff, though these impacts would be limited to fishing-related
36 businesses within the action area. Many of these businesses also support non-fishing recreational
37 activities and thus may not be as impacted by the No-action Alternative.

38 39 **4.7.2 Alternative 2 (Proposed Action) – Approve the HGMPs under limit 5 of the 4(d)** 40 **Rule**

41 Unlike under the No-action Alternative, the Proposed Action would have positive impacts on
42 socioeconomics in the action area. Such benefits would be realized by visitors continuing to
43 support community expenditures for freshwater fisheries, including through the purchase of
44 recreational supplies such as fishing gear, license fees, camping equipment, consumables and
45 fuel at local businesses, and lodging expenditures. The cost of fishing licenses would not be
46 expected to change, but the number of anglers fishing in the Sandy River Basin – and, therefore,

1 the total revenue generated by purchase of fishing licenses – may possibly increase under the
2 Proposed Action if hatchery returns increase.

3
4 Runyan (2009) provides economic estimates for freshwater fisheries for the action area (Table
5 8). The Proposed Action would likely result in \$20.5 million direct expenditures by freshwater
6 anglers from the Portland Metro Area (Subsection 3.7, Socioeconomics). The economic benefits
7 of other activities associated with the fisheries (e.g., travel, local recreation, equipment
8 purchases) in the action area would also be expected to continue at current levels (Table 8)
9 unlike conditions under the No-action Alternative.

10
11 Under the Proposed Action, expenditures for the hatchery programs would be expected to
12 continue to support businesses in the action area. The annual state budget for the Sandy Hatchery
13 for on station broodstock collection and rearing is \$265,000; it is unknown how much of this is
14 spent within the action area but the total includes funding for three full-time ODFW employees
15 that live at the hatchery. The Sandy Hatchery programs were funded through Mitchell Act funds
16 in the past at levels currently described in Subsection 3.7, Socioeconomics.

17
18 Recreational fisheries expenditures for fish produced at Mitchell Act funded hatcheries were
19 over \$9.2 million with direct and secondary economic impact of \$17.3 million and contributed to
20 an estimated 395 jobs (Subsection 3.7, Socioeconomics) (Wegge 2010). The proportion that can
21 be contributed to the Sandy Hatchery programs within the action area is unknown, but the Sandy
22 Hatchery programs are only four programs out of almost 40 large and small programs that were
23 funded by the Mitchell Act in the Lower Columbia River. Under the Proposed Action, economic
24 impacts similar to these would be expected to continue. As a comparison, the potential reduction
25 in these totals from the closure of the hatchery programs under the No-action Alternative is
26 unknown because the funds currently going to support the Sandy Hatchery programs could be
27 spent at other ODFW or Mitchell Act hatcheries in the Lower Columbia River region.

28
29 Runyan (2009) estimated that, within the three counties (Multnomah, Clackamas, and
30 Washington), an estimated \$40 million was spent on fishing and fishing-related travel.
31 Fishermen in the Portland Metro Area are not limited to rivers in the three counties and can fish
32 in other parts of the state. It is not clear if the Proposed Action would increase or maintain
33 visitor and hatchery expenditures and their effect on the median income in the three counties in
34 the action area; median incomes would likely remain generally similar to those described by
35 recent years' statistics, and possibly higher than under the No-action Alternative, since the
36 fisheries supported by the proposed hatchery programs considered under the Proposed Action are
37 similar to those taking place now and when the 2008 economic data were collected (Subsection
38 3.6, Socioeconomics).

39
40 The expected revenue to support fishery management and law enforcement activities would
41 remain the same as current levels under the Proposed Action, and could slightly increase
42 compared to the No-action Alternative as a result of an increase in purchases of fishing licenses.
43 The Federal tax to support fisheries research, development, and public information actions would
44 remain as current under the Proposed Action, and could increase as a result of an increase of
45 purchases of fishing gear compared to the No-action Alternative, but the increase would not be

substantial because other fisheries in the Oregon that are not affected by either alternative would continue to generate tax revenues.

Additional beneficial impacts could occur under the Proposed Action in the employment sector that supports such tourism and recreational services or the government sector that employs recreational fishery-related staff. The Proposed Action could have a positive impact on the important contribution to economic activity for the Sandy River Basin that result from fishing activities, especially when natural-origin adult abundance levels increase for each population, which would not occur under the No-action Alternative.

4.8 Effects on Tourism and Recreation

4.8.1 Alternative 1 (No-action) – Do not approve the HGMPs under limit 5 of the 4(d) Rule

The potential effects of the No-action Alternative on tourism and recreation would be low to moderately adverse, because, as mentioned in Subsection 4.7, Socioeconomics, the lack of hatchery-supported salmon and steelhead fisheries could result in fewer visitors to the action area who both fish and hunt, and who may spend financial resources on other tourist attractions while visiting (Subsection 3.7, Socioeconomics). This lack of visitor tourism for recreational opportunities could then result in reduced community expenditures for freshwater fisheries, including through the purchase of recreational supplies such as fishing gear, license fees, camping equipment, consumables and fuel at local businesses, and lodging expenditures (Subsection 4.7, Socioeconomics). However, other tourism and recreational activities in the action area (hiking and camping, river rafting and kayaking, picnicking, swimming, mountain biking, and non-consumptive observation of wildlife and scenery) would still be available to Portland Metro Area residents **and could possibly increase if the listed salmon and steelhead populations recover** (Subsection 3.8, Tourism and Recreation). Runyan (2009) estimated that almost 2.2 million Oregon residents and non-residents participated in non-fishing related activities in Oregon. A reduction in the number of tourists and recreational activities that would be expected to result from the fisheries closures in the action area under the No-action Alternative would not be substantial **because and may be off-set by increases in** participation in these other activities ~~would be expected to continue~~.

Travel expenditures would not be affected under either alternative in the Portland Metro Area because fishing would be only a small part of tourism and recreational activities, being second to regional expenditures for wildlife viewing (Table 8).

Additional negative impacts could occur from the No-action Alternative in the employment sector that supports such tourism and recreational services or the government sector that employs recreational fishery-related staff, though these impacts would be limited to fishing-related businesses within the action area. Many of these businesses also support non-fishing recreational activities and thus may not be as impacted by the No-action Alternative.

4.8.2 Alternative 2 (Proposed Action) – Approve the HGMPs under limit 5 of the 4(d) Rule

The potential effects of the Proposed Action on tourism and recreation in the action area would be slightly beneficial compared to the No-action Alternative. Such benefits would be realized by visitors continuing to support community expenditures for freshwater fisheries. The Proposed Action would be expected to result in a continuation of the number of visitors to the action area engaging in various recreational opportunities (Subsection 3.8, Tourism and Recreation). The maintenance of the visitors to the action area would result in maintaining community expenditures for freshwater fisheries, including through the purchase of recreational supplies such as fishing gear, license fees, camping equipment, consumables and fuel at local businesses, and lodging expenditures (Subsection 4.7, Socioeconomics). . These benefits would be in addition to those that would continue from other recreational activities in the action area under either alternative (e.g., hiking and camping, river rafting and kayaking, picnicking, swimming, mountain biking, and non-consumptive observation of wildlife and scenery) (Subsection 3.8, Tourism and Recreation).

Travel expenditures would not be expected to change under either alternative in the Portland Metro Area because fishing would be only a small part of tourism and recreational activities, being second to regional expenditures for wildlife viewing (Table 8).

Beneficial impacts could occur under the Proposed Action, compare to the No-action Alternative, with regards to the employment sector that supports such tourism and recreational services or the government sector that employs recreational fishery-related staff, if fishing activities and license sales increase. However, these impacts would be limited to fishing-related businesses within the action area. Many of these businesses also support non-fishing recreational activities and thus may not be as impacted under either the Proposed Action or the No-action Alternative.

4.9 Effects on Environmental Justice

4.9.1 Alternative 1 (No-action) – Do not approve the HGMPs under limit 5 of the 4(d) Rule

Because the population sectors generally participate in fisheries in proportions similar to their representation in the general population, the loss of fishing opportunities that may result under the No-action Alternative would not result in a disproportionately negative impact on any minority or low income population group – the negative economic effect would be experienced by all groups (White, Hispanic, Asian, African-American, and Native American) in the action area (Subsection 3.9, Environmental Justice).

4.9.2 Alternative 2 (Proposed Action) – Approve the HGMPs under limit 5 of the 4(d) Rule

Impacts on environmental justice under the Proposed Action would be the same to minority and low income populations in the action area as under the No-action Alternative because all population sectors would experience the same effect; there would be no disproportional effect to

any population. The fishing opportunities made possible by the hatchery production that would be implemented under the Proposed Action would not be exclusive to select portions of the population sector.

The composition of the angling public in Oregon (USDOI et al. 2008) did not reflect participation by minority groups proportional to race composition in Portland Metro Area (Subsection 3.9, Environmental Justice). However, this may be due to a very small sample size for minority respondents to the survey. Benefits from fisheries in the Sandy River Basin would tend to accrue to all population sectors in proportion to their participation in fisheries (which may or may not be proportional to their representation in the overall population). Because fishing opportunities would positively benefit the overall tourism and recreation-based economic and employment segment in the action area, all population sectors would potentially benefit under the Proposed Action.

5 CUMULATIVE IMPACTS

5.1 Other Agency Programs, Plans, and Policies

Cumulative impacts of NMFS' Proposed Action under the 4(d) Rule would be minor, if at all measurable. Other Federal, tribal, and state actions are expected to occur within the action area, in other Columbia River tributaries, and in the migration corridor between the Sandy River and the Pacific Ocean that would affect the fish populations considered under the Proposed Action. State fisheries would still occur in other Oregon tributaries and in the mainstem Columbia River. Land management and water-use decisions that affect these populations are made inside and outside the Sandy River Basin. There are overarching concerns and legal mandates for the recovery of listed salmon and steelhead populations in the Columbia River Basin; at the same time, there are social and cultural needs for sustainable fisheries and sustainable economic use of resources.

There are numerous initiatives by state, Federal, tribal, and private entities designed to restore salmon and steelhead populations, but it is not usually clear who those initiatives would be implemented by, when they would be implemented, or how effective they would be. In part, this is due to the reduced effectiveness of individually and separately implemented actions at the local scale. An exception to this uncertainty, then, would come as a result of a more broad-scale implementation of different actions across larger portions of the watersheds – such a broad-scale approach exists in several scenarios currently playing out in the Columbia River Basin. In large part, these actions are coordinated through or in association with Federal ESA recovery plans either already developed (e.g., ODFW 2010) or currently in development by NMFS. These plans are intended to provide a framework by which Federal, state, local, tribal, and private actions can be designed and implemented in a manner that would most effectively restore salmon and steelhead populations. NMFS has reached an agreement with the City of Portland (NMFS 2008a) that addresses listed fish species issues raised during the relicensing of the Bull Run River Water Supply projects. State initiatives include legislative measures to facilitate the recovery of listed species and their habitats, as well as the overall health of watersheds and ecosystems. Regional programs are being developed that designate priority watersheds and facilitate development of watershed Management Plans. All of these regional efforts are

1 expected to help increase salmon and steelhead populations in the action area (and elsewhere in
2 the region) because of compatible goals and objectives.

3
4 The operation of the Sandy Hatchery programs as described in the proposed HGMPs are
5 designed to be consistent with recovery efforts and actions outlined in the Recovery Plan
6 (ODFW 2010). The proposed hatchery operations, if successful, are expected to contribute to the
7 recovery of the natural-origin salmon and steelhead populations in the Sandy River by, for
8 example, the removal of hatchery spring Chinook salmon at weirs to reduce the proportion of
9 hatchery spring Chinook salmon spawning naturally to less than 10 of the naturally spawning
10 population. Monitoring and evaluation activities under the Proposed Action in combination with
11 other monitoring activities would determine if the proposed hatchery programs and consistent
12 with the Recovery Plan goals for salmon and steelhead in the Sandy River.

13 14 **5.2 Conservation Management under the ESA**

15 The hatchery programs and associated fisheries that may impact listed salmon and steelhead
16 within the action area would be managed based on the impacts on ESA-listed fish that are
17 returning to the Sandy River and their associated ESUs and DPSs. If the cumulative effects of
18 other hatchery programs, fisheries, pinniped predation on salmonids, ocean conditions or
19 conservation efforts do not allow sufficient escapement of returning adult salmon and steelhead
20 to the action area to meet recovery goals while providing for the operation of the proposed
21 hatchery programs, adjustments to fisheries and to the hatchery production would be proposed.

22
23 If the cumulative effects of salmon management efforts fail to provide for recovery of listed
24 species, then impacts due to the hatchery programs and fishing in the action area would be
25 substantially diminished. Therefore, the cumulative impacts of the Proposed Action on recovery
26 actions are expected to be minor because of reporting and monitoring requirements that would
27 ensure compatibility with recovery plans. Management of the hatchery programs and of fishing
28 opportunity is only one element of a large suite of regulations and environmental factors that
29 may influence the overall health of listed salmon and steelhead populations and their habitat.
30 The proposed hatchery programs are coordinated with monitoring so that hatchery managers can
31 respond to changes in the status of affected listed species. Monitoring and adaptive management
32 would help ensure that the affected ESU and DPS are adequately protected and would help
33 counter-balance any potential adverse cumulative impacts. Healthy and self-sustaining Sandy
34 River salmon and steelhead populations would be an important component in long-term recovery
35 of each of the affected species as a whole.

36 37 **5.3 Climate Change**

38 The action area – the Sandy River Basin – is located in the Pacific Northwest. The climate is
39 changing in the Pacific Northwest due to human activities, and this is affecting hydrologic
40 patterns and water temperatures. Regionally averaged air temperature rose about 1.5°F over the
41 past century (with some areas experiencing increases up to 4°F) and is projected to increase
42 another 3°F to 10°F during this century. Increases in winter precipitation and decreases in
43 summer precipitation are projected by many climate models, although these projections are less
44 certain than those for temperature (USGCRP 2009).

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

10
11 High and base stream flows are likely to change with warming. Increasing winter rainfall is
12 likely to increase winter flooding in relatively warm watersheds on the west side of the Cascade
13 Mountains. Earlier snowmelt, and increased evaporation and water loss from vegetation, will
14 increase stream flows during the warm season (April through September). On the western slopes
15 of the Cascade Mountains, reductions in warm season runoff of 30 percent or more are likely by
16 mid-century. In some sensitive watersheds, both increased flood risk in winter and increased
17 drought risk in summer are likely due to warming of the climate (USGCRP 2009).

18
19 In areas where it snows, a warmer climate means major changes in the timing of runoff:
20 increased stream flows during winter and early spring, and decreases in late spring, summer, and
21 fall. Flow timing has shifted over the past 50 years, with the peak of spring runoff shifting from a
22 few days earlier in some places to as much as 25 to 30 days earlier in others. This trend is likely
23 to continue, with runoff shifting 20 to 40 days earlier within this century. Major shifts in the
24 timing of runoff are not likely in areas dominated by rain rather than snow (ISAB 2007;
25 USGCRP 2009).

26
27 Fish habitat changes due to climate change are likely to create a variety of challenges for ESA-
28 listed species of fish. Higher winter stream flows can scour streambeds, damaging spawning
29 redds and washing away incubating eggs (USGCRP 2009). Earlier peak stream flows could flush
30 young salmon and steelhead from rivers to estuaries before they are physically mature enough
31 for the transition, increasing a variety of stresses and the risk of predation (USGCRP 2009).
32 Lower summer stream flows and warmer water temperatures will degrade summer rearing
33 conditions in many parts of the Pacific Northwest for a variety of salmon and steelhead species
34 (USGCRP 2009), and are likely to reduce the survival of steelhead fry in streams with incubation
35 in early summer. Other likely effects include alterations to migration patterns, accelerated
36 embryo development, premature emergence of fry, and increased competition and predation risk
37 from warm-water, non-native species (ISAB 2007). The increased prevalence and virulence of
38 diseases and parasites that tend to flourish in warmer water will further stress salmon and
39 steelhead (USGCRP 2009). Overall, about one-third of the current habitat for the Pacific
40 Northwest's coldwater fish may well no longer be suitable for them by the end of this century as
41 key temperature thresholds are exceeded (USGCRP 2009).

42
43 Climate change is also likely to affect conditions in the Pacific Ocean. Historically, warm
44 periods in the coastal Pacific Ocean have coincided with relatively low abundances of salmon
45 and steelhead, while cooler ocean periods have coincided with relatively high abundances
46 (USGCRP 2009). It is likely that, as ocean conditions change, abundances of salmon and

1 steelhead will continue to change accordingly, resulting in changes in abundance of adults
2 returning to freshwater to spawn.

3
4 In the Sandy River Basin, impacts from climate change may be similar to those described above.
5 The Sandy River is fed by glaciers and snow-melt; if climate change reduces the snow pack, then
6 summertime flows may be reduced to an extent that would reduce the suitable habitat for spring
7 Chinook salmon, coho salmon, and steelhead yearling rearing, decreasing their abundance.
8 Climate change may also increase the frequency of major flood events that can scour redds
9 (especially for fall Chinook salmon) and adversely impact salmon and steelhead spawning and
10 rearing in the Zigzag River and the upper Sandy River. Lower summer flows due to a reduced
11 winter snow pack may increase water temperatures that may lead to an increase in the abundance
12 of non-native warm water species that can compete and prey on listed salmon and steelhead.
13 Warmer water temperatures may also increase the incidence of disease outbreaks and virulence
14 in both the natural-population and hatchery produced juveniles.

15
16 If climate change contributes to a substantial decline in the abundance of listed salmon and
17 steelhead populations in the Sandy River through impacts on habitat and from changes in ocean
18 conditions, it might become necessary to consider the proposed hatchery programs as a “safety
19 net” programs to maintain genetic resources. The proposed hatchery programs are somewhat
20 protected from the possible increase in disease prevalence from warmer water temperatures
21 because much of the rearing occurs outside the basin and the fish are tested prior to transfer to
22 the Sandy Hatchery and before release to limit disease transmission to the natural-origin
23 populations.

24
25 While climate change may well have impacts on the abundance and/or distribution of ESA-listed
26 salmonids that are considered under the Proposed Action, the proposed hatchery management
27 described in the HGMPs and the associated monitoring provide the ability to evaluate hatchery
28 program impacts as abundances change, leading to adjustments accordingly.

29 30 **6 AGENCIES CONSULTED**

31 National Marine Fisheries Service
32 Oregon Department of Fish and Wildlife
33 Warm Springs Tribe
34 Cowlitz Indian Tribe
35

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31 Corvallis, Oregon.
32 |

8 FINDING OF NO SIGNIFICANT IMPACTS

Finding Of No Significant Impact for NMFS' Determination that the Hatchery and Genetic Management Plans for Sandy River Programs Submitted by the Oregon Department of Fish and Wildlife Satisfy the Endangered Species Act Section 4(d) Rule under Limit 5

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.

Four Hatchery and Genetic Management Plans (HGMPs) were submitted by the Oregon Department of Fish and Wildlife (ODFW) pursuant to Limit 5 of the Endangered Species Act (ESA) 4(d) Rule. ODFW has also applied to NMFS for funding grants pursuant to the Mitchell Act for operation of the HGMPs. This matter considers the impacts of the pending Mitchell Act grant.⁷ Implementation of the HGMPs may potentially affect the ESA-listed Lower Columbia River Chinook Salmon, Lower Columbia River Coho Salmon, and Columbia River Chum Salmon Evolutionarily Significant Units (ESU), and the Lower Columbia River Steelhead, and Southern Pacific Eulachon Distinct Population Segments (DPS).

NMFS's determination that the HGMPs satisfy Limit 5 of the 4(d) Rule constitutes the Federal action that is subject to analysis as required by the National Environmental Policy Act (NEPA). The significance of this action is analyzed based on the NAO 216-6 criteria and CEQ's context and intensity criteria. These include:

1. 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 Chinook salmon, coho salmon, winter steelhead, and summer steelhead. These are the target species. Impacts on these species are expected to be negligible to low in all categories analyzed as described below:

Facility Effects – Negligible to Low effect based on proportionally small water withdrawals, compliance with Clean Water Act criteria, and limited and negligible impacts due to migration delay from weir operation.

Fish Removal – There will be negligible to low risk to natural-origin salmon and steelhead due to handling during the collection of hatchery salmon and steelhead for broodstock and adult management.

⁷ For the purposes of this document, any subsequent references to the HGMPs or operation of the hatchery programs should be assumed to include the Mitchell Act funding of the HGMPs as well. The act of funding the HGMPs does not result in any impacts beyond those resulting from implementation of the HGMPs and considered herein.

1
2 Genetics – There will be an increased risk of genetic impacts from outbreeding effects due to the
3 presence of naturally spawning hatchery adults; however, these impacts are expected to be low,
4 and the impacts will be monitored closely over time.

5
6 Ecological Interactions – Impacts are expected to be low, because the programs produce hatchery
7 juveniles that are acclimated and released at optimal size and condition which leads to rapid
8 downstream migration. This rapid migration limits the ecological and predator/prey interactions
9 with natural-origin juveniles present below the hatchery release locations.

10
11 Monitoring and Evaluation – Impacts are expected to be low, because sampling is non-lethal,
12 trapping and handling would likely increase only slightly, and the information provided is
13 necessary to monitor and assess impacts on the natural-origin population from the hatchery
14 programs.

15
16 In addition, an ESA section 7 consultation was completed on the impacts on ESA-listed salmon
17 and steelhead, and concluded that the effects of the Proposed Action would not jeopardize the
18 continued existence of the Lower Columbia River Chinook Salmon, Lower Columbia River
19 Coho Salmon, or Columbia River Chum Salmon ESUs or the Lower Columbia River Steelhead
20 or Southern Pacific Eulachon DPSs (NMFS 2012a).

21
22 The effect of the proposed hatchery programs on ESA-listed ESUs and DPSs overall range-wide
23 abundance, distribution, and productivity will be small because these HGMPs are specifically
24 designed to minimize known impacts on ESA-listed fish and to evaluate uncertainties. The
25 Proposed Action includes explicit steps to monitor and evaluate these uncertainties and includes
26 adaptive management actions that allow for the timely adjustment to risks that might arise.
27 Additionally, hatchery-origin fish are produced in part to sustain the desired hatchery- and
28 natural-origin production into the future.

29
30 **2. Can the Proposed Action reasonably be expected to jeopardize the sustainability of any**
31 **non-target species?**

32 The Proposed Action is not expected to jeopardize the sustainability of non-target species, as
33 summarized below.

34
35 *Salmonids:* There will be some effects on non-target salmonids from the Proposed Action.
36 Impacts on non-target salmonids include direct contact with hatchery fish or alteration of habitat
37 elements. Non-target, ESA-listed fish that may be affected include the Columbia River chum
38 salmon ESU. Impacts on listed fish are analyzed in detail during the ESA consultation, and are
39 low because impacts are primarily on target species. Additionally, the HGMPs are specifically
40 designed to minimize known impacts on listed fish and to monitor and evaluate uncertainties in
41 impact levels for improved future management.

42
43 In addition, an ESA section 7 consultation was completed considering the impacts on ESA-listed
44 salmon and steelhead, and concluded that the effects of the Proposed Action would not
45 jeopardize the continued existence of Columbia River chum salmon (NMFS 2012a).

1 An ESA section 7 consultation will also be completed on the incidental impacts on the Columbia
2 River Bull Trout DPS. NMFS has determined that the effects of the Proposed Action are not
3 likely to adversely affect the continued existence of the Columbia River Bull Trout DPS.
4

5 *Other Fish Species:* The Proposed Action may affect non-target species in the Sandy River Basin
6 in three ways: through obstruction or other behavioral effects of the structures required by the
7 proposed programs, through incidental impacts in fisheries targeting fish returning to the
8 proposed programs, and through ecological interactions. Potentially affected non-listed, non-
9 salmonid fish include suckers, northern pikeminnow, sculpins, lamprey, and sturgeon. There are
10 also a number of introduced species present though not abundant in the action area: Percidae
11 (perch, walleye), Centrarchidae (bass, sunfish, crappie), Ictaluridae (catfish, bullhead), Cyprinidae
12 (carp), Clupeidae (shad). The Pacific eulachon is the only ESA-listed, non-salmonid fish that
13 may be affected by the Proposed Action, and an ESA section 7 consultation was completed
14 considering the effects of the Proposed Action on the southern DPS of Pacific Eulachon,
15 concluding that the Proposed Action would not jeopardize the continued existence of the species.
16 No non-target fish species would be expected to be intercepted at the Sandy River weirs or
17 obstructed by any hatchery facility structure. All water intakes are screened to prevent fish
18 impingement. Because of gear selection, few non-target species would be intercepted in
19 fisheries targeting salmon and steelhead produced in the proposed hatchery programs. Although
20 some non-target fish species may compete or be preyed upon by hatchery-origin salmon and
21 steelhead, others may benefit by preying upon salmon and steelhead produced by the proposed
22 hatchery programs.
23

24 *Avian and Terrestrial Wildlife:* Impacts on avian and terrestrial wildlife may occur from the
25 maintenance of weirs, habitat disturbance from fishing activities, and contribution of hatchery-
26 origin fish to the diet of avian and wildlife species. Although the Sandy River weirs may change
27 the migration and feeding behavior of wildlife species, effects would be low because (1) the
28 weirs would be located in tributaries with semi-rural habitat where human activity already
29 occurs, (2) the weirs would be temporary and would affect the wildlife species for a limited
30 amount of time each year, and (3) the weirs would only disturb small reaches of each of the
31 tributaries. Because fishing activities would occur throughout the action area even without the
32 proposed hatchery programs, and the proposed hatchery programs would only be expected to
33 increase the amount of fishing effort, no change in disturbance on avian and terrestrial wildlife
34 species would be expected. The Proposed Action would be expected to benefit wildlife species
35 that feed on salmon because they would increase the total abundance of salmon and steelhead in
36 the action area.
37

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

41 There will be no effect on ocean or coastal habitats from the Proposed Action because the action
42 area is in the Sandy River, a tributary to the Columbia River, hundreds of river miles from its
43 confluence with the ocean.
44

1 There will be little or no effect on essential fish habitat for any fish species, including Chinook
2 salmon, coho salmon, and chum salmon,⁸ because there will be limited or no impact on water
3 quality or substrate necessary for these species to carry out spawning, breeding, feeding, or
4 growth to maturity and because activities associated with the proposed HGMPs, such as
5 maintenance of intake structures, are unlikely to remove or destroy habitat elements. Essential
6 fish habitat associated with the migration of spring Chinook salmon will be impacted by the
7 operation of the weirs, but the impacts are expected to be small because the weirs will be
8 checked at least daily, more if abundances increase, to pass natural-origin adults quickly to
9 minimize migration delay. Essential fish habitat associated with the migration of coho salmon
10 will be impacted by the operation of the adult weir at the Sandy Hatchery on Cedar Creek
11 (tributary to the Sandy River). The impacts are expected to be low because the natural-origin
12 coho salmon trapped at the weir will be passed quickly above the adult weir to continue their
13 migration. The return of hatchery-origin salmon and steelhead in the proposed HGMPs is likely
14 to have a positive effect on water quality related to marine-derived nutrients because the
15 additional returns from hatchery production will result in a net increase of marine-derived
16 nutrients in the action area.

17
18 **4. Can the Proposed Action be reasonably expected to have a substantial adverse impact**
19 **on public health or safety?**

20 The Proposed Action is not reasonably expected to have a substantial adverse impact on public
21 health or safety, directly or indirectly. Hatchery actions described in the HGMPs will be
22 implemented by a state agency that complies with state and Federal safety and environmental
23 laws, thus reducing the risk to the public. The public will have limited exposure to hatchery
24 actions except for visiting hatcheries or participating in salmon and steelhead fisheries, which
25 have little or no risk to human health.

26
27 **5. Can the Proposed Action reasonably be expected to adversely affect endangered or**
28 **threatened species, marine mammals, or critical habitat of the species?**

29 The Proposed Action will have a minor, adverse impact on ESA-listed Lower Columbia River
30 Chinook salmon, Lower Columbia River coho salmon, Columbia River chum salmon, Lower
31 Columbia River steelhead, Columbia River Basin bull trout and Pacific Eulachon because each
32 species may be captured, handled, and released during broodstock collection. There is also a risk
33 of adverse impacts from direct and indirect competition of juveniles from the release of hatchery-
34 origin salmon and steelhead. An ESA section 7 consultation was completed on the incidental
35 impacts on the Lower Columbia River Chinook Salmon, Lower Columbia River Coho Salmon,
36 Columbia River Chum Salmon ESUs, and Lower Columbia River Steelhead, Southern Pacific
37 Eulachon, and Columbia Basin Bull Trout DPSs, and concluded that the effects of the Proposed
38 Action would not jeopardize the continued existence of any of these species (NMFS 2012a).

39
40 There are no expected impacts on critical habitat for endangered or threatened species because
41 activities associated with the HGMPs (such as maintenance of facilities and instream structures)

⁸ EFH has not been defined for steelhead.

are unlikely to remove or destroy critical habitat elements. The effects of the Proposed Action on critical habitat was considered in the ESA section 7 consultation (NMFS 2012a).

There are limited opportunities for impacts on marine mammals, because of the small overlap of shared habitat. Marine mammals are not present in the action area, and the potential for hatchery-origin salmon and steelhead from the program being a food source is limited.

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

The Proposed Action is not expected to have a substantial impact on biodiversity and/or ecosystem function, such as benthic productivity or predator/prey interactions, within the affected area. Although salmon and steelhead produced in the proposed hatchery programs are expected to prey on other fish species in the action area, predation is not expected in large quantities since juvenile hatchery-origin salmon and steelhead generally migrate through the action area quickly after being released. Hatchery-origin salmon and steelhead produced in the proposed hatchery programs may become prey for other predatory species, but the proposed programs represent only a small proportion of the total amount of food available to predator species, so the Proposed Action is not expected to have substantial impacts on biodiversity and ecosystem function.

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

Impacts on socioeconomics will be moderately beneficial for local businesses supplying recreational fishing commodities, because the proposed hatchery programs will produce hatchery-origin salmon and steelhead that will return to the area as adults and may be harvested in fisheries. As a result, an increase is expected in economic activity from additional purchase of recreational supplies such as fishing gear, camping equipment, consumables, and fuel at local businesses from customers visiting the area as a result of the increase in adult returns. It is possible that the returning salmon adults may draw some people from outside of the action area and, therefore, fisheries are expected to add slightly to the revenue within the action area. However, considering that recreational fishing businesses are not likely responsible for a large percentage of the economy within the action area or the state, the economic increase will likely be low at this scale.

Impacts on social communities will be moderately beneficial because the hatchery-origin fish will provide fishing opportunities for local citizens. All population sectors are expected to benefit equally.

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

The effects on the quality of the human environment are not likely to be highly controversial because these effects are consistent with implementation of the hatchery programs over prior years and are beneficial to the affected human communities.

1
2 **9. Can the Proposed Action reasonably be expected to result in substantial impacts on**
3 **unique areas, such as historic or cultural resources, park land, prime farmlands,**
4 **wetlands, wild and scenic rivers, or ecologically critical areas?**

5 The Proposed Action is not expected to result in substantial impacts on unique areas, such as
6 historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers, or
7 ecologically critical areas, because it does not involve the construction of any new infrastructure,
8 and because none of the proposed activities occur in such areas. Designated critical habitat for
9 the Lower Columbia River Chinook Salmon ESU, Lower Columbia River Steelhead DPS, and
10 Pacific Eulachon DPS is within the action area; however, all habitat impacts would be small
11 under the Proposed Action as described in Subsection 4.3, Effects on Anadromous Fish Listed
12 under the ESA, and are not considered significant.
13

14 **10. Are the effects on the human environment likely to be highly uncertain or involve**
15 **unique or unknown risks?**

16 The effects on the human environment are all known and minor impacts. No unique or unknown
17 risks have been identified after applying the results of research conducted over several years in
18 this action area on these and other species. There are uncertainties involved in the on-going
19 operation of hatchery programs, but the Proposed Action includes explicit steps to monitor and
20 evaluate these uncertainties in a manner that allows timely adjustment to risks that might arise.
21

22 **11. Is the Proposed Action related to other actions with individually insignificant, but**
23 **cumulatively significant, impacts?**

24 The cumulative impacts of the Proposed Action have been considered in the environmental
25 assessment and in the associated biological opinion (NMFS 2012a). The take of ESA-listed
26 species will be limited to a maximum level considered to result in a no-jeopardy ESA
27 determination when considering all existing conditions, all other permits, and other actions in the
28 area affecting these conditions and permits. The proposed hatchery programs are coordinated
29 with monitoring so that hatchery managers can respond to changes in the status of affected listed
30 species. If the cumulative effects of salmon management efforts fail to provide for recovery of
31 listed species, adjustments to fisheries and to the hatchery production levels would likely be
32 proposed.
33

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

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

The Proposed Action does not include any new construction, and is therefore unlikely to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places. Accordingly, it is equally unlikely that the action may cause loss or destruction of significant scientific, cultural, or historical resources because of the limited scope of the action area, which includes none of the aforementioned structures or resources.

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

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

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

The Proposed Action is not likely to establish a precedent for future actions with significant effects or to represent a decision in principle about a future consideration because the Proposed Action is similar in nature and scope to similar hatchery actions in the action area over the past several years. Other HGMPs in the mainstem Columbia River have been analyzed through similar ESA determinations and NEPA reviews. Future requests in the action area would be analyzed through new ESA determinations and NEPA reviews.

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

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

The Proposed Action is not expected to threaten a violation of Federal, state, or local law or requirements imposed for the protection of the environment because the Proposed Action was developed in the broader context of consultations involving Federal and state agencies charged with recovery planning and implementation of the ESA. The Proposed Action is also specifically designed to comply with the ESA, and is part of the purpose of the action. The action complies with other applicable local, state, and Federal laws. National Pollution Discharge Elimination System permits related to this action would be issued under Federal laws implemented by the states that are consistent with Federal and local laws related to environmental protection.

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

4 The Proposed Action will not result in substantial cumulative adverse effects on target or non-
5 target species because the take of ESA-listed species would be limited to a maximum level
6 considered to result in a no-jeopardy ESA determination when considering all existing fishery
7 conditions, all other permits, and other actions in the area affecting these conditions and permits.
8 The cumulative impacts of the Proposed Action have been considered in the environmental
9 assessment and in the associated biological opinion (NMFS 2012a; NMFS 2012b).

10
11 **8.1 List of Reviewers**

- 12 • Kathe Hawe, NWR NEPA Coordinator
13 • Robert Bayley, Salmon Management Division QA/QC Coordinator
14 • Christopher Fontecchio, General Counsel
15

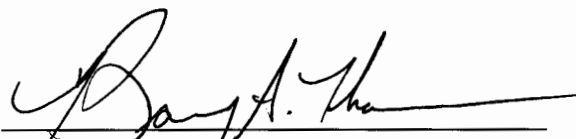
16 **8.2 References**

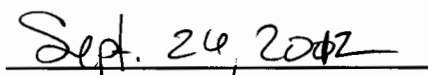
17 NMFS (National Marine Fisheries Service). 2012a. Endangered Species Act (ESA) Section
18 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery Conservation and
19 Management Act Essential Fish Habitat (EFH) Consultation for Sandy River Spring
20 Chinook Salmon, Coho Salmon, Winter Steelhead, and Summer Steelhead Hatchery
21 Programs. National Marine Fisheries Service, Portland, Oregon.
22

23 NMFS. 2012b. Draft Environmental Assessment to Analyze Impacts of a NOAA's National
24 Marine Fisheries Service Issuance of a Letter of Concurrence for the Hatchery Genetic
25 Management Plans Submitted by the Oregon Department of Fish and Wildlife under
26 Limit 5 of the 4(d) Rule of the Endangered Species Act. Portland, Oregon.
27
28

29 **8.3 Determination**

30 In view of the information presented in the environmental assessment and analysis prepared for
31 the Proposed Action, it is hereby determined that the approval by NMFS of this action will not
32 significantly impact the quality of the human environment. In addition, all beneficial and adverse
33 impacts of the Proposed Action have been considered in reaching a finding of no significant
34 impact. Accordingly, preparation of an Environmental Impact Statement is not necessary to
35 further analyze the potential for significant impacts resulting from the Proposed Action.
36

37
38
39 
40 Barry Thom, Deputy Regional Administrator

41
42
43 
Date

1 Appendix A. Draft Environmental Assessment Comments and Responses



SandyHatcheries nwr <sandyhatcheries.nwr@noaa.gov>

Hatchery fish depress the recovery of wild stocks

1 message

Bill Gordon <billG@gmail.com>
To: SandyHatcheries.nwr@noaa.gov

Wed, Jun 20, 2012 at 11:10 PM

1 | Please put the recovery and health of wild steelhead and salmon first. Please do not substitute wild fish with inferior hatchery fish.

Sincerely,
Bill Gordon
Eugene, OR
97401

Bill Gordon Comment
Email received June 20, 2012

1. Comment noted.



July 9th, 2012

NMFS Salmon Management Division,
1201 NE Lloyd Blvd., Suite 1100
Portland, OR 97232

Re: Sandy River HGMPs

Dear NMFS Salmon Management Division,

- 1 Thank you for the accepting public comment on the Sandy River Hatchery and Genetic Management Plans. The Coastal Conservation Association (CCA) has over 8,000 members in the Northwest including our Mount Hood Chapter who consider the Sandy River their home river.

I hope you will consider this letter as speaking for the thousands of our members who have fished, and will fish the Sandy River as I have.

Our members are eager participants in many projects to protect and rebuild this important river that is located so close to so many conservation minded sport fishers.

Many of our Portland metro area members have grown up fishing on the Sandy and support efforts to restore and maintain this river, it's native fish and the hatchery fishing opportunities that are so important for keeping people engaged in fish recovery.

We are aware that some groups would like to curtail all hatchery and broodstock programs on the Sandy. CCA endorses modernization of hatchery practices while working with the managing agencies to rebuild and protect native stocks.

The HGMPs call for numerous changes to management to reduce stray rates and help recover native fish, while at the same time providing a fishery to the tens thousands of anglers who fish the Sandy.

Since the removal of Marmot Dam, new strategies and measures have been and are being implemented to reduce stray rates, and help recover native stocks.

30 Years of Conservation

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1006 West 11th Street • Vancouver, WA 98660 • Tel (877) 255-8772 • Fax (877) 255-8774
www.ccapnw.org

We are hopeful you will work with ODFW in giving these measures an opportunity to work, and adapting as needed rather than curtailing an important catch and keep opportunity so close to many who care about our fisheries.

We are optimistic about the future of the Sandy River and are encouraged that so many changes to improve the fishery for both catch and keep opportunity and native fish recovery are working together like never before.

We ask NMFS to approve ODFW's HGMP and continue to consider the multiple uses of our rivers. Our members and many other fish advocates have worked hard to help restore this river and improve the conditions needed for native fish recovery and rebuilding.

Regards,

Bruce Polley
Chair Government Relations Committee
CCA Oregon

Bruce Polly, Coastal Conservation Association Comment
Email received July 9, 2012

1. Comment noted.



SandyHatcheries nwr <sandyhatcheries.nwr@noaa.gov>

Keep hatcheries open!

1 message

Chris Hillmann <canonpdx@gmail.com>

Mon, Jul 9, 2012 at 6:47 PM

To: SandyHatcheries.nwr@noaa.gov

- 1 | Let the naturalists work on another river. You screw up this chance for me to fish a river that doesn't cost 50-100 bucks in gas to get too and I will be fuming pissed! Let them driver their electric cars far far away. I LIVE on the Sandy, so I should have more say than Portlanders....

Chris Hillmann Comment
Email received July 9, 2012

1. Comment noted.



Randy Leonard, Commissioner
David G. Shaff, Administrator

1120 SW 5th Avenue, Room 600
Portland, Oregon 97204-1926
Information: 503-823-7404
www.portlandonline.com/water



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July 19, 2012

NMFS Salmon Management Division
1201 NE Lloyd Boulevard, Suite 1100
Portland, OR 97232

Re: City of Portland Comments on NMFS' Draft Environmental Assessment
Potential Impacts of Oregon Department of Fish and Wildlife's
Hatchery and Genetics Management Plans for Sandy River Fish Stocks

Dear Sir or Madam:

The City of Portland (City) has reviewed the draft environmental assessment (DEA) and has the following comments for your consideration.

- 1) The framing of the City's mitigation obligations in the contextual part of the DEA is not accurate. Under section 1.6 Relationship to Other Plans and Policies, the DEA states that *"NMFS and the City of Portland have completed a Habitat Conservation Plan (HCP) for the Bull Run Water Supply System (NMFS 2008a). Under the HCP, the City of Portland provides funding for the spawning and rearing of Sandy River spring Chinook salmon to mitigate for habitat lost to construction and operation of the Bull Run Water Supply System. The HCP also funds habitat improvement projects and monitoring and evaluation activities that will be coordinated with monitoring and evaluation of the hatchery programs. The City of Portland has also provided funds to ODFW to make changes to the Sandy Hatchery water intake structure that will bring the intake structure up to NMFS passage criteria (NMFS 2008b) and will allow passage into upper Cedar Creek that was blocked at the hatchery until 2010. The HCP includes other habitat actions in the Sandy River Basin that are expected to benefit hatchery and natural-origin salmon and steelhead in the basin. The HCP does not include the hatchery actions within the basin and thus the need for this analysis."*

The City suggests the following clarifying language to replace the italicized language above:

The City is currently mitigating for the fisheries and habitat impacts of the Bull Run water supply under a habitat conservation plan. The City completed, and NMFS approved, the Bull Run Water Supply Habitat Conservation Plan (HCP) in 2008. The primary focus of the HCP is protection for natural-origin ESA-listed anadromous fish under the jurisdiction of the National Marine Fisheries Service. By following the HCP commitments, the City is in full compliance with the ESA and Clean Water Act for all Bull Run water supply operational impacts.

In addition, in 1979, the City received a hydropower license from the Federal Energy Regulatory Commission in order to install electric power production facilities at the Bull Run dams. Under the terms of that license and an agreement with Oregon Department of Fish and Wildlife (ODFW) the City each year provides ODFW money to produce hatchery fish in the Sandy River basin. In return, ODFW agreed to seek no additional actions by the City based on the construction and operation of the Project as long as it operated in compliance with the City's FERC license.

The City's hydropower license term expires in 2029, while the HCP's term expires in 2059. Under the terms of the HCP Implementation Agreement signed by NMFS and the City, if the City seeks to renew its hydropower license, it must incorporate the HCP into its relicense application. The purpose of this is to assure, absent significantly changed circumstances, that the HCP terms will become the fish and wildlife protection conditions for any new license.

There are 49 conservation measures in the City's HCP and they are being implemented in the Bull Run basin and elsewhere in the greater Sandy River watershed. The HCP provides funding for habitat improvement projects and monitoring and evaluation efforts, all targeted toward improving wild fish stocks. The City is also providing most of the money to improve the Sandy Fish Hatchery facilities to allow for coho salmon and steelhead passage, which has been blocked since the construction of the hatchery in the 1950's.

- 2) In several places, the DEA declares ODFW's intention to build a fish trap/weir at the mouth of the Bull Run River if it can obtain permission to use City land for that purpose. The City does not support continued acclimation and releases of hatchery spring Chinook to the lower Bull Run River. But if such a program continues, the City wants the hatchery adult salmon removed so that they will not spawn on grounds protected and enhanced for natural spawners by HCP measures. Under appropriate conditions, therefore, the City will consider granting approval for ODFW to use City land to build a weir at the mouth of the river. Nonetheless, the City has serious concerns about the efficacy of such a weir. Thus, even if the City grants permission for the weir, it will continue to monitor closely adult salmon use of the Bull Run to determine if ODFW can successfully prevent hatchery fish from straying onto Bull Run spawning grounds.
- 3) The City was not able to review each of ODFW's fish stock HGMPs in order to provide detailed comments. However, the City did look at the DEA effects analysis for spring Chinook salmon. The City believes that the DEA significantly understates the impacts of continued hatchery operations on natural-origin spring Chinook salmon in the Sandy River. Based on the very high straying rates of spring Chinook salmon in the upper Sandy River in recent years and the difficulty in trapping the hatchery fish and removing them from the primary spawning

grounds, the City believes that the current hatchery programs for spring Chinook are having a significant impact on the integrity of the natural origin fish. The City acknowledges that ODFW is implementing management actions identified in the draft recovery plan for fish in the Sandy River, but the trapping actions so far appear to be ineffective. The City urges NMFS to re-evaluate the impacts on spring Chinook of the current HGMPs and revise its analysis to more accurately reflect the actual and reasonably anticipated adverse effects on natural stocks.

Sincerely,

Steve Kucas
Environmental Compliance Manager
Habitat Conservation Plan Manager

CC: Todd Alsbury, ODFW
Ben Meyer, NMFS
Sand River Basin Partners (electronically)

City of Portland Water Bureau Comment
Email received July 9, 2012

1. Subsection 1.6, Relationship to Other Plans and Policies, was modified to reflect this comment.
2. NMFS supports the actions of the City to coordinate with ODFW on the placement and operation of a weir at the mouth of the Bull Run River.
3. Comment noted.



SandyHatcheries nwr <sandyhatcheries.nwr@noaa.gov>

Sandy River Hatchery Genetiuc Management Plan

1 message

Frank Amato <frank@amatobooks.com>

Fri, Jun 29, 2012 at 5:46 PM

To: "sandyhatcheries.nwr@noaa.gov" <sandyhatcheries.nwr@noaa.gov>

Cc: Nick Amato <nick@amatobooks.com>, Dave Eng <deng@amatobooks.com>, Tony Amato <tony@amatobooks.com>

Dear NMFS:

1 I have fished the Sandy River for summer and winter steelhead since the 1970s. I am fully in support of ODFW's Sandy River hatchery programs.

I have published Salmon Trout Steelheader magazine since 1967. It is circulated in the Pacific Coast and has a total readership per issue of about 50,000 to 80,000 avid steelhead and salmon sport fishing anglers throughout its circulation range. I know our magazine readers well, and virtually 100% of them, if asked, would want the Sandy River to have CATCHABLE hatchery winter and summer steelhead as well as RETURNABLE wild winter steelhead! For nearly 30 years now they have been returning wild steelhead to preserve their sport. They have a REAL stake in what you decide.

With ODFW's present conservative hatchery steelhead management (fin marking to designate harvest) and TOTAL wild steelhead release, straying and interbreeding is minimal and there is absolutely no proof that there is a specific Sandy River steelhead genetic problem!

The general public, and sport fishers and their organizations specifically, supported the removal of Marmot Dam. For your agency to stab sport anglers in the back by deleting non-genetic threatening hatchery steelhead and salmon programs would leave otherwise conservation-supporting anglers in a very ugly mood!

I stand prepared to make a crusade against NOAA in the pages of Salmon Trout Steelheader and in other media if ODFW's reasonable approach to the Sandy River is ignored!

Thanks!

Frank W. Amato

Publisher, Salmon Trout Steelhead magazine and fishing and fly tying books

www.amatobooks.com

Jack Amato Comment
Email received June 29, 2012

1. Comment noted.



SandyHatcheries nwr <sandyhatcheries.nwr@noaa.gov>

Sandy river plan

1 message

Jack Glass <jackfish4u@yahoo.com>

Wed, Jul 4, 2012 at 5:43 PM

Reply-To: Jack Glass <jackfish4u@yahoo.com>

To: "SandyHatcheries.nwr@noaa.gov" <SandyHatcheries.nwr@noaa.gov>

Cc: Russell Bassett <executivedirector@anws.org>, Colonel & Judy Thomas <cjthomas@ipns.com>, Norm Ritchie <normritchie@q.com>, Todd Alsbury <toddalsbury@state.or.us>, brandon glass <jbglasss@yahoo.com>

To whom it may concern

My name is Jack Glass I have a home on the Sandy river mile 3.5 and have lived here since 1981 we have fished the Sandy river since I was 8 years old when my father guided the river during the late 60s and 70s.

I am a second generation full time fishing guide on the Sandy river now 29 years my Son is a third generation full time fishing guide, we make our living on the Sandy river and we are very passionate about its management.

We have worked hand and hand with ODFW on many river projects and have be strong supporters of ODFW for many years ask any of the managing staff on the fish side they will know my name.

1 It is very important for our career as fishing guides on the Sandy river to have some consumptive fishing, with all my years on the river I have experienced very successful angling in years past with the high levels of hatchery planting of steelhead and Salmon, I understand the need for reducing straying in spawning grounds and with the present plan Steelhead & Coho are within those

parameters, Spring Chinook program will also meet those requirements if it is given time to work Marmot Dam was removed only 4 1/2 years ago it will take more time for the new management plan to take hold with such a major change to the river.

The spring Chinook program on the Sandy river is our bread and butter time of the year there is not another person that has sat in a boat on the Sandy river over 46 years than I my knowledge about the watershed runs deep.

The protection of Natural spawning fish on the Sandy river is in place and is working please allow the present program to take hold any more reduction in a harvest able fish out of the Sandy will not support our jobs and will have a devastating impact on local retailers.

The recent pressure form advocate groups that feel this program is not in the best interest of the Sandy river are less than 10% of license sales in the sport fishing industry budget the other 90% is dependent on ODFW to protect our resource and provide sport fishing for those who wish to catch and keep one.

Jack Glass
1208 E, Columbia River Hwy
Troutdale OR 97060
H, 503 666 5370

C, 503 260 2315

R&E Board Member with Oregon Fish & Wildlife

Guide Advisory Board Member with Oregon State Marine Board

Jack Glass Comment
Email received July 4, 2012

1. Comment noted.



SandyHatcheries nwr <sandyhatcheries.nwr@noaa.gov>

Sandy River Wild Fish

1 message

James Fraser <fraserjames.uo@gmail.com>

Wed, Jun 20, 2012 at 4:10 PM

To: SandyHatcheries.nwr@noaa.gov

To whom it may concern,

- 1 | The science is clear; hatchery and wild fish cannot co-exist in our rivers for the long term (let's think 50, 100, 500 years)!
- 2 | Besides the value I place on wild fish in wild rivers, most fishermen will agree that wild fish fight harder and are more willing to take a fly or lure than hatchery fish. Please manage the Sandy River as a haven for wild steelhead and salmon, not as a river for hatchery fish.

Sincerely,
James Fraser
Driggs, ID
83422

James Fraser Comment
Email received June 20, 2012

1. Comment did not provide references for NMFS to review this statement.
2. Comment noted.



SandyHatcheries nwr <sandyhatcheries.nwr@noaa.gov>

Sandy River Hatchery Genetic Management Plan

1 message

Oregon Navigator <ornavigator@hotmail.com>

Mon, Jul 9, 2012 at 10:10 PM

To: sandyhatcheries.nwr@noaa.gov

dNational Marine Fisheries Service

To Whom it May Concern:

I am writing in support of the Sandy River Hatchery Genetic Management Plan because the plan represents a technically sound, monitored and adaptive approach of protecting the wild fisheries in the Sandy River in balance with a very important hatchery fishery within a 30 minute to an hour drive from the Portland Metropolitan Area.

I have been fishing the Sandy River since 1989 -- mainly as a bankie -- both using gear and fly tackle. Most of my trips have been for the fishing -- not the catching -- as I find the river wild, scenic, peaceful - a nearby natural oasis within 20 minutes from my Portland residence. In all those years I have only landed a handful of fish - both natives carefully released and those of hatchery origin which I gleefully keep. It is not just for bringing home a good eating fish -- but bringing a fish home every now and then has connected my children and neighbors to the watershed. A kept fish is tangible and many a story about the importance of clean water, healthy watersheds and conservation occur around the aroma of a steelhead fillet on the BBQ.

1 I have been following the native fish - hatchery fish debate through all this time as well. It irks me that the debate is cast as a win-lose debate because as is evidence by the evolution of the Sandy River Hatchery Genetic Management Plan -- the correct solution is a balanced solution where hatchery fish are managed with minimal risk to wild stocks. As wild fish stocks became more of a concern through federal Endangered Species Act listings -- the Oregon Department of Fish and Wildlife, with support from sports fishers such as myself -- has adapted accordingly. First was the elimination of the Big Creek stock of winter steelhead - a decision I supported because I understood the benefit to wild fish stocks. (This was painful for me as it appears I have only have the ability to catch Big Creek stock of steelhead). Next, was the establishment of brood stock hatchery fisheries and significant reductions in the number of smolts released. When Marmot Dam came down - the next appropriate action was placing acclimation sites lower down in the basin. I personally invested in this strategy with my own volunteer sweat equity - being part of a handful of dedicated steelheaders who removed and salvaged the acclimation ponds located at Marmot Dam for use lower in the basin. All these changes have led to reduced amounts of hatchery steelhead for the catch in keep fishery -- a reduction I was willing to accept to support native stocks.

It has almost become cliché - but sustainable management of fisheries on the Sandy River - must include the social, economic and ecological aspects of management. Making decisions based on ecological ideology that ignores that other two tenants - is just that -- ideology that in the end will result in a failed fishery. If anything -- the Sandy River basin should be thought of as the ideal opportunity to demonstrate how federal and state agencies can work together to achieve a balanced management of hatchery and wild stocks. The social dimension is that this river is so close to Portland. There are numerous outdoor schools and other K through 12 education forums centered on the Sandy River. I volunteer for some of these -- and the chance of catching and keeping a steelhead or salmon -- is an attention grabber. Keeping a hatchery fish should be viewed as a social gateway to the science and ecology of the native fisheries. Kids get it -- just as the Hatchery Genetic Management Plan gets it. Economically -- a catch and keep opportunity supports guides, local tackle shops and sportsman clubs. These folks are at the forefront of conservation action in our watersheds. Keep in mind that those with an economic interest in these fisheries support the same ecological needs of wild fish -- clean water, functioning riparian systems, healthy forests and agricultural/urban uses that don't damage the watershed. Think about it -- sportsman such as myself are not against wild stocks. We are for wild stocks and support sound hatchery management strategies that protect wild stocks.

The Sandy River Hatchery Genetic Management Plan does just that. Emphasis is placed on reducing straying of hatchery fish on wild fish spawning beds. This is accomplished by acclimation sites low in the basin, reduced numbers of hatchery plants and using broodstock genetics in the hatchery stocks. Eliminating the hatchery stocks will end up alienating the silent majority from the river. It will result in lower social connections to the river and come at unnecessary cost to our sport fishing economy. Support the local tackle shop, the local sportfishing groups, the guides who advocate for the river and the local bank maggot that goes to the river for the "fishing" - with the lure that "catching and keeping" is a possibility. You can do that by supporting

the Sandy River Hatchery Genetic Management Plan.

Regards,

Jim

Jim Cathcart
2035 NE 37th Avenue
Portland, Oregon 97212

Jim Cathcart Comment
Email received July 9, 2012

1. Comment noted.



SandyHatcheries nwr <sandyhatcheries.nwr@noaa.gov>

Please reject ODFW's Sandy River HGMPs

1 message

John Rabel <johnrabel@hotmail.com>

Tue, Jun 19, 2012 at 9:10 AM

To: SandyHatcheries.nwr@noaa.gov

- 1 | Each year I travel to Oregon to fish the Sandy. My goal is to encounter wild fish. It seems conter-productive to spend millions on wild habitat restoration and then infect the areas with hatchery fish. Watersheds should be managed either for wild fish or for hatchery fish. The two types do not fare well together.

Sincerely,
John Rabel
Carnation, Washington
98014

John Rabel Comment
Email received June 19, 2012

1. Comment noted.



**McKenzie Flyfishers
Eugene, Oregon**

To: SandyHatcheries.nwr@noaa.gov

Date: July 8, 2012

Subject Line: Comments on Oregon's Sandy River hatchery plans

- 1 The McKenzie Flyfishers respectfully submits these comments on the National Marine Fisheries Service's (NMFS) draft Environmental Assessment (EA) under the National Environmental Policy Act (NEPA), which evaluates Oregon Department of Fish and Wildlife (ODFW) Hatchery Genetic Management Plans (HGMP) for fish hatcheries on the Sandy River in Oregon. The McKenzie Flyfishers comprise a group of people who share an interest in fly fishing. The club, based in Eugene, was conceived and organized in April, 1964. The club has approximately 100 members living throughout the Pacific Northwest. Members of the club fish primarily in Oregon, including on the Sandy River. The club has a long history of involvement in conservation issues, as advocates for the preservation of fishing resources and maintaining or enhancing the environment as required to maintain quality fishing opportunities.
- 2 Our analysis of and comments on the EA and HGMPs for the Sandy River follow. Our overarching comments are that the EA fails to contain high quality information or accurate scientific data, fails to consider or disclose adequate or specific mitigation measures, and fails to support any finding of no significant impact under NEPA. We also believe that the HGMPs and actions evaluated in the EA fail to conform to the requirements promulgated for Pacific salmon and steelhead under the Endangered Species Act (ESA).
- 3 While there are many important points that need to be made regarding both the content of the EA and the HGMPs, we feel that it is imperative that two concepts be given priority in this evaluation and that a revised EA or Environmental Impact Statement (EIS) assure that immediate action is taken to address these concerns:
 - 1) Among all the dangers that hatchery fish present to their wild, native counterparts, introgression of hatchery-stock genes and resultant loss of genetic diversity in the wild population is the most serious and the most immediately critical one. It is irreversible. Once those adaptive wild genes are lost, they are gone for good. As elaborated below, ODFW has essentially ignored or downplayed the striking genetic difference between wild fish and any existing hatchery stock. There is no time to waste—the introgression of hatchery-stock genes must be stopped at once.
 - 2) ODFW's overall approach to mitigating the effects of hatchery stock on wild fish is backwards and needs to be reversed. ODFW has historically tested, and proposes to continue testing its various hypotheses—for example, local "conditioning" of hatchery smolts to prevent straying—at massive scales. Hundreds of thousands or even millions of hatchery fish are continually injected on the hope that the latest unproven tweak will be effective, despite the long history of failure. Given the probability and huge negative consequences of being wrong, ODFW should be required to conduct its experiments in locations and at scales where wild salmon listed under the ESA are unaffected. Only if and when a technique is proven effective should it be allowed.

Our review of the information contained within the EA and HGMPs, as well as recent relevant scientific reports not referenced in those documents, raises serious concerns. In

the following comments, we will expand upon the bases for those concerns and discuss additional issues that we feel the EA has not adequately addressed.

- 4 After decades of research, numerous peer-reviewed publications, and important scientific conferences on the subject, the negative impacts of hatchery-raised fish on their wild counterparts are now well established within the fishery science community. ODFW and NMFS do not dispute the validity of this science. Indeed, the EA states that interaction between hatchery salmonids and wild fish is a limiting factor in the recovery of the ESA-listed species. It thus acknowledges that the ESA requires measures be taken to limit those interactions to the point that they do not result in significant reduction of the listed species' recovery prospects.

In the case of the HGMPs, we conclude from our review that NMFS proposes to approve them based primarily on three such measures, which ODFW claims will sufficiently limit the negative impacts of hatchery fish. These measures include:

- 5 1) *Minimizing the difference between hatchery and wild fish.* For Chinook salmon and winter steelhead, the hatchery stocks were relatively recently (2002-2010) derived from Sandy River wild fish, and therefore are claimed not to be significantly different from them. The Sandy hatchery stock of coho salmon, though established decades ago (1952), was also originally derived mostly from local Sandy River wild fish; and is therefore claimed by ODFW to still be closely related to the Sandy River wild, native coho population. NMFS accepts these assertions and concludes that its standard rule, which prohibits more than 5% of fish on the breeding grounds to be of hatchery origin, can be relaxed because the Sandy hatchery stocks represent less of a threat than other hatchery fish stocks.
- 6 2) *Local conditioning of hatchery smolts to reduce straying.* ODFW claims, and NMFS accepts, that holding hatchery smolts for 2-3 weeks at the release location prior to release will improve their homing fidelity and significantly reduce the rate of straying onto the wild fish breeding grounds.
- 7 3) *Physical prevention of hatchery fish straying.* ODFW claims, and NMFS accepts, that it can utilize physical sorting methods including weirs, traps, and seining, to separate returning hatchery adults from wild adult fish with sufficient efficiency to keep hatchery fish numbers on the breeding grounds below harmful levels.
- 8 After careful analysis, we conclude that approval of the HGMPs based on these measures is unwarranted and contraindicated. In each case, ODFW and NMFS either fail to consider the best available science, or assume the success of approaches that have not been proven to be effective. We believe that after consideration of the arguments, reasonable parties will join us in insisting that ODFW first prove that its proposed mitigation measures are effective before employing them. Below we provide expanded explanations for our conclusions regarding the efficacy of each of the primary hatchery mitigation measures put forth in the HGMPs.

Mitigation Measure 1. Minimizing the difference between hatchery and wild fish.

- 9 The most serious and immediately critical danger to ESA-listed wild Chinook salmon and winter steelhead is posed by introgression of hatchery stock genes. The available data strongly suggest that genetic interbreeding between native Chinook salmon and hatchery-bred Chinook salmon (and possibly other listed species) is currently occurring at a rate substantially above any accepted standard (*cf.* EA, section 4.1, p. 64, lines 8-29), and should be addressed immediately while there remains some semblance of a native gene pool within the wild population. In 2010, the most recent year for which the HGMP and the EA provide data, the proportion of hatchery Chinook salmon on the breeding grounds reached almost 80% (EA, p. 35, Table 3), after having risen steadily every year since the removal of Marmot dam in 2007. It is clear that under ODFW's current practices the hatchery and wild Chinook salmon populations are mixing and interbreeding. The situation regarding intermixing of hatchery and native Coho salmon and steelhead in the river may be much the same as with Chinook salmon and is simply masked by the lack of appropriate monitoring following the removal of the Marmot Dam.
- 10 Over the last decade and longer, published scientific studies have demonstrated the remarkable loss of reproductive fitness and genetic diversity when fish—particularly salmonids—are raised in hatcheries. (A lengthy but non-exhaustive list of such studies is provided in the References section at the end of these Comments – please let us know if we may supply any of these to you in hard copy.) This loss of fitness persists at least for generations, even when the descendants of hatchery parents revert to natural reproduction in the wild. (For example, see Araki et al., 2009; Chilcote et al., 2012.) These findings have become so well established that they are rarely disputed by anyone in the fishery science field. ODFW and NMFS accept these findings in their HGMPs and EA, and provide their own list of references that overlap those cited above.
- 11 In response to the demonstration of loss of reproductive fitness when fish are raised in hatcheries, hatchery managers developed an alternate strategy in which hatchery stock are derived from wild fish native to the river where they are to be released. In one version of this strategy, the hatchery stock continually has its wild fish genes "replenished" by regular cross-breeding of hatchery parents with wild parents. Such a design is called an "integrated" broodstock program. Its premise appears to be that maybe if a hatchery stock were derived from local wild fish, and its gene pool were regularly refreshed with infusions from wild parents, the loss of fitness could be eliminated or greatly reduced.
- 12 In reality, maintaining an integrated hatchery stock of an ESA-listed species requires the regular removal of scarce parents from the naturally producing wild population, resulting in fewer naturally produced descendants. Moreover, results of scientific studies over the last few years have been showing that this approach doesn't work. It seems that adaptation to artificial conditions and loss of genes important to wild reproductive fitness occur so quickly in the hatchery, that it makes little difference whether hatchery stocks are locally derived, integrated, or not.

- 13 Quote from Chilcote et al., 2011: "*[T]he impact of hatchery fish from “wild type” hatchery broodstocks was no less adverse than hatchery fish from traditional, domesticated broodstocks. We also found no support for the hypothesis that a population’s reproductive performance was affected by the length of exposure to hatchery fish. In most cases, measures that minimize the interactions between wild and hatchery fish will be the best long-term conservation strategy for wild populations.*" (Emphasis added.)
- 14 Quote from Blanchet et al., 2008: "*Overall, our results showed that both phenotypic and genetic changes can arise even if genitors share a common brood-stock and after only a few months of rearing in a controlled environment. We conclude that the progeny produced in such supportive breeding programs does not meet the criteria necessary to ensure preserving the genetic and ecological integrity of wild populations.*" (Emphasis added.)
- 15 Quote from Christie et al., 2012: "*We used a multigenerational pedigree analysis to demonstrate that domestication selection can explain the precipitous decline in fitness observed in hatchery steelhead released into the Hood River in Oregon. After returning from the ocean, wild-born and first-generation hatchery fish were used as broodstock in the hatchery, and their offspring were released into the wild as smolts. First-generation hatchery fish had nearly double the lifetime reproductive success (measured as the number of returning adult offspring) when spawned in captivity compared with wild fish spawned under identical conditions, which is a clear demonstration of adaptation to captivity. We also documented a tradeoff among the wild-born broodstock: Those with the greatest fitness in a captive environment produced offspring that performed the worst in the wild. These results demonstrate that a single generation in captivity can result in a substantial response to selection on traits that are beneficial in captivity but severely maladaptive in the wild.*" (Emphasis added.)
- 16 Quote from Araki et al., 2008: "*Accumulating data indicate that hatchery fish have lower fitness in natural environments than wild fish. This fitness decline can occur very quickly, sometimes following only one or two generations of captive rearing.*" (Emphasis added.)
- 17 The HGMPs describe the recent creation of Chinook salmon and winter steelhead hatchery stocks from local Sandy River wild fish, and the plans rely on these stocks to help mitigate the loss of fitness resulting from intermingling of wild and hatchery fish on the breeding grounds. The hatchery programs operated as integrated broodstock programs until 2010, when collection of wild parents was halted. These programs are now operating as "isolated" hatchery programs, since they no longer receive regular genetic infusions from wild parents.
- 18 However, as discussed above, the best available science indicates that such programs may do little if anything to alleviate the threat of reduction of fitness in wild populations due to introgression with hatchery derived fish. The HGMPs and EA ignore the latest and best scientific findings that indicate locally derived hatchery stocks (whether integrated

or not) offer little if any advantage over other hatchery stocks in regard to loss of fitness when interbreeding with wild fish occurs. Some of this research was conducted at least partially by ODFW itself—for example, Chilcote et al., 2011. There is thus no excuse for the failure of the HGMPs and the EA to discuss these findings and take them into consideration.

- 19 Similar arguments apply to the Sandy River hatchery coho salmon HGMP. As the EA states at p. 18: "The Sandy River coho salmon hatchery program is managed as a segregated hatchery program and would continue to be under the Proposed Action. The program started in 1952 with the vast majority of the broodstock for the program coming from natural-origin coho salmon captured in Cedar Creek." Thus the coho salmon hatchery stock is not even recently or completely derived from local wild fish, so there is even less reason than in the Chinook salmon and winter steelhead cases to think they are closely enough related to ameliorate the potential damage to wild reproductive fitness their interbreeding would cause.
- 20 We find the EA's failure to show concern over the possible genetic introgression of hatchery into the wild stock of these threatened populations to be astounding, in view of their own stated standards. Citing its 1995 workshop (p. 64), the EA states that "NMFS applies the Grant (1997) guideline that non-local hatchery stray rates should be managed such that less than 5 percent of the naturally spawning population consists of non-local strays." Yet in the next paragraph, it exempts the ODFW HGMPs from this standard by accepting without evaluation that ODFW's "hatchery maximum stray rate target of 10 percent was identified as the level necessary to meet delisting goals for the naturally spawning population, and reflects the similarity between the hatchery and naturally produced spring Chinook salmon (ODFW 2010)." In other sections of the EA, NMFS also accepts modification of the target to 10% for winter steelhead and coho salmon on the same grounds. However, we believe the value of this assumed genetic "similarity" is highly questionable given the current research findings discussed above.
- 21 The latest scientific results throw much doubt on the wisdom of NMFS' decision to allow the maximum hatchery stray rate to be raised from its standard 5% to the 10% level called for in the ODFW HGMPs. These findings also undermine the rationale for "taking" native fish for inclusion in integrated broodstock programs, and require a rigorous evaluation before such practices are allowed to continue. Neither ODFW nor NMFS present any evidence that the introgression of the Sandy hatchery stock will be any less damaging to wild fish than would any other hatchery stock. It is merely an unsupported assumption on their part that the Sandy hatchery stock produced from Sandy River wild fish will prove to be more fit than previous stocks.

Mitigation Measure 2. Local conditioning of hatchery smolts to reduce straying.

- 22 ODFW proposes to mitigate the harm to wild fish from hatchery straying in part by modifying its procedures in a way that it hopes will significantly reduce the tendency of hatchery fish to stray from their release point. Unfortunately such attempts have proven to be unsuccessful, and there is little objective basis for expecting more from this approach in the future.
- 23 The EA at p. 16 states that starting in 2003, two thirds of the Chinook salmon hatchery smolts were acclimated for 2-3 weeks prior to release at the Sandy hatchery; and that starting in 2006, all of them were acclimated. And yet the proportion of returning salmon on the breeding grounds that were of hatchery origin was estimated to be 45% in 2008, 53% in 2009, and 78% in 2010. So ODFW has already been trying this strategy for several years, and the evidence of its effectiveness all points in the same direction. If there is any positive effect at all, it is too small to make much difference in mitigating the overall problem.
- 24 The EA at p. 47 admits that it is uncertain whether the local conditioning will be successful in reducing the proportion of hatchery strays: "It would take a number of years to determine whether the acclimation and release of hatchery spring Chinook salmon at the Bull Run acclimation pond would reduce the proportion of hatchery spring Chinook salmon reaching the primary spawning areas in the upper Sandy River Basin."
- 25 Therefore given the meager benefits, if any, that conditioning of smolts has demonstrated to date, the prospect of it proving substantially efficacious in the future appears speculative at best. It seems to us that in cases of possible harm to an ESA listed species, policy selection should default to protecting the species rather than choosing the more convenient option and hoping for the best. This seems particularly important when the possible harm is to the gene pool of the species.
- 26 It is also important to realize that even if the ODFW were to stop releasing hatchery smolts into the river tomorrow, that would not be sufficient to completely address the immediate crisis of genetic introgression. Given the life history of these fish, we know that for the next few years, hatchery Chinook and the other listed anadromous species of hatchery origin previously released in the Sandy River will be returning and, without an efficacious program in place to avoid it, will be interbreeding with their native counterparts. Therefore, ODFW's efforts to "condition" hatchery Chinook smolts to avoid straying could not have any influence on this problem for the next three to five years; assuming that "anti-straying conditioning" will ever achieve the efficiency desired.
- 27 As we said at the beginning of this commentary, ODFW should be required to conduct these acclimation experiments at small scale first. Only if and when it is proven effective should it be allowed to scale up.

Mitigation Measure 3. Physical prevention of hatchery fish straying.

- 28 ODFW in its HGMPs also proposes to mitigate the harm to wild Chinook salmon from hatchery fish straying in part by physically preventing them from doing so. Marked hatchery fish would be separated from wild fish primarily through the use of weir/trap systems located at various points within the Sandy River basin, and possibly secondarily via seining and tangle-nets. The hatchery fish would be collected and prevented from reaching the spawning grounds in the upper reaches of the watershed. Unfortunately neither the ODFW HGMPs nor the NMFS EA provides enough detailed information about the operation and performance of the weir/traps to draw an informed conclusion as to their likely effectiveness. Nevertheless, some indication may be drawn from ODFW's past experience with these techniques.
- 29 In 2011, ODFW installed weir/traps in several locations in the Sandy basin and operated them during part of the summer and fall. The EA at p. 87 states: "The collection of 420 hatchery spring Chinook salmon adults using weirs in 2011 is more than double the 192 collected in 2010 using seines alone. However, even with the removal of hatchery spring Chinook salmon in 2011, the proportion of hatchery spring Chinook salmon in the naturally spawning population was estimated to be 61 percent (Alsby, 2012). This estimate is a decline from the proportion of hatchery spring Chinook salmon estimated in 2010 (75.7 percent), but is well above the Recovery Plan goal of 10 percent."
- 30 ODFW plans to employ these weir/trap systems in the future at multiple, inadequately specified locations over longer time periods throughout the summer. It is reasonable to expect that with more weir/traps operating over longer periods, higher numbers of hatchery fish will be caught and prevented from reaching the spawning grounds. However, there are clearly insufficient data to project that they will be efficient enough to greatly reduce the proportion of hatchery spring Chinook salmon in the spawning population from the 61 percent observed in 2011. And given the modest success thus far, it would certainly be improper to believe that the rate will approach anywhere near the HGMP target of 10%, much less the 5% target that NMFS should enforce.
- 31 The effectiveness of weir/traps has been called into question by published studies of similar attempts to segregate hatchery and wild salmonids. For example, consider this excerpt from Seamons et al., 2012; a report of a study on steelhead in a Washington river:
- "Our aim was to evaluate whether segregation by life history was an effective management strategy for minimizing or eliminating genetic interactions between wild and hatchery populations. Despite the earlier spawn timing in the hatchery population, our data suggest that hatchery and wild steelhead interbred and produced 'hybrid' offspring.*
- ...in this case, intentional selection for early return and spawn timing and **use of a weir were thought to segregate the hatchery fish from wild conspecifics**. Using estimates of mixture and admixture proportions, we found that the wild proportion of the annual number of outmigrating smolt and returning adult steelhead declined by 10–20%*

*between 1998 (the first year offspring of hatchery fish would be detectable) and 2009 (our last year of sampling), or within about three generations....**Although it was assumed that the weir spanning Forks Creek at the hatchery prevented upstream migration of most if not all adult steelhead (McLean et al. 2003, 2004), we discovered that marked (hatchery-produced) steelhead spawned in the wild every year (Dauer et al., 2009), likely bypassing the weir during the moderate to high stream flows that are common in winter and spring. Thus, data suggest that a continual input of hatchery-produced fish resulted in a proportional increase in hatchery/wild hybrid individuals and a related decline in proportions of wild ancestry in the naturally spawning population.***

*...One obvious solution is to reduce or cease production and release of steelhead from the hatchery; however, this option may be unpopular and difficult to implement. Physical segregation may be augmented by improving weirs. **However, weirs or dams are costly and they affect the habitat to some extent. Flooding and debris compromise most weirs, allowing fish to bypass them. Even if barriers were completely effective at preventing upstream migration, the hatchery-produced fish might spawn elsewhere in the basin (Quinn, 1993; Dittman et al., 2010).** Segregation by life history was thought to complement physical segregation, but our study shows that it failed to prevent genetic interactions between hatchery and wild steelhead populations. Thus, managers should also consider other options for minimizing interactions between wild and cultured animals." (Emphasis added.)*

- 32 NMFS itself admits the uncertainty of the effectiveness of the weir/traps. The EA at p. 15 states: "Currently, the proportion of hatchery spring Chinook salmon in the naturally spawning population exceeds the 10 percent goal for the Sandy River spring Chinook salmon population that was identified in the Recovery Plan (ODFW, 2010). The operation of the proposed weir/trap facilities and the possible use of seines and tangle-net to collect broodstock also have an additional goal of removing hatchery spring Chinook salmon from the naturally spawning population. It is unknown if the operation of the weir/traps will be successful in removing enough of the hatchery spring Chinook salmon adults to meet the 10% goal, while at the same time minimizing impacts on natural-origin spring Chinook salmon that are handled and released during collection activities." The EA at p. 87 states: "It is also uncertain whether the installation and operation of the weirs under the Proposed Action would be enough to reduce the number of hatchery spring Chinook salmon that could potentially spawn naturally to achieve the less than 10 percent hatchery spawner goal."
- 33 It is also unclear what the effect of the multiple weir/traps will have on returning wild fish. In some cases obstructions like weirs have been known to induce wild salmon to spawn downstream of the blockage. If this were to happen to any extent below the proposed Sandy River weir/traps, it would provide an opportunity for hatchery fish to breed with their wild counterparts.
- 34 Once again, ODFW should be required to prove the effectiveness of these trapping experiments before employing them. Only if and when it is proven effective in preventing

significant numbers of hatchery fish from reaching the breeding grounds should it be allowed to scale up and release larger numbers of hatchery smolts.

For the foregoing reasons, McKenzie Flyfishers respectfully requests that NMFS reject ODFW's proposed HGMPs and prepare an environmental impact statement under NEPA to evaluate a reasonable range of alternatives to preserve and restore wild salmon in the Sandy River.

Thank you for your time and consideration.

Date: July 9, 2012.

Sincerely,

/s/ David Thomas

David Thomas

For McKenzie Flyfishers

Tel: 541-505-7213

Email: davethomas1939@gmail.com

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McKenzie Flyfishers Comments

Letter Dated July 8, 2012

The following responses reply to comments submitted by the McKenzie Flyfishers. Each response corresponds to margin numbers added to the comment letter.

1. Comment noted.
2. Comment noted.
3. Comment noted. The first concern is addressed in responses to Comment Numbers 5, 9, and 10. With regards to the second concern, ODFW has proposed actions (e.g., acclimation, locally adapted broodstock, installation and operation of weirs) that have been successful in other basins to meet the goals of the hatchery programs: providing hatchery salmon and steelhead to support fishing opportunities while minimizing impacts to natural-origin Sandy River salmon and steelhead consistent with the Oregon's Lower Columbia River Conservation and Recovery Plan (Recovery Plan)(ODFW 2010). Because measures to minimize hatchery impacts on natural-origin populations are not "one-size-fits-all," monitoring and evaluation activities are included in the HGMPs to ensure that actions that are being taken are being successful in minimize the impacts from the proposed hatchery programs consistent with the Recovery Plan (ODFW 2010). The proposed monitoring (Subsections 2.2.1, Sandy River Spring Chinook Salmon Program; 2.2.2., Sandy River Coho Salmon Program; 2.2.3, Sandy River Winter Steelhead Program) will also provide information needed to determine if the proposed actions are not being successful or having an adverse impact such that the program can be altered to reduce those impacts.
4. Comment noted.
5. NMFS does not have a standard requirement to achieve a 5 percent stray rate. The 5 percent stray rate was developed as described in Subsection 4.1, Potential Hatchery Effects, to describe a possible measure of genetic introgression and applies to strays (natural-origin and hatchery) from outside the local population. Recent analysis has shown that at the 10 percent hatchery stray rate, the proportion of natural-origin by natural-origin crosses in the naturally spawning population would be over 81 percent and the proportion of natural-origin, and hatchery crosses would be 18 percent (NMFS 2012). Furthermore, the hatchery stray rate target of 10 percent was identified in the Recovery Plan (ODFW 2010) as the level necessary to meet delisting goals for the naturally spawning population and the delisting goal incorporated recently developed criteria for VSP along with results from population viability analysis modeling.
6. Comment noted.
7. Comment noted.
8. Comment noted.

9. The proportion of hatchery spring Chinook salmon spawning naturally currently far exceeds the less than 10 percent goal that is in the Lower Columbia River Conservation & Recovery Plan (Recovery Plan)(ODFW 2010), and is the main reason behind ODFW's proposal to install and operate weirs in the Salmon River, Zigzag River, and in the future, in the Bull Run River. It is also the reason for having all of the spring Chinook salmon smolts acclimated and released at the Bull Run acclimation pond (Subsection 2.2.1, Spring Chinook Salmon Program). On-going monitoring and evaluation activities will be used to determine if these actions are successful in reducing the proportion of hatchery spring Chinook salmon spawning naturally.

With regards to the proportions of hatchery coho salmon and steelhead contributing to the naturally spawning populations, recent data (see updated Table 3 in Subsection 3.3.1, Sandy River Spring Chinook Salmon) show that hatchery coho salmon and hatchery winter and summer steelhead make up less than 10 percent of the natural-origin coho salmon and winter steelhead populations, respectively.

10. The research that is referenced in this comment reflects how salmonids can become adapted to the hatchery environment to the detriment of being reproductively successful in the natural environment. This is especially true for hatchery programs where the goal is for the hatchery salmon or steelhead to spawn naturally to supplement the natural-origin population. This is not the goal for the proposed hatchery programs. The actions proposed in the HGMPs are designed to minimize the proportion of hatchery salmon or steelhead spawning naturally.
11. Comment noted.
12. Comment noted.
13. NMFS has concerns about Chilcote et al. (2011), which contained multiple data errors that raise questions as to the validity of the analysis and the conclusions reached by the authors.
14. See response to Comment Number 10. Furthermore, the results of the study cited may reflect the use of only 10 spawning pairs leading to the genetic differences when compared to the larger population, and the phenotypic differences are due to the hatchery environment and where not shown to be detrimental to the survival or reproductive success in the natural environment or if these phenotypic differences would be passed on to the next generation.
15. See response to Comment Number 10.
16. See response to Comment Number 10. Furthermore, the abstract quoted in the comment goes on to state that "The summary of studies to date suggests: nonlocal hatchery stocks consistently reproduce very poorly in the wild; hatchery stocks that use wild, local fish for captive propagation generally perform better than nonlocal stocks, but often worse than wild fish. However, the data above are from a limited number of studies and species, and more studies are needed before one can generalize further." This statement supports the position that hatchery programs derived from the local population do better compared to non-local

broodstock, and the position that it may not be appropriate to apply findings from one study to all hatchery programs and all species.

17. Comment noted.

18. The references described in Comment Numbers 13 through 16 represent some of the latest findings though some may not represent the “best available science” (i.e., Chilcote et al. 2011). The study referenced in Comment Number 16 (i.e., Araki et al. 2008), counters the comment’s contention that the approach that was taken by ODFW to develop the hatchery spring Chinook salmon and winter steelhead programs from locally returning adults would not potentially reduce impacts to the natural-origin populations if those hatchery fish did spawn naturally. Plus, the goal of most of the programs described in these studies was to have the hatchery produced fish spawn naturally to increase the abundance and productivity of the natural population. That is not the goal of the proposed hatchery programs, which is to limit the proportion of hatchery salmon and steelhead that spawn naturally.

19. See response to Comment Number 18.

20. The research findings discussed in previous comments do support the assumption that hatchery programs developed from local broodstock are more similar to that population than hatchery fish produced from non-local stocks (see also NMFS 2011; HSRG 2004; Mobrand et al., 2005; ICF – Jones and Stokes 2009). Furthermore, the 10 percent target that is in the Recovery Plan (ODFW 2010) was developed such that it met NMFS’s VSP diversity criteria (see McElhany et al. 2007) and was based on the results of population viability analysis modeling (see ODFW 2010 for modeling assumptions).

21. See response to Comment Number 20 and Subsection 4.1, Potential Hatchery Effects.

22. The acclimation of salmon and steelhead has been proven to increase homing to the release location (see Kostow 2009; NMFS 2011; HSRG 2004; Mobrand et al., 2005; ICF – Jones and Stokes 2009 and Subsection 4.1, Potential Hatchery Effects). The weir in the Bull Run River will be used to remove hatchery spring Chinook salmon returning to the Bull Run acclimation pond; monitoring and evaluation activities will be used to evaluate if this approach is successful in the Sandy River.

23. The problem with spring Chinook salmon that were acclimated and released from the Sandy Hatchery and then return and stray into the upper Sandy River is addressed in Subsection 4.3.2.1, Sandy River Spring Chinook Salmon. The HGMPs have been modified to demonstrate that all spring Chinook salmon releases will be acclimated at the Bull Run acclimation pond beginning with the 2012 release.

24. Comment noted.

25. Acclimation of steelhead and coho salmon has shown to be successful in reducing the number of adults straying into the upper basin (see Table 3). To address the uncertainty regarding the actions to reduce the proportion of hatchery fish spawning naturally, the

HGMPs have been modified to include expanded adaptive management sections. Furthermore, monitoring and evaluation will be included in the concurrence letter as part of the reporting requirements to meet ESA approval under limit 5 of the 4(d) rule. If reporting shows that the monitoring and evaluation activities are not being implemented, NMFS can reinstate consultation pursuant to 50 CFR 402.16.

26. Comment noted.

27. Acclimation has been shown to work (see responses to Comment Numbers 22 and 25), and monitoring and evaluation activities will be used to determine if the acclimation is successful in achieving the Recovery Plan (ODFW 2010) goal that less than 10 percent of the natural origin spawning are of hatchery origin..

28. Detailed descriptions of the weir operations are provided in the draft EA (Subsection 2.2.1, Sandy River Spring Chinook Salmon Program), and the results of the 2011 operations are discussed in Subsection 4.3.2.1, Sandy River Spring Chinook Salmon. These descriptions indicate how the weirs would be operated and how they would perform during the short period they are in operation during fall 2011.

29. Comment noted.

30. See response to Comment Numbers, 5, 20, and 25.

31. The study referenced describes the problems with operating weirs to manage adult steelhead. The adult steelhead migrate and spawn during periods of high flows (winter to spring) and thus, the weir cannot be effective in controlling the proportion of hatchery steelhead spawning naturally. To collect spring Chinook salmon, the weirs in the Sandy River will be operated during the summer and fall when the tributary flow is at its lowest and thus, the weirs will not be affected by flooding and debris. As a result, they are anticipated to be effective at controlling the number of adults getting past the weir, although NMFS acknowledges that there is uncertainty at this stage about achieving the less than 10 percent hatchery spawner goal

32. See response to Comment Number 31.

33. See Subsection 4.3.2.1, Sandy River Spring Chinook Salmon, regarding effects analyses associated with weirs under the Proposed Action Alternative.

34. Comment noted.

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SandyHatcheries nwr <sandyhatcheries.nwr@noaa.gov>

Please reject ODFW's Sandy River HGMPs

1 message

Melvin Eric Whittier <TheCamel49@comcast.net>

Thu, Jun 21, 2012 at 9:21 PM

To: SandyHatcheries.nwr@noaa.gov

1 I urge NMFS to reject the current Draft Hatchery and Genetic Management Plans (HGMPs) for the Sandy River and require ODFW manage the Sandy based on the best available science for the recovery of its native, wild fish. Continuing to plant over 1 million hatchery fish in the Sandy River constitutes the single greatest threat to the recovery of its wild native fish. Recovery goals should reflect that wild fish abundance is limited by the current condition of habitat and hatchery operations in the Sandy River Basin.

In order for the Sandy to fully realize its potential for wild recovery there must be higher escapement goals and a recovery program that allows existing wild stocks to reach their productive potential within the available habitat without hatchery or harvest impediments. Because operation of the hatchery under the HGMPs will continue to threaten the survival and recovery of wild fish in the Sandy River, I request that NMFS not approve the four HGMPs. Thank you for the opportunity to participate in the public comment process.

Melvin Eric Whittier

Sincerely,
Melvin Eric Whittier
Philomath, Or
97370
5419296255

Melvin Eric Whittier Comment
Email received June 21, 2012

1. Comment noted.

Public Commentary on Sandy River Draft EA and HGMPs



July 9, 2012

Rich Turner
NMFS Salmon Management Division
1201 NE Lloyd Boulevard, Suite 1100
Portland, OR 97232
By email to: SandyHatcheries.nwr@noaa.gov
Subject: Comments on Oregon's Sandy hatchery plans.

Dear Mr. Turner:

Please accept these comments from the Native Fish Society, the McKenzie Flyfishers, Bill McMillan, Wild Fish Conservancy, the Federation of Fly Fishers, The Conservation Angler and Wild Steelhead Coalition on the draft Environmental Assessment ("Draft EA") and Hatchery and Genetic Management Plans ("HGMPs") for four artificial fish propagation programs at the Sandy River Hatchery in Sandy, Oregon. The comments are being sent to you by email, with a separate submission by hand-delivery including a CD-ROM containing supporting and referenced materials.

Sincerely,




Bill Bakke, Native Fish Society Director of Science and Conservation
221 Molalla Ave. Ste., 100
Oregon City, OR 97045



Michael Moody, Native Fish Society Executive Director
221 Molalla Ave. Ste., 100
Oregon City, OR 97045

Arlen Thomason and David Thomas
McKenzie Flyfishers
Post Office Box 10865
Eugene, Oregon 97440-2865

A handwritten signature in black ink that reads "Bill McMillan". The signature is fluid and cursive, with a long horizontal line extending from the end.

Bill McMillan, Wild Fish Conservancy retired biologist
Bill McMillan
40104 Savage Rd.
Concrete, WA 98237

A handwritten signature in black ink that reads "Kurt Beardslee". The signature is cursive and somewhat compact.

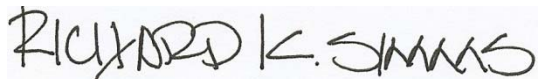
Kurt Beardslee, WFC Executive Director
Wild Fish Conservancy
P.O. Box 402
15629 Main St. NE.
Duvall, WA 98019

A handwritten signature in purple ink that reads "Will Atlas". The signature is cursive and stylized, with a large loop at the end.

Will Atlas, FFF Chair, Steelhead Committee
Federation of Fly Fishers
5237 US Hwy 89 South, Suite 11
Livingston, MT 59047



Pete Soverel
The Conservation Angler
16430 72nd Ave. West
Edmonds, WA 98026



Rich Simms, WSC President
Wild Steelhead Coalition
218 Main St. Box #264
Kirkland, WA 98033

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I. Introduction

The Sandy River is unique in its importance for the recovery of Lower Columbia River chinook and coho salmon and steelhead listed as threatened under the Endangered Species Act (“ESA”). In the past five years, two dams have been removed from the Sandy River and Little Sandy River, opening more than 50 miles of spawning habitat in the designated wild fish sanctuary in upper Sandy River Basin. Over \$100 million has been committed to habitat conservation in the basin. No mainstem dam on the Columbia impedes passage of fish to and from the ocean. This river system that once supported runs of wild fish runs as great as 20,000 winter steelhead, 15,000 coho salmon, 10,000 fall Chinook, and up to 10,000 spring Chinook, and even a small run of chum salmon, is poised again to be sanctuary for wild fish and a centerpiece of the recovery of self-sustaining natural runs of fish in this region.

Yet the Sandy River system currently contains fewer than 1,000 wild winter steelhead, 700 wild coho, and just over 1,300 wild spring chinook. The continued presence and operation of the Sandy River Hatchery and its four artificial propagation programs have contributed significantly to the current depressed state of wild stocks and preventing the recovery of ESA-listed species. More than 1,000,000 hatchery-bred smolts are dumped into the Sandy River Basin annually by the Sandy River Hatchery through its programs to provide harvest augmentation and a sport fishery on the Sandy River. There is no scientific dispute that hatchery fish have a significant negative effect on the productivity of wild populations by competing with wild fish for food and space; diluting the fitness of wild fish when adult hatchery fish stray and spawn with wild fish; preying on wild fish; and by potentially spreading disease. Hatchery fish are less fit for survival in the wild than genetically similar wild fish, and that fitness diminishes rapidly after only one or two generations in the hatchery. The continued presence of hatchery fish in the Sandy River Basin threatens wild fish in that system with introgression that all but assures their eventual extinction.

The wild fish present in the Sandy River Basin belong to species—the Lower Columbia River Chinook Salmon Evolutionarily Significant Unit (“ESU”), Lower Columbia River Coho Salmon ESU, and Lower Columbia River Steelhead Distinct Population Segment—that are at a very high or high risk of extinction, with most or all of the historical populations extirpated or at very high risk. The Sandy River is of critical importance to these species because its populations of wild fish are some of the very few remaining that have a chance of being restored and thereby supporting the recovery of self-sustaining natural populations. Another listed species, the Columbia River Chum Salmon ESU, is extremely depressed or functionally extirpated, with the fish no longer present in the Sandy River.

Despite the dire condition of the listed species and their Sandy River Basin populations, the Oregon Department of Fish & Wildlife (“ODFW”) has operated the hatchery for the past ten years since these species were listed under the ESA without complying with the prohibition against the “take” of listed fish in ESA Section 9, and without obtaining approval from NMFS for operation of the hatcheries pursuant to HGMPs. ODFW last year revised and resubmitted its

HGMPs to the National Marine Fisheries Service (“NMFS” or “NOAA Fisheries”) for review, and NMFS has prepared a Draft EA to evaluate a proposed action of approving the four HGMPs.

NMFS may only approve the HGMPs if the artificial propagation programs will contribute to the recovery of the ESA-listed species and prevent harm to the species, their critical habitat, and their wild members. Unfortunately, the HGMPs offer little more than cosmetic changes to the operations of the Sandy Hatchery which have so devastated wild stocks in the system, and continued operation as proposed in the HGMPs would only further depress the productivity of the wild stocks and prevent their recovery. The proposed action calls for continuation of the annual release of over 1,000,000 artificially-bred smolts into a river system where wild fish populations are struggling to survive. Hatchery fish make up more than 75% of the spawning population of spring chinook, despite the best science setting a threshold of no more than 5% to avoid the adverse effects of interaction between hatchery and wild fish.

Relative to other watersheds, the Sandy River Basin is relatively intact and has had significant improvements in terms of fish habitat in recent years, yet wild populations continue to be suppressed by the presence of artificially-bred fish from the Sandy River Hatchery. Yet the proposed action NMFS is evaluating would result in the continuation of the programs that have prevented recovery of wild fish in this system.

As described in more detail in the pages that follow, the Draft EA and related HGMPs do not comply with the legal standards and requirements of the National Environmental Policy Act (“NEPA”) and the ESA. It appears that all four of the HGMPs were largely copied from a single template by ODFW. As a result, all, or nearly all, of the deficiencies identified in each HGMP are common to all of the HGMPs, and NMFS should evaluate the concerns expressed below related to specific HGMPs for their application to the other HGMPs. To the extent possible, we have identified the specific deficiencies in the discussions of each HGMP, but NMFS has the obligation under NEPA to undertake the evaluation of these serious, common deficiencies as part of its environmental review process. We also request that NMFS review the scientific literature and data which we have submitted on the enclosed CD-ROM as part of its review.

The mitigation measures described in all of the HGMPs share the same fundamental flaw: there is no data, scientific analysis, or reasoned explanation of how they will achieve the results that the HGMPs claim will be achieved. There is no explanation how the proposed programs would support the recovery of ESA-listed species and prevent harm to wild fish. For example, weirs are “expected” to prevent a multitude of impacts, but there is no scientific study or data presented to demonstrate whether these claims are valid. By contrast, many scientific studies demonstrate the opposite—that weirs are imperfect barriers, subject to being wiped out or circumvented in high water events, and causing additional stress to wild fish during the trapping and handling process. The HGMPs also do not provide sufficiently precise information about the locations of releases and the traps/weirs and the relationship of those locations to the spawning areas of the different species, to allow for meaningful comment or from which the agency could draw a non-arbitrary conclusion. The lack of disclosure of high quality

information and the paucity of analysis illustrate that NMFS has not taken a hard look at the consequences to wild fish and the recovery of the species from its proposed action.

The Hatchery programs are the greatest single impediment to recovery in the Sandy River Basin. Absent significant changes to the Sandy River Hatchery programs, hatchery-bred fish will continue to depress wild populations and undermine their adaptive capacity in the face of further anthropogenic change. NMFS, with its obligation to insure the survival and recovery of ESA-listed fish, cannot approve the HGMPs and the continuation of the artificial propagation programs in the Sandy River based on the current analysis. In order for the Sandy River Basin to fully realize its potential for wild recovery there must be dramatic reduction or elimination of the threats which hatchery fish pose to the wild fish in the basin. Nothing in the Draft EA demonstrates that the proposed mitigation would allow the recovery of these species. Only major changes to the proposed action that place the recovery of wild populations above harvest opportunity, allowing existing wild stocks to recover without hindrance of high numbers of hatchery spawners, and based on a full Environmental Impact Statement that includes a complete disclosure of information and full discussion and analysis based on science rather than speculation, might pass muster. Given these concerns, we believe that NMFS should adopt the “no action” alternative in the Draft EA and deny approval to the Sandy River Hatchery HGMPs.

II. Summer Steelhead HGMP

A. Introduction

Hatchery summer steelhead are a risk to protected winter steelhead under the Endangered Species Act and this risk is not quantified in the HGMP. This point can be illustrated throughout the HGMP. All hatcheries are a compromise and the tradeoffs need to be stated and explained (HSRG 2011).

Hatchery summer steelhead used to augment harvest in the Sandy River originated from hatchery stock developed in 1957 by the Washington Department of Fish and Wildlife from fish derived from Klickitat and Wind River stocks. Oregon has developed a broodstock and reared at the South Santiam Hatchery for release into Willamette River tributaries, Clackamas and Sandy Rivers among others.

The hatchery summer steelhead are not native to the Sandy River and were derived from stocks outside the lower Columbia ESU (HSRG 2009). This type of hatchery summer steelhead program was evaluated on the Clackamas River, showing that ecological impacts from releasing non-native hatchery summer steelhead reduced the productivity of wild ESA-listed winter steelhead by 50% (Kostow et al. 2003). Summer and winter steelhead are biologically separated into distinct breeding populations based on run timing and hydrologic barriers that prevent winter steelhead access to spawning areas used by summer steelhead. On the Sandy River, this biological structure defining steelhead races was not considered, for the ODFW desired only to increase harvest even though it imposed a risk to native winter steelhead from documented ecological interactions. For example, ODFW terminated releases of non-native and non-ESU hatchery summer steelhead on the Molalla River to protect native, wild winter steelhead. When Sandy River winter steelhead were listed as a threatened species, the ODFW should have terminated the release of non-native hatchery summer steelhead in the Sandy River in order to eliminate the risk this hatchery program imposed on threatened winter steelhead. But the ODFW did not terminate the hatchery summer steelhead releases and have instead issued a Hatchery and Genetic Management Plan (HGMP) to justify continued releases. This hatchery program purpose is to augment harvest even though risks to ESA-listed winter steelhead are documented by ODFW research.

B. General Program Description (HGMP Sect. 1)

i. Justification for the Program (HGMP 1.8)

“The Sandy River summer steelhead program is managed to supplement regionally important steelhead fisheries while minimizing potential risks to wild Chinook, coho, and steelhead populations.”

Comment:

- 1 | ODFW does not provide a definition of “minimizing” when referring to potential risks presented by the hatchery program. The monitoring program reliant on spawning ground surveys is not

- 1 adequate to determine the ecological or genetic impact of hatchery summer steelhead on ESA-listed steelhead and other ESA-listed fish. The ODFW hatchery policy directs that each hatchery program shall describe how the hatchery objectives are to be monitored and evaluated. Neither the HGMP nor the related EA explains what “minimizing” means nor how operation of the Hatchery will “minimize” risk to wild fish. Without this explanation and analysis, the HGMP does not comply with the criteria of the 4(d) Rule, 50 C.F.R. § 223.203(b)(5), and the failure of the EA to evaluate whether the proposed action complies with the relevant requirements of the substantive statute in question—the Endangered Species Act—is a violation of NEPA.

“Summer-run steelhead are not considered indigenous to the Sandy River Basin, but evidence suggests naturally produced fish do exist in limited numbers that are thought to be primarily the result of natural production of hatchery fish (when hatchery fish were intentionally passed into the upper basin).”

Comment:

- 1 The HGMP presents no data to support that the origin of naturally produced summer steelhead are from natural hatchery spawners above the Marmot Dam site and not from natural production areas downstream. However, ODFW acknowledges that naturally produced summer steelhead are from naturally spawning hatchery summer steelhead. The fact that Marmot Dam is no longer available as a sorting facility, blocking hatchery fish from the upper basin, hatchery summer steelhead can now migrate into the upper basin and reproduce. Blocking these fish with weirs is not possible through their entire migration period due to high spring flows and the inability to block access to all spawning areas, and so as long as ODFW continues to release non-native, non-ESU summer steelhead into the Sandy River, there will be ecological interactions with wild ESA-listed winter steelhead and the potential for genetic introgression between the two races. Therefore, ODFW is unable to verify that it is able to minimize potential risks to ESA-listed species in the Sandy Basin.

“However, harvest of hatchery-produced summer steelhead is managed to comply with the lower Columbia steelhead DPS Fisheries Management and Evaluation Plan (FMEP) that explains the management implications for holding a sport fishery where hooking mortality of listed fish may occur (ODFW 2001). Current fishing regulations in the Lower Columbia River DPS require that all unmarked adult steelhead be released back to the water unharmed.”

Comment:

- 1 A hooking mortality study has not been conducted to determine the encounter rate of a fishery that is targeted on hatchery summer steelhead and the mortality impact on ESA-listed winter steelhead in the Sandy River or the mainstem Columbia River. Hatchery summer steelhead and ESA winter steelhead have run timing overlap (March to June) in the spring and early winter (November to March). Bait fisheries have the highest encounter rate of all gear types for steelhead and not knowing the encounter rate it is impossible to determine the associated mortality on ESA-listed winter steelhead adults and rearing juveniles. During this time ODFW angling regulations allow the use of bait to harvest steelhead. By allowing the use of bait and barbed hooks, the encounter rate on adult winter steelhead, smolts and rearing juveniles is

likely to be high, but a monitoring program is not evaluating the effects on ESA-listed adult and juvenile fish.

“The following is a summary of key hatchery practices and management features in place to minimize the risk of potential impacts to listed salmonids:”

Comment:

- 1 Key hatchery practices and management features to “minimize the risk of potential impacts to listed salmonids” is not quantified, so it is impossible to determine or even estimate whether risks from the hatchery and harvest program are actually protecting ESA-listed winter steelhead and other ESA-listed species. A specific monitoring and evaluation plan needs to be defined in the HGMP to address ecological and genetic risks to ESA-listed winter steelhead from having naturally spawning hatchery summer steelhead in the Sandy River. Failing an adequate scientific risk assessment and a monitoring program to verify impacts, non-native hatchery summer steelhead should be no longer released in the Sandy River. The risk assessment and monitoring program should include impact triggers that would reduce or eliminate the release of non-native summer steelhead in the Sandy River.

The ODFW hatchery policy and the primary objectives of the Sandy Hatchery, as outlined in the 2011 Sandy Hatchery Operations Plan, cannot be successfully achieved unless there is a hatchery risk assessment and a monitoring and evaluation program of hatchery effects on ESA-listed wild winter steelhead. The objectives that would not be effectively applied are:

Objective 1: Foster and sustain opportunities for sport, commercial, and tribal fishers consistent with the conservation of naturally produced native fish.

Objective 2: Contribute toward the sustainability of naturally produced native fish populations through the responsible use of hatcheries and hatchery produced fish.

Objective 5: Minimize adverse ecological impacts to watersheds caused by hatchery facilities and operations.

Given these serious problems and non-compliance with ODFW hatchery policy the HGMP should be rejected until these flaws are corrected.

“This program complies with all other applicable IHOT standards.”

Comment:

- 1 The IHOT standards were adopted in 1995 prior to important scientific investigations addressing ecological and genetic impacts of hatchery salmonids on wild fish. While there is no reference provided for the Fishery Management and Evaluation Plan it probably predates the most recent scientific studies. The IHOT standards do predate the most recent scientific studies listed below regarding the effect of hatchery fish on wild fish. We found an IHOT evaluation of

the coho hatchery program and it failed to comply with many performance measures for ecological interactions and genetics policy. If the coho performance measures came up short, one can only assume that hatchery programs for other species also failed, however, we were unable to find IHOT evaluations for steelhead or chinook. Given this, it is obvious that the HGMP relies on standards that are not up to date regarding the best available science on hatchery risks to ESA-listed salmonids and all IHOT performance measures. We provide a few of the scientific studies that came after the IHOT evaluation of the Sandy Hatchery:

“Hatchery programs are not a substitute for, or an alternative to, achieving a viable wild population according to NOAA Fisheries' Hatchery Policy. Instead, any hatchery programs have to support natural production.” (Bowles 2008)

“The threats to wild populations caused by stray hatchery fish are well documented in the scientific literature. Among the impacts are substantial genetic risks that affect the fitness, productivity and genetic diversity of wild populations. Genetic risks increase substantially when the proportion of the adult population that is hatchery fish increases over 5% (Lynch and O'Hely 2001, Ford 2002).”

“Hatchery programs also pose ecological risks to wild populations that can further decrease abundance and productivity.” (reviewed by Kostow 2008)

“The level of risk is related to both the proportion of the fish in a basin that are hatchery fish and to the source of the hatchery fish. Ecological risks due to the presence of hatchery adults (including adults of a different species) have been demonstrated when the proportion that is hatchery fish is over 10%” (Kostow and Zhou 2006).

“Origin of broodstock will not alleviate ecological hatchery risks and by itself it may not be enough to substantially reduce genetic risks.” (Kostow and Zhou 2006)

“Our analyses highlight four critical factors influencing the productivity of these populations: (1) negative density-dependent effects of hatchery-origin spawners were ~5 times greater than those of wild spawners; (2) the productivity of wild salmon decreased as releases of hatchery juveniles increased; (3) salmon production was positively related to an index of freshwater habitat quality; and (4) ocean conditions strongly affect productivity at large spatial scales, potentially masking more localized drivers. These results suggest that hatchery programs' unintended negative effects on wild salmon populations, and their role in salmon recovery, should be considered in the context of other ecological drivers.” (Buhle et al. 2009)

“The addition of hatchery spawners to the natural environment does not appear a useful tool for rebuilding depressed populations of wild steelhead. These results support the view that hatchery programs should be managed to minimize the number of hatchery fish that spawn and rear in natural habitats.” (Chilcote 2002)

“In most cases, measures that minimize the interactions between wild and hatchery fish will be the best long-term conservation strategy for wild populations.” (Chilcote et al. 2010)

“What is known from peer-reviewed scientific studies on the impact of hatchery salmonids on wild salmonids? Hatchery fish reproductive success is poor; there is a large scale negative correlation between the presence of hatchery fish and wild population performance; hatchery fish reproductive success is lower than for wild fish and this is true for both supplementation and production hatchery programs; there is evidence of both environmental and heritable effects; effects were detected for both release and proportion of hatchery spawners; negative correlations between hatchery influence and wild productivity are widespread; habitat or ocean conditions do not appear to explain the pattern; current science indicates that limiting natural spawning of hatchery fish is generally beneficial to wild populations; there is evidence that reducing hatchery production leads to increased wild production, and cumulative effects of hatchery could be a factor limiting recovery of some ESUs.” (Ford 2010)

“Our data support a conclusion that hatchery summer steelhead adults and their offspring contribute to wild steelhead population declines through competition for spawning and rearing habitats.” (Kostow 2003)

“A rapidly growing body of literature points towards detrimental behavioural interactions between hatchery and wild fish. More is known about these interactions in freshwater rearing habitats than in estuarine and marine environments. There is also, however, a paucity of information on whether risk avoidance measures are effective at reducing competition and predation and, as far as we know, little attention is directed towards carrying capacity when the size of release is considered.” (Naish et. al. 2008)

“Hatchery programs designed for harvest augmentation should be removed from basins with habitat that has high potential to produce wild salmonids. To aid recovery of depressed wild salmon, the operation of hatcheries must be changed to reduce interactions of hatchery smolts with wild smolts. A program that reduces harvest, restores habitat, and reduces hatchery effects is necessary.” (Nickelson 2003)

“Hatchery programs have the potential to benefit or harm salmonid population viability by affecting abundance, productivity, distribution, and/or diversity. Hatchery related risks to salmon population viability include genetic changes that reduce fitness of wild fish, increase risk of disease outbreaks, and/or alter life history traits, and ecological effects—such as increased competition for food and space or amplified predation—that reduce population productivity and abundance. Hatcheries can also impose environmental changes by creating migration barriers that reduce a population’s spatial structure by limiting access to historical habitat.”(ODFW 2010b)

“Hatcheries are by their very nature a compromise – a balancing of benefits and risks to the target populations, other populations, and the natural and human environment they affect.” (Paquet et al. 2011)

“Most information available indicates that artificially-propagated fish do have ecological impacts on wild salmonid populations under most conditions (e.g. a 50% reduction in productivity for steelhead in an Oregon population).” (RIST 2009)

“Hatchery adult steelhead strayed more than wild steelhead.” (Slaney, et al. 1993)

Authors reviewed 606 hatchery supplementation studies and found that few directly assessed the effects on natural stocks. Genetic and ecological effects and changes in productivity of the native stocks that can result remain largely unmeasured. However, the general failure of supplementation to achieve management objectives is evident from the continued decline of wild stocks.” (Steward et al. 1990)

ii. List of “Performance Indicators”, designed by “benefits” and “risks” (HGMP 1.10)

“Performance Standard (3): Contribute to the Sandy River and the lower Columbia River sport fisheries.”

“Indicator (3)(a): Number of adult hatchery steelhead caught in the Sandy River and the lower Columbia River fisheries.”

“Monitoring and Evaluation: River and dock-side creel samples, and harvest card records.”

“This program aims to provide for harvest in the lower Columbia River and the Sandy River recreational fisheries. Although no numeric harvest goal has been adopted for this program the average smolt to adult survival of summer steelhead in the past 10 years (2.12%) has provided with good angling opportunities in the Lower Columbia and Sandy rivers.”

Comment:

- 1 Evaluation of this performance standard is insufficient since ODFW has not established a “numeric harvest goal” for the hatchery summer steelhead program, therefore the effectiveness of this hatchery program cannot be verified, only interpreted by indirect means such as estimated harvest based on creel samples and an estimated extrapolation of harvest using harvest card returns from anglers. Lacking a target harvest metric for the hatchery summer steelhead program the actual effectiveness cannot be verified.

“Performance Standard (2): Program goals are aligned with authorized federal, state, regional, and local fisheries conservation and restoration initiatives.”

“Indicator (2)(a): Program complies with Oregon Native Fish Conservation Policy and the

Sandy River Basin Plan, and the Oregon Hatchery Management Policy (OAR 635-007-0542 through 0548).”

“Monitoring and Evaluation: Conduct periodic program policy and goal reviews in relation to hatchery program management, practices, and facilities.”

Comment:

- 1 Compliance monitoring with state fish management policy needs to take place on a specific schedule. For example, annual modifications of hatchery programs to address changing facility needs and social expectations cause changes in the Sandy River Basin Plan. The plan is no longer up-to-date with modifications that have been adopted (Todd Alsbury personal communication). Compliance monitoring with the Endangered Species Act on a specific schedule should be stated in this performance standard.

“Performance Standard (3): Contribute to the Sandy River and the lower Columbia River sport fisheries.”

“Indicator (3)(a): Number of adult hatchery steelhead caught in the Sandy River and the lower Columbia River fisheries.”

“Monitoring and Evaluation: River and dock-side creel samples, and harvest card records.”

Comment:

- 1 The performance standard should include a specific harvest contribution. The HGMP states: “This program aims to provide for harvest in the lower Columbia River and the Sandy River recreational fisheries. Although no numeric harvest goal has been adopted for this program...”

A harvest goal is needed to determine the effectiveness of the hatchery program and its economic benefit. In this way the hatchery program can be evaluated in terms of its actual contribution so that the cost of producing harvested fish (the purpose of the hatchery summer steelhead program) can be determined and short-falls can be addressed. Assuming that the cost benefit ratio is always achieved is an inappropriate standard for any hatchery program for it lacks any verification. In addition, the performance standard should include the cost to provide a fish that is harvested. According to a study by Natural Resource Economist Hans Radtke, the cost to produce a harvested hatchery summer steelhead is \$171 per fish (Radtke 2011). Since public funding is used to provide the harvest benefits from hatchery summer steelhead, there needs to be an annual evaluation of the cost and benefits that his hatchery program is providing the public. To do otherwise the socio-economic benefits cannot be adequately verified through this performance standard.

“Performance Standard (4): Hatchery release groups are sufficiently marked to facilitate identification and track survival. Goal is 100% marking of hatchery smolts.”

“Indicator (4)(a): Number of program fish adipose fin clipped.”

“Monitoring and Evaluation: Sample all smolt release groups to verify that mark rate is in between 95% and 100%.”

Comment:

- 1 The goal for marking hatchery summer steelhead is 100%, but the actual marking rate is estimated to be from 95% to 100%. This means that not all hatchery summer steelhead produced are marked as hatchery fish. This affects the cost- benefit evaluation, the cost to produce a harvested adult hatchery summer steelhead, and increases the stray rate by up to 5% because the fish are not identified as hatchery origin fish and increases the risks to ESA-listed winter steelhead. It is unclear in this performance standard whether unmarked hatchery summer steelhead will be passed at weirs put into place to block their migration into the upper Sandy River, however, it was the policy to do so when these fish were trapped at the old Marmot Dam fishway (*Indicator (10)(b)*: Prior to removal of Marmot Dam, all fish without fin clips were passed above Marmot Dam). Consequently, this performance standard is inadequate to effectively evaluate the cost-benefit and cost of harvested fish and the increased stray rate of hatchery summer steelhead.

“Performance Standard (8): Minimize impacts to naturally produced adult salmonids.”

“Indicator (8)(a): Weir/trap operation at Sandy Hatchery, Cedar Creek, or tributary weirs/traps does not result in significant stress, injury, or mortality to naturally produced salmonids.”

“Monitoring and Evaluation: Monitor the number of mortalities in adult collection traps and weirs for each species.”

Comment:

- 1 Weirs do cause harm to wild ESA-listed salmonids for unless there is focused enforcement they are locations where poachers concentrate. This has been a problem on the Sandy River weirs. Wild fish can also be harmed by remaining in the traps for long periods of time, and the harm from trapping and holding fish is not evaluated in the HGMP. Also, weirs cause blocked fish to select spawning sites downstream from the weir so reproduction of non-native hatchery fish is not prevented by a weir and ESA-listed fish are forced to spawn in habitat that is less optimal for successful reproductive success. This also has the effect of fewer wild spawners in upstream spawning areas that could result in an increased genetic risk to the wild population. Again, the term minimize is not quantified so it is not measurable and the risk it promotes on wild ESA-listed fish is not measurable. The proposed monitoring does not evaluate the risk impact on ESA-listed salmonids for genetic and ecological impacts, and the monitoring of impacts on reproductive success is inadequate. By confining M&E to mortalities at weirs, it is not sufficient to address all risks the weir imposes on wild ESA-listed fish.

“Performance Standard (9): Minimize impacts to naturally produced juvenile salmonids.”

“Indicator (9)(a): Hatchery fish will be released in time and locations, and in a condition that minimizes the interaction with listed fish.”

“Monitoring and Evaluation: Monitor smolt development at the hatchery (using available indicators, e.g. age, size, and coloration of smolts) to assure that fish are released as full term smolts. Utilize release locations at or downstream of Cedar Creek.”

Comment:

- 1 This performance standard does not address other significant the risks and impacts imposed on ESA-listed salmonids in the Sandy River. Smolts are reared to a larger size than naturally produced smolts to increase survival of the hatchery product, yet large smolts are more successful in competition with wild smolts, they are a potential predator on smaller naturally produced wild juveniles such as fall chinook and chum salmon, and they attract predators that often stage when smolts are released and impact both wild and hatchery fish survival. The Monitoring and Evaluation program is confined to the hatchery product inside the hatchery fence but ignores the ecological effects of hatchery smolts following their release. The cumulative effect of Sandy Hatchery salmonid smolt production on ESA-listed salmonids once they reach the Columbia River and migrate to the estuary and ocean are totally ignored by this performance standard. There is also no detailed information or data provided in the HGMP or related EA describing where and when smolts are being released, no description of the time during which different life stages of different species are in the Sandy River Basin, no evaluation of whether these release timing/location measures are successful in preventing impacts to juvenile salmonids, and no description of any monitoring plan that would answer the question of whether these measures will, in fact, “minimize” the effects on listed fish.

“Performance Standard (10): Manage the Sandy Basin for hatchery and wild fish with emphasis on natural production of wild fish.”

“Indicator (10)(a): Minimize the number of hatchery summer steelhead adults that stray throughout the basin. Prior to removal of Marmot Dam, fish with fin clips were selectively excluded from passing upstream of the dam.”

“Monitoring and Evaluation: Only unmarked steelhead were passed above Marmot Dam. Conduct annual spawning ground surveys to assess the number of hatchery fish spawning in areas above Marmot Dam site following removal of the dam.”

“Indicator (10)(b): Prior to removal of Marmot Dam, all fish without fin clips were passed above Marmot Dam.”

Comment:

- 1 This performance standard is silent on how stray summer steelhead will be effectively removed from the natural spawning population of Sandy River steelhead and the ecological and genetic impacts likely to impose risk to ESA-listed species including threatened wild winter steelhead. Spawning ground surveys can estimate the number of naturally spawning hatchery summer steelhead, but they are not designed to evaluate the ecological and genetic risk to wild threatened winter steelhead in the Sandy River. The migration timing of hatchery summer steelhead can be early enough to prevent the use of weirs to remove hatchery steelhead from

upstream spawning and rearing areas and are ineffective for controlling natural spawning hatchery fish below the weirs. Consequently, this performance standard is meaningless, for it cannot “minimize the number of hatchery summer steelhead adults that stray” and cannot successfully protect natural production of wild fish. Again, minimize is not an adequate metric for achieving this performance standard for is not a specific stray rate target that can be verified and used to evaluate the effectiveness of a program to control stray rates and protect threatened winter steelhead.

iii. Indicate alternative actions considered for attaining program goals, and reasons why those actions are not being proposed. (HGMP 1.16)

“...to mitigate for the loss of habitat resulting from hydroelectric development in the basin.”

“Issue 1: The removal of Marmot Dam may have led to unintended straying of hatchery fish into the primary natural production areas in the Sandy due to lack of ability to sort and remove hatchery fish from the natural spawning population”

“Issue 2: Some summer steelhead may naturally reproduce in the Sandy River and the resulting production may end up in the primary natural production areas of the Sandy River upstream of the former Marmot Dam.”

“Issue 3: A portion of summer steelhead smolts released in the lower basin may not outmigrate as desired. No information is available to document or measure the extent of potential residualism.”

“Issue 4: Limited information is available to assess the effects of recycling adult summer steelhead in the lower river for fishery benefits (detailed info in Section 7.5). Some of these fish may stray and spawn in the lower river and tributaries.”

Comment:

- 1 The ODFW recognizes that the inability to control stray hatchery fish that spawn naturally with wild winter steelhead in the Sandy River Basin, all of the basin, not just that part above the Marmot Dam site, is an important risk factor for recovery of ESA-listed winter steelhead and other ESA-listed species in the river. Even though ODFW has conducted research indicating that naturally spawning hatchery summer steelhead have an ecological impact on wild winter steelhead in the Clackamas River above North Fork Dam and took action by terminating the release of hatchery summer steelhead above the dam, they are not willing to take the same precautionary action on the Sandy River. In addition residualized hatchery smolt and recycling adult hatchery fish for the fishery are risk factors that will not be evaluated or controlled. Consequently, the key risk factors of the hatchery program on ESA-listed salmonids will not be effectively addressed in the HGMP. Therefore, the HGMP is incompetent to provide the intended risk protection necessary for recovery of ESA-listed species.

These issues and others not addressed constitute a hatchery program for summer steelhead that cannot be managed to protect and recover ESA-listed winter steelhead and other ESA-

listed species in the Sandy River. The only conclusion that can be reached is that the summer steelhead must be terminated in the Sandy River in order to provide the management needed to recover ESA-listed species.

“Alternative 1: If summer steelhead straying to the upper basin (above the former Marmot Dam site) cannot be minimized, investigate options for program changes to reduce stray rates including reducing smolt release numbers, developing alternate release sites, and developing adult trapping facilities in the lower Sandy (such as in the Bull Run River), etc. {Issue 1}”

Comment:

- 1 This alternative would not control hatchery summer steelhead strays in the Sandy River to levels that can be verified as sufficient to protect and recover ESA-listed species. It would not reduce the incidental harvest impact on ESA-listed species and would impose a disproportionate impact on late-run wild winter steelhead and spring chinook salmon. Attempts to reduce summer steelhead strays through angling contribute to harvest impacts in the upper basin on ESA-listed winter steelhead adults, smolts and juveniles caught in that fishery. Stray hatchery summer steelhead would continue to impact ESA-listed winter steelhead in the lower Sandy River and tributaries used for spawning and rearing. This represents about 25% of the basin utilized by ESA-listed winter steelhead. Hatchery smolt releases would continue to expose ESA-listed salmonids to predation, predator attraction, and competition for rearing space and food resources. The cumulative effect of this hatchery program on Columbia River wild salmonids in the mainstem, estuary and near-ocean environments would continue. Consequently, the negative effects of this alternative do not support recovery of ESA-listed salmonids in the Sandy Basin.

“Alternative 2: Eliminate the summer steelhead program in the Sandy basin. {All Issues}”

“Pros & Cons: Eliminating the program would eliminate all potential risks to the wild winter steelhead population due to potential interactions with summer steelhead. This action would impact a recreational fishery and result in significant opposition from the sports fishing industry and anglers. There is currently no information to document that the summer steelhead program is impacting wild winter steelhead in the basin. Historic fish passage data indicated a relatively low number of hatchery summer steelhead migrated upstream to Marmot Dam.”

Comment:

- 1 Alternative 2 attempts to minimize the risks to ESA-listed salmonids from hatchery summer steelhead calling them “potential risks” even though ODFW staff research verified the impact of hatchery summer steelhead on wild winter steelhead, causing a management shift which eliminated releases and passage of hatchery summer steelhead above North Fork Dam on the Clackamas River. This kind of deception is not helping concerned anglers and guides of the steelhead fishery to understand absolute risks hatchery summer steelhead pose to recovery of ESA-listed species. The alternative also says “There is currently no information to document that the summer steelhead program is impacting wild winter steelhead in the basin.” This statement ignores the available scientific evidence accumulated on impacts of hatchery programs on wild salmonids, including ODFW’s own research. ODFW’s hatchery management

programs on the Sandy River have not identified impacts of hatchery summer steelhead on winter steelhead in the Sandy River because monitoring and evaluation of those risk factors have not been done. This is known as the lie of omission. The existing summer steelhead hatchery program is not in compliance with the agency policy for Native Fish Conservation where the primary purpose is to ensure the conservation and recovery of native fish; ensure the avoidance of serious depletion of native fish. The Native Fish Conservation Policy Goals (635-007-0503) states: "Prevent the serious depletion of any native fish species by protecting natural ecological communities, conserving genetic resources, managing consumptive and non-consumptive fisheries, and using hatcheries responsibly so that naturally produced native fish are sustainable." The historic estimate for wild winter steelhead is 20,000 fish (Mattson 1955). The current wild winter steelhead abundance is less than 1,000 fish or less than 5% of the estimated historic abundance. ODFW has a record of moving the conservation baseline for Sandy River wild winter steelhead. In 1996 the wild winter steelhead escapement goal over Marmot Dam was 4900 fish, that was reduced to 1730 fish in 1998 and finally to 1519 in 2010. As the wild run declined, ODFW lowered the escapement goal creating a management plan that has a trend line declining rapidly toward zero. In the 1991 Steelhead Data Report ODFW said, "Our concern is what effect is the summer steelhead program having on other species and races of fish." The factual decline of wild winter steelhead means that the management program, including hatchery production, is not in compliance with either the Native Fish Conservation Policy or the Fish Hatchery Management Policy adopted in 2003.

The only justification for the hatchery summer steelhead program according to ODFW is to maintain a popular sport fishery which means a continuing stream of public funding from federal sources and license sales. ODFW would not adopt Alternative 2 because it threatens the agency's revenue generation.

"Alternative 3: Investigate, through genetic sampling and analysis, whether genetic information can be used to distinguish summer steelhead from the wild winter steelhead population. Based on this information, determine whether naturally produced summer steelhead exist within the basin and, specifically, whether natural production is occurring in the upper basin. If natural production of summer steelhead is occurring, develop management strategies to eliminate potential interactions between summer steelhead and the naturally produced winter steelhead population. {Issue 2}"

Comment:

- 1 Alternative 3 would repeat studies that are available regarding the genetic distinction between winter and summer steelhead and whether natural production of hatchery summer steelhead is taking place. This existing literature could be used to determine the answer to these questions and would therefore not require additional funding. Alternative 2 does not identify potential solutions to the problem having natural production of hatchery summer steelhead in the Sandy River, therefore the alternative is incomplete. If ODFW does not have the funds to repeat existing studies on the Sandy, it is unlikely that there will be funds available to correct problems that these studies confirm. This alternative is designed so that it would not be selected. In addition, this alternative puts off until some unspecified distant time any effective control of

hatchery summer steelhead therefore placing all the risk on ESA-listed salmonids in the Sandy River.

“Alternative 4: Investigate whether summer steelhead smolts are failing to migrate after release, determine the rate of residual rearing, and identify the spatial distribution and temporal presence of residual fish, and if found, determine if negative interactions with wild salmonids may be occurring. Based on this information, develop management strategies to reduce potential interactions between summer steelhead and the naturally produced winter steelhead population. {Issue 3}”

Comment:

- 1 No funding source has been identified to carry out this research project so it will not be done and even if it is completed the time frame is vague and actions to solve the problem of residual hatchery fish would take even more time and may not work out. Consequently, alternative 4 would put off for an unspecified, presumably at least a decade, delaying any substantive actions by ODFW to control hatchery summer steelhead residualized smolts. The ODFW already has information on residualism for this same stock of summer steelhead in the Clackamas River and have been unable to solve this problem. Given the fact that information already exists on residual hatchery summer steelhead impacts ODFW could implement remedial actions to address this problem immediately rather than drag it out for a decade or two. This alternative is designed to delay making any changes to the hatchery summer steelhead program and as such imposes all the risk on ESA-listed wild winter steelhead.

“Alternative 5: Conduct an investigation to determine the fate of summer steelhead that are recycled through the lower river fishery, and evaluate the extent and location of natural spawning by recycled summer steelhead. Based on the information obtained, develop management strategies to reduce potential interactions between summer steelhead and the naturally produced winter steelhead population. {Issue 4}”

Comment:

- 1 ODFW has evaluated recycled steelhead in the past and found that they tend to return quickly to their capture site and do not contribute to the fishery in any substantial way. It has also been determined by ODFW research that recycled fish stray. Repeating these studies for Sandy River hatchery summer steelhead would not be worth the expense and since no funding has been allocated to this study it is unlikely to take place soon if at all. This amounts to additional delay in implementing a conservation and recovery management program for ESA-listed wild winter steelhead, putting off any changes in the hatchery program and placing all the risk on ESA-listed winter steelhead. This alternative is designed to delay termination or reform of the hatchery summer steelhead program.

“The following draft of potential reforms and investments were identified during public workshops, are for discussion purposes, and are not necessarily being endorsed by the managing agency or the author of this document.”

Comment:

- 1 These potential reforms and investments are a continuation of the alternatives. These alternatives and the list of potential reforms and investments would not resolve the already identified problems associated with the hatchery summer steelhead program for ESA-listed winter steelhead and other species. By following this line of reform proposals and investments risk would continue to be placed on the ESA-listed species unnecessarily, for ODFW already knows the outcomes these reform studies would provide. In addition, there is no funding for implementation and the cost for this monitoring has not been developed.

C. Program Effects on ESA-Listed Salmonid Populations (HGMP Sect. 2)

i. Status of ESA-listed salmonid population(s) affected by the program (HGMP 2.2.2)

“Current population status and de-listing scenarios identified in existing/current recovery plans.”

Comment:

- 1 According to the HGMP the “Sandy winter steelhead assessed abundance (674) is above the critical level, but below the viable level.”

Based on Table 2.2.2(a) the Sandy River wild ESA-listed winter steelhead are high risk of extinction, it is a primary population and the delisting goal is 1,519 wild winter steelhead. The population at that level would be considered “Very Low” risk of extinction and the confidence in that estimate is “exceeded.”

Table 2.2.2(c) provides total numbers of wild winter steelhead from 1992 to 2010. By adding the wild fish up in four year groups from 1992 to 2007 the average wild steelhead run size ranges from 1,714 to 610 adult winter steelhead.

<u>Years</u>	<u>Average Winter steelhead run size</u>
1992 – 1995	1,714
1996-1999	610
2000-2003	836
2004-2007	746
2010	969

Comment:

- 1 There is no discussion about the time line used in Table 2.2.2(c), but data is available back to 1955 for wild steelhead run size (ODFW Steelhead Data Report 1991; Phil Howell et al. 1985) provide data on wild steelhead run size in the Sandy River going back to 1955. The HGMP should use all available data rather rely on a recent slice of the available data. This is an error

of omission and a shifting baseline all wrapped up together and introduces a bias into the HGMP document.

ODFW Steelhead Data Report 1991:

<u>Years</u>	<u>Average Winter Steelhead Run Size</u>
1956-1959	3,628 (based on sport harvest)
1960-1962	7,414 (based on sport harvest and Marmot Dam count)

Comment:

- 1 We did not go beyond 1962 because the first returns of unmarked hatchery fish returned to the Sandy River in 1963 inflating the number of steelhead in the river.

Phil Howell, et al 1985:

<u>Years</u>	<u>Average Winter Steelhead Run Size</u>
1955-1958	3,287 Wild
1959-1962	3,973 Wild
1963-1966	4,598 Wild and Hatchery

Comment:

- 1 The wild steelhead run evaluation for the mid 1950s through the early 1960s shows that the wild steelhead population was about 6 times greater than in the 1992 to 2007 period used in the HGMP. The lack of historical information to establish an estimate of wild steelhead abundance in the Sandy River should be explained in the HGMP.

The current delisting goal for Sandy River wild winter steelhead is 1,519 (table 2.2.2(a)). The delisting goal is only 38% of the historic abundance of wild steelhead in the Sandy River. Over the lifetime of an angler that has fished the river from 1956 to 2012 he would have seen the wild steelhead run crash from 3,953 fish to less than a thousand. From his perspective the Sandy wild winter steelhead run is depleted. When compared to the estimated historic run size of 20,000 winter steelhead (Mattson 1955) it is clear that what seemed to be a large wild winter steelhead abundance in the 1950s and 1960s is already depleted by over 16,000 fish and the delisting goal is only 7.5% of the historic abundance. The HGMP fails to provide a historic context for wild steelhead abundance and therefore may be underestimating the actual potential for wild steelhead abundance in the Sandy River. In addition, the selection of a 1,519 wild steelhead delisting goal also may be underestimating the actual recovery potential of the Sandy River basin. By not including a historical context a new management framework is established, using a shifting baseline, and may be promoting a recovery plan for non-viable wild steelhead in the Sandy River.

The HGMP management framework anticipates continued hatchery production of summer and winter steelhead along with hatchery production of other species that all interact within the Sandy basin and in the Columbia River and estuary. The HGMP ignores the ODFW research that points out a reduction in the wild population is equal to the proportion of naturally spawning hatchery fish in the basin regardless of the type of hatchery program (Chilcote et al. 2011). It ignores the conclusion that hatchery steelhead are so unproductive that they “waste the habitat” (Kostow and Zhou 2006) while contributing to the decline in wild steelhead reproductive success through ecological and genetic interactions.

D. Relationship of Program to Other Management Objectives (HGMP Sect. 3)

i. List all existing cooperative agreements, memoranda of understanding, memoranda of agreement, or other management plans or court orders under which the program operates (HGMP 3.2)

“This HGMP is consistent with the above policies, plans, agreements and permits.”

Comment:

- 1 This statement assumes that the listed policies, plans, agreements and permits support recovery of ESA-listed fish. They may be helpful, but many predate the ESA listing of Columbia River basin salmonids and are therefore not specifically developed to address conservation of threatened salmonids. By any measure the policy framework for salmonids is a failure based on the fact that most wild native populations of salmonids are now protected under the federal Endangered Species Act. In the Northwest there is still no coherent policy agreement designed to maintain and protect native wild salmonids among the fish managers, federal agencies, and tribes. Existing policy and agreements construct a management framework for commodity production through hatcheries, using hatcheries to replace wild salmonids and their habitats, and harvest share agreements among the various parties. Specifically the Sandy River HGMP justifies the continued release of non-native hatchery steelhead for the sole purpose of harvest while ignoring the best available science that challenges the continuation of that hatchery program.

ii. Relationship to habitat protection and recovery strategies (HGMP 3.4)

Comment:

- 1 Investments in restoring habitat for salmonids are more likely to provide the expected benefits when hatchery fish are not utilizing those habitats. This is confirmed by a recent study (Kostow and Zhou 2006) in their study of hatchery summer steelhead impacts on wild winter steelhead in the Clackamas River:

“In the Clackamas River basin, the summer steelhead hatchery adults had poor reproductive success; fewer smolts were produced per parent than in the wild population, and almost no

1 offspring of hatchery fish survived to adulthood (Kostow et al. 2003). The hatchery program was meant to provide a sport fishery, and the production of adult offspring was not intended. If successful hatchery reproduction had occurred, at least the offspring could have contributed to fisheries. Instead, the hatchery fish wasted basin capacity by occupying habitat and depressing wild production while producing nothing useful themselves. It is not unusual for hatchery adults to have poor reproductive success when they spawn naturally (other examples are provided by Reisenbichler and Rubin 1999, Kostow 2004, and McLean et al. 2004). The combined effect of poor hatchery fish fitness and depressed wild fish production due to competition with the hatchery fish poses a double jeopardy that could quickly erode natural production in any system.”

The habitat discussion does not include a statement about the impact of artificially produced salmonids on habitats and their impact on expected benefits from investments in habitat restoration. We suggest that this statement be included. The impact of stray hatchery summer steelhead on habitat investments and expected benefits is another issue that supports a decision to terminate their continued release in the basin and to take the necessary management actions to block all naturally produced summer steelhead from spawning, thus reducing the threat of ecological impacts on ESA-listed winter steelhead and other ESA-listed species.

iii. Ecological Interactions (HGMP: 3.5)

“(2) Species that could be negatively impacted by the program include:

- Lower Columbia River Chinook
- Lower Columbia River steelhead
- Lower Columbia River coho
- Columbia River chum
- Out-of-basin wild salmonids using the Columbia River estuary”

“Wild juvenile salmonids using the Columbia River may be affected by releases of Sandy Hatchery summer steelhead. However, the summer steelhead are released as full-term yearling smolts so they are expected to promptly out-migrate through the Sandy River and the lower Columbia River with a minimum of ecological interaction with other species.”

Comment:

1 Expectations may or may not work out, but they are not the same as data collected through a monitoring and evaluation program to evaluate smolt residualism and basing the HGMP on facts. Non-native hatchery summer steelhead are artificially released into the environment and have the potential for ecological impacts on ESA-listed wild winter steelhead and other listed species. A factual basis for concluding there is minimal impact is necessary. In addition, “minimal” impact is not measurable and it is meaningless for describing the actual impact on ESA-listed fish. The HGMP is incapable of determining the ecological impact of the hatchery program for summer steelhead on ESA-listed fish because it is based on opinion and judgment rather than on a factual basis. The HGMP makes no effort to provide data, standards, or any

analysis of whether there will or will not be effects from the releases, but rather simply provides a conclusory statement of what is “expected” without any basis for that opinion.

“(a) *Genetic Introgression* - Genetic introgression may occur if hatchery adults spawn in the natural spawning habitat of wild fish. This impact is minimized through the following actions:”

“All hatchery fish are marked and returning hatchery adults with visible fin clips will be sorted and removed from the spawning population of upstream migrants by ODFW staff through sorting operations at a weir/trap located at the mouth of Cedar Creek, weirs/traps in select upper basin tributaries, or deployment of seines/tangle nets in select areas of the upper basin. While these activities are conducted to collect hatchery spring Chinook, hatchery summer steelhead encountered during these operations will be removed.”

Comment:

- 1 Weirs and traps in the mainstem or in tributaries are not reliable due to high flow conditions that breach them and allow summer steelhead spawners to pass. Funding for their operation and maintenance is also uncertain given agency budget priorities. Removing summer steelhead while collecting spring chinook for hatchery production is an indirect means for reducing summer steelhead spawners. None of these methods are sufficient to prevent spawning by hatchery summer steelhead in the Sandy Basin and to prevent impacts to ESA-listed salmonids. The only reasonable assurance that would prevent ecological and genetic impacts from hatchery summer steelhead is to terminate the releases of these fish in the Sandy River. Scientific studies confirm that weirs are an imperfect barrier to preventing interbreeding of hatchery and wild fish (Seamons 2012).

“(b) *Competition* - Freshwater carrying capacity may be compromised if hatchery summer steelhead competitively displace wild fish in their natural rearing habitats. Although there are little data to substantiate whether competitive interactions are occurring in the Sandy basin, there is a chance that it may occur now that Marmot Dam no longer allows for sorting and removal of hatchery summer steelhead. The following are several strategies ODFW uses to avoid or minimize risks associated with hatchery and wild summer steelhead competitive interactions and carrying capacity concerns.”

“Summer steelhead smolts are released in the lower river at a target size that supports swift emigration and reduces the tendency for fish that do not meet the target size to residualize. This should minimize spatial and temporal overlap, thereby reducing competition with wild juveniles for food and cover.”

“The number of hatchery summer steelhead released from this program is considered moderate in magnitude relative to other Columbia River production programs and is not expected to cause serious density dependent effects in the Sandy Basin or lower Columbia River reaches (NMFS 1999).”

Comment:

- 1 As stated above the HGMP needs to be based on factual information resulting from a monitoring and evaluation program rather than on supposition, beliefs and judgment as to whether hatchery summer steelhead smolts residualize and pose an ecological impact on ESA-listed species. The number released adds to the cumulative impact of hatchery releases in the Columbia River basin promoting density dependent effects, predation and predator attraction in the Sandy subbasin and in the Columbia River mainstem and in the estuary. The releases may be “moderate in magnitude” but they still contribute to the cumulative impact of hatchery releases on wild salmonids. Since the hatchery summer steelhead program’s purpose is designed for harvest rather than for recovery of ESA-listed salmonids, it can be considered optional and given the potential impacts on wild salmonids it is also unnecessary for it has the ability to contribute to the decline of ESA-listed species. The lack of any factual information on the impacts of the hatchery summer steelhead program on ESA-listed salmonids, does not mean there is no impact.

E. Incubation and Rearing (HGMP Sect. 9)

i. Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish during incubation. (HGMP 9.1.7)

“South Santiam Hatchery - During spawning, eggs destined for Oak Springs Hatchery that test positive for IHNV are culled to minimize the likelihood that the program spreads IHNV to this spring-fed hatchery. IHNV positive eggs are often used for shipment to Bonneville Hatchery with pathology approval since Bonneville’s water source is already infected with IHNV. Disinfection procedures are implemented during incubation that prevents pathogen transmission between stocks of fish on site. Dead or culled eggs are discarded in a manner that prevents transmission to the receiving watershed.”

Comment:

- 1 The HGMP does not state whether IHNV is found in the Sandy River, but if it isn’t the transfer of IHNV positive eggs to Bonneville Hatchery which has IHNV in its water supply, could end up infecting the hatchery summer steelhead that are released into the Sandy River. The HGMP should discuss this relationship between IHNV and the potential to introduce it into the Sandy River and the measures that would be used to counteract such an introduction. Releasing potentially IHN virus positive fish into the Sandy River is a strong argument for not releasing those fish in the Sandy.

ii. Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish under propagation. (HGMP 9.2.10)

“To minimize possible impacts on listed fish, ODFW acclimates and releases full-term smolts that exhibit swift emigration and low residualism (dependant on size at release), and strong homing. Minimizing potential temporal and spatial overlap reduces risk that could result from competition for food or other vital resources.”

Comment:

- 1 As stated above the HGMP would be strengthened by having a factual basis for the claim and expectation that hatchery summer steelhead smolts emigrate rapidly and residualism is low. Just how low residualism is not quantified in the HGMP. Standards for residualism have not been stated for the hatchery management plan. No data or analysis is provided of how, or how much, risk would be reduced.

F. Monitoring and Evaluation of Performance Standards and Indicators (HGMP Sect. 11)

i. Monitoring and Evaluation of “Performance Indicators” presented in Section 1.10 (HGMP 11.1)

“Describe plans and methods proposed to collect data necessary to respond to each “Performance Indicator” identified for the program.”

Comment:

- 1 Monitoring and evaluation is presently planned and funded for actions that primarily evaluate hatchery operations (inside the hatchery fence) and harvest of hatchery fish. These are standard hatchery performance monitoring actions, but monitoring for risk factors affecting wild winter steelhead (outside the hatchery fence) are not funded and the likelihood they will be considering agency funding constraints means that risk factors of the hatchery operation on ESA-wild salmonids including wild winter steelhead will not be an active part of the monitoring and evaluation program. The HGMP identifies important monitoring and evaluation needs that would address gathering more information on risk factors due to hatchery operations while also admitting that this monitoring and evaluation will not be an active part of the HGMP program. In fact key risk factors considered to be key issues are relegated to “alternative actions” that are not being proposed. The list of those key issues is provided below:

ii. Indicate whether funding, staffing and other support logistics are available or committed to allow implementation of the monitoring and evaluation program. (HGMP 11.1.2)

“Current funding and staffing are adequately provided to allow implementation of the monitoring and evaluation activities identified in Section 1.10. Additional desired monitoring activities (currently unfunded) are identified in Section 1.16.”

Comment:

- 1 This conclusory statement of funding and staffing has no projected funding information or data in the HGMP to support it. Protection of ESA-listed species requires guaranteed commitments, and the HGMP does not explain how funding will be guaranteed to perform the monitoring and evaluation that is required to ensure against harm to ESA-listed fish.

G. Compatibility with Native Fish Conservation Policy (OAR 635-007-0502)

Is the hatchery summer steelhead program consistent with ODFW policy, state law and the Oregon Plan for Salmon and Watersheds?

Comment:

- 1 All hatchery programs in Oregon operated by the ODFW are to be managed so they are consistent with six objectives. The release of non-native hatchery summer steelhead into the Sandy River is not consistent with objective #2: "Contribute toward the sustainability of naturally produced native fish populations through the responsible use of hatcheries and hatchery-produced fish." (OAR 635-007-0543(2)). It is not consistent because of the risk it imposes on ESA-listed salmonids, especially wild winter steelhead. These risks include potential interbreeding between wild winter steelhead and hatchery summer steelhead, ecological impacts documented in the research by Kostow et al (2003, 2006), Chilcote 2011); predation and predator attraction, and incidental harvest impact on adult and juvenile salmonids in fisheries targeted on hatchery summer steelhead.

The Native Fish Conservation Policy (OAR 635-007-0502) defines ODFW's principle obligation for fish management as the conservation of naturally produced native fish in the geographic areas to which they are indigenous. The policy is based on the concept that "locally adapted populations provide the best foundation for maintaining and restoring sustainable naturally-produced fish." The NFCP requires a conservation plan for each native stock.

Even though the ODFW and commission prefer to manage for social and economic benefit and have interpreted Oregon State law (ORS 496.012) to mean the balancing conservation with utilization, the Oregon Department of Justice informed the agency in 1997 and 2003 that "The Department and the Commission have an overriding obligation to prevent the serious depletion of any indigenous species which thereby enables the Department and Commission to provide optimum recreational and aesthetic benefits" (Coon 1997). In a letter to Mr. Bowles, ODFW Chief of Fisheries, the Oregon Department of Justice said:

Dear Mr. Bowles: "You have asked whether the Fish and Wildlife Commission has authority to adopt rules as part of the proposed Native Fish Conservation Policy that would establish the conservation of naturally-produced native fish species as the Department's 'overriding obligation,' 'top priority,' or 'principal obligation' for fish management. We conclude that the fish and wildlife laws confer such authority. We have no reason to change this conclusion. The proposed language for the new Native Fish Conservation Policy would establish the conservation of naturally produced native fish species as the Department's 'principal obligation' and first priority for fish management." (McIntyre 2002)

In 2008 Mr. Bowles in a sworn statement said:

"Hatchery programs are not a substitute for, or an alternative to, achieving a viable wild population according to NOAA Fisheries' Hatchery Policy. Instead, any hatchery programs have to support natural production. Hatchery programs also pose ecological risks to wild populations that can further decrease abundance and productivity (reviewed by Kostow 2008). The level of

risk is related to both the proportion of the fish in a basin that are hatchery fish and to the source of the hatchery fish. Ecological risks due to the presence of hatchery adults (including adults of a different species) have been demonstrated when the proportion that is hatchery fish is over 10% (Kostow and Zhou 2006).” (Bowles 2008).

Aside from concerns regarding the spread of disease from hatchery fish to wild native fish, ODFW has no stock transfer policy that sets standards and management criteria for the transfer of hatchery fish among watersheds that address their ecological and genetic effects on native salmonids. The Oregon Plan for Salmon and Watersheds (1999) states:

“....there is increasing evidence that some stock transfers may result in fewer net benefits than expected. Problems have resulted from the transfer of disease organisms between stations, and from genetic alterations to the native stock. Guidelines are needed to manage not only for today, but in such a way that the productive nature of the wild and hatchery stocks of steelhead are maintained for future generations. Potential stock transfers will be reviewed by the Steelhead Coordinator...on the basis of potential benefits, potential impacts, relationship to steelhead plan goals, disease considerations, and alternative enhancement/production approaches. Each stock transfer proposal will also include an evaluation plan and a decision day given in advance when the evaluation results are weighed and the recommendation made to the Chief of Fisheries to continue or terminate the program.”

Unfortunately, ODFW eliminated the Steelhead Coordinator position and the administrative responsibility (OAR 635-07-510) to make sure that stock transfer proposal were defensible based on the best available science. The Steelhead Plan (1986) is no longer a factor in statewide steelhead management even though it was adopted by the ODFW commission following public involvement and support through fifteen workshops throughout the state. By eliminating the position of the Steelhead Plan Coordinator, the department no longer has an individual that is responsible for steelhead conservation and coordination throughout the state, and Oregon Plan recommendation for a stock transfer policy was never implemented for steelhead or any other species. The initial fish transfer protocols in the Steelhead Plan were based on “A Department Guide for Introduction and Transfers of Finfish into Oregon Waters,” but this policy is no longer available.

Columbia River hatchery operations and impact have been reviewed frequently. These reviews include Integrated Hatchery Operations Team (1995), Upstream (1996), the Independent Scientific Advisory Board (1998), Artificial Production Review (1999), Independent Scientific Review Panel (2005), ISRP and ISAB (2005), Return To The River (2006), Hatchery Science Review Team (2011) Independent Multidisciplinary Science Team (2001) among others including peer reviewed article published in science journals. While ODFW has made changes in hatchery operations, most have been focused on internal hatchery performance rather than their impact on the ecosystem they operate within.

In 2011 the Hatchery Science Review Group (HSRG) reviewed all hatchery programs in the Columbia River basin and provided direction to improve hatchery operations to reduce risk to native, wild salmonids. The HSRG said “Hatcheries are by their very nature a compromise” and the agency has to explain what the risks and tradeoffs are likely to be. “Hatchery fish on the

spawning grounds always represent a compromise between the demographic benefits and the genetic risk, even when they come from a well-integrated program.” In addition the HSRG makes the following recommendations:

- “The purpose, operation, and management of each hatchery program must be scientifically defensible. The strategy chosen must be consistent with current scientific knowledge. Where there is uncertainty, hypotheses and assumptions should be articulated.”
- “The HSRG also recommends establishing hatchery-free populations as a means of reducing the genetic and ecological risks to an MPG or ESU.”
- “Hatchery managers’ decision-making processes must include provisions to monitor the results of their programs and identify when environmental conditions or scientific knowledge has changed.”

The hatchery summer steelhead program should comply with the recommendations of the HSRG (2011) in order to cause this hatchery program to be scientifically defensible.

The Independent Multidisciplinary Science Team (IMST) for the State of Oregon recommended that ODFW should develop a comprehensive plan and cohesive policy for hatchery management, and the policy should include: specific management objectives, strategic guidelines for the entire hatchery program, link hatchery objectives and management objectives, link hatchery management to the Oregon plan, include strategies in addition to hatcheries such as harvest management, and habitat protection.

The IMST also recommended that ODFW should adopt and incorporate the recommendations of the independent science panels into statewide comprehensive policy. This would do the following:

- Minimize the adverse effects of hatcheries on natural populations.
- Adequately evaluate hatchery programs.
- Link supplementation programs with habitat improvements.
- Include genetic considerations in hatchery programs.
- Eliminate stock transfers and introduction of non-native species.
- Incorporate more experimental approaches into the artificial propagation program.

The hatchery summer steelhead program on the Sandy River does not effectively address the recommendations of the IMST, especially the reliance on stock transfers.

H. Conclusion

The release of hatchery summer steelhead into the Sandy River contribute to the decline of ESA-listed salmonids including wild winter steelhead. It is also inconsistent with ODFW administrative law, Oregon State statutes, the Oregon Plan for Salmon and Watersheds, recommendations by independent science panels, and best available scientific literature referenced above.

The HGMP attempts to justify the continued release of non-native hatchery summer steelhead in the Sandy River even though it fails to comply with ODFW administrative rules, policy, state law, and the recommendations by independent scientific panels as well as the best available scientific information, some of which the agency has conducted. It is for these reasons that the HGMP should be rejected. It is our recommendation that the release of hatchery summer steelhead be terminated in order to recover ESA-listed salmonids in the Sandy River basin.

III. Winter Steelhead HGMP

A. Introduction

The HGMP for hatchery winter steelhead in the Sandy River describes a program that has not supported recovery of ESA-listed wild winter steelhead for the run continues to decline (see graph in Appendix A). While the hatchery program has been releasing winter steelhead in the Sandy River for 114 years, the wild run continues to decline from an estimated 20,000 fish (Mattson 1955) to less than 1,000 fish. A hatchery program based on mitigation for numbers of fish (measured by juvenile release rather than adult return and contribution to fisheries) and for the purpose of harvest has failed to maintain the productive capacity of the wild steelhead population. The ODFW framework is based on a conceptual foundation that is focused on hatchery production for harvest while giving a modest nod to conservation in recent years following the listing of wild steelhead as a species threatened with extinction. In order to reverse the extinction trend for ESA-listed wild winter steelhead, the ODFW conceptual foundation needs to change to a conservation based management program. Saying that the winter steelhead management program is consistent with conservation policies is misleading because the purpose of the hatchery program is harvest not conservation and the continuing decline of the threatened wild population is proof of the non-compliance with conservation policies. The HGMP fails to address the problem of hatchery and harvest impacts on threatened wild steelhead and is therefore should be rejected and re-designed to accomplish recovery of wild ESA-listed species.

The HGMP lacks specific standards and over-uses terms such as minimize all of which contribute to a lack of clarity and the ability to determine how the HGMP is used to protect and recover ESA-listed steelhead in the Sandy River. For example the HGMP refers to a stray rate standard adopted by ODFW without stating what it is. The overused yet undefined word “minimize” is a relative term lacking specifics that can be monitored and evaluated. A harvest rate standard for steelhead is lacking, which would make it possible to determine the contribution of the hatchery program. The economic information lacks a detail addressing the cost to produce a fish that is actually harvested so that the hatchery program can be evaluated for cost effectiveness. There is no monitoring and evaluation for hatchery fish cost and benefits. Stray rates are not presented with enough detail. Annual stray rates are not stated and these stray rates need to be converted into adult spawners with discussion about genetic and ecological impacts of these strays on wild ESA-listed salmonids. Monitoring provisions such as using spawning ground counts to determine stray rates is not discussed in terms of its limitations. These problems, among others, limit the usefulness of the HGMP for determining its effectiveness in conservation and recovery of ESA-listed salmonids. The HGMP is fatally flawed by not including specifics and effectively addressing hatchery-harvest impacts on ESA-listed salmonids.

B. General Program Description (HGMP Sect. 1)

i. Justification for the Program (HGMP 1.8)

“The Sandy winter steelhead program is in place for both harvest augmentation and mitigation. The intent is to provide a sport fishery with fish that are similar to the wild fish in the Sandy to maintain a quality fishery that meets public demand and satisfies the desires of anglers while minimizing potential risks to wild spring Chinook, coho and winter steelhead populations, consistent with Oregon’s Lower Columbia River Salmon and Steelhead Conservation and Recovery Plan.”

Comment:

- 1 ODFW does not provide a definition of “minimizing” when referring to potential risks presented by the hatchery program. The monitoring program reliant on spawning ground surveys is not adequate to determine the ecological or genetic impact of hatchery winter steelhead on ESA-listed steelhead and other ESA-listed fish. The ODFW hatchery policy directs that each hatchery program shall describe how the hatchery objectives are to be monitored and evaluated. Neither the HGMP nor the related EA explains what “minimizing” means nor how operation of the Hatchery will “minimize” risk to wild fish. Without this explanation and analysis, the HGMP does not comply with the criteria of the 4(d) Rule, 50 C.F.R. § 223.203(b)(5), and the failure of the EA to evaluate whether the proposed action complies with the relevant requirements of the substantive statute in question—the Endangered Species Act—is a violation of NEPA.

ii. Potential Alternatives to the Current Program (HGMP 1.16.2)

Comment:

- 1 This section identifies project improvements such as fish passage in Cedar Creek and issues that represent a risk to ESA-listed stocks. Of the seven issues four of them do not have funding and these primarily address risk reduction to wild ESA-populations. Two of the projects proposed have funding or partial funding supplied by the City of Portland. And two issues have no projected costs and funding capability associated with them. In terms of reducing risk to ESA listed species there is no funding. The only funding available is to solve passage issues at Cedar Creek Hatchery. It is interesting that Issue #1, Alternative 2 would maintain the current out-of-basin steelhead rearing program but would not reduce stray rates of hatchery steelhead (summer and winter fish). This alternative is attractive to ODFW because it would not increase funding. Yet, it would not reduce straying impacts and risks to ESA-listed fish, so in order to maintain the existing hatchery operation and reduce funding; the actual cost would be externalized, increasing the risk to ESA-listed fish. It is the same problem that ODFW complains about when it comes to habitat protection, that is, the land and water management agencies externalize the costs of production for which the public must pay while increasing the risk to other important public resources such as salmonids. The conceptual framework used by ODFW in salmonid management is identical to that of other natural resource agencies and corporations that prefer to externalize costs to hold down the cost of production.

“Issue 1; Alternative 1: “Rear all Sandy late winter steelhead hatchery smolts within the Sandy basin.”

Comment:

- 1 There is no funding to support this alternative. Rearing hatchery steelhead within the Sandy River basin may or may not reduce the straying of hatchery steelhead, fish that do not return to the hatchery but spawn in the river. It is likely that the hatchery stray problem will not be totally resolved, creating continuing ecological and genetic impacts on ESA-listed wild winter steelhead throughout the Sandy River. The HGMP assumes that an allowance for a specific hatchery steelhead stray rate reduces risk to ESA-listed wild steelhead, even though there is no scientific support for that conclusion. (Chilcote et al. 2011) concludes that the proportion of naturally spawning hatchery fish reduces the productivity of the wild steelhead population equal to that proportion. In other words, a 10% stray rate for hatchery fish reduces the productivity of the wild population by 10% and operates the same as a harvest impact on the wild population. It means that the wild population would be 10% more productive without a stray rate of 10% for hatchery steelhead. Combining the impact of the hatchery stray rate and the incidental mortality associated with a selective fishery on wild steelhead increases the impact on wild steelhead productivity. The HGMP does not provide an analysis of the various impacts on the wild steelhead run from harvest and stray rates to determine whether the hatchery program is supporting recovery of wild steelhead or impeding recovery. The conceptual framework imbedded in the HGMP is to maintain the hatchery steelhead program for harvest, while under estimating the impacts of the hatchery program on ESA-steelhead recovery. Given the persistent declining abundance of wild steelhead in the Sandy River, it is necessary to evaluate the impact of the hatchery program and the harvest of hatchery steelhead on the reproductive success of wild steelhead. This evaluation is not included in the HGMP and funding to do this work is not available.

“Issue 2; Alternative 1: “If Sandy late winter steelhead stray rates exceed ODFW adopted Standards...”

Comment:

- 1 The stray rate standard adopted by ODFW should be stated to provide information important to public review of the HGMP.

“Issue 2; Alternative 1: Pros and Cons: Due to the current low stray rate observed for hatchery winter steelhead in the Sandy basin (below 10% in the last 5 years of Marmot trap operation; 2.6% basin-wide in 2010 based on spawning surveys), interaction between wild and hatchery winter steelhead on spawning grounds should be minimal throughout the Sandy Basin.”

Comment:

- 1 For clarity and to promote public review the stray rates for Marmot trap all years and for whole basin in all years should be stated and these stray rates should be converted to adult spawners and the proportion of the naturally spawning population that includes a breakout of hatchery and wild steelhead. The HGMP assumes that by reducing the stray rate that the hatchery and

harvest program does not impede recovery of ESA-listed winter steelhead in the Sandy River, but there is no factual support for this conclusion. There is no funding to do this work.

“Issue 3; Alternative 1: Conduct an investigation to determine the fate of hatchery winter steelhead that are recycled through the lower river fishery, and evaluate the extent and location of natural spawning by recycled winter steelhead. If necessary, based on the information obtained, develop management strategies to reduce potential interactions between hatchery winter steelhead and the naturally produced winter steelhead population.”

Comment:

- 1 Research on straying of recycled hatchery steelhead has already been done. There are some fishery benefits, but not all recycled fish (44%) returned to the point of origin. At least some of those fish strayed and spawned naturally. Homing decreased after the first recycle trip, suggesting fish died or strayed at a higher and higher rate on subsequent trips (Lindsay et al. 2001). Schemmel evaluated recycled summer steelhead on the Clackamas River and found that “While recycling fish may increase angler catch, the majority of the fish do not return to the hatchery. Further evaluation of this management strategy should be done, especially in rivers with endangered wild populations.”(Schemmel.2009). These studies were completed in Oregon by the ODFW and Oregon State University, so they should be readily available. There is no funding available for this study, so a literature review should suffice rather than continuing to compound the risk to wild steelhead by re-evaluating recycling hatchery fish. Given the status of ESA-listed wild winter steelhead in the Sandy River a proposal to benefit the fishery by recycling hatchery steelhead would run counter to threatened steelhead recovery.

“Issue 7; Alternative 1: *The transition of the program to an integrated program should reduce the program productivity losses caused by domestication.* **Pros & Cons:** The action should reduce the loss of productivity via domestication effects. The downfall is mining of wild adults for the spawning population and reduction of natural production. The alternative will be more closely examined when the population has become more viable.”

Comment:

- 1 Converting the segregated hatchery to an integrated one would expand the risk of hatchery operations on ESA-listed wild winter steelhead. While the integrated hatchery program would improve survival and by extension harvest contribution of the hatchery product, it would also consume wild fish to support the hatchery program and produce fish that would interbreed with wild fish and reduce their reproductive success (Araki et al. 2008; Chilcote et al. 2011). The integrated hatchery would also have a carry-over genetic impact on the threatened wild steelhead population, affecting long term reproductive success (Araki et al. 2009). The solution that provides the most benefit for wild ESA-listed winter steelhead recovery would be to terminate the hatchery program since the ecological, harvest, and genetic impacts of the program cannot be controlled sufficiently to reverse the declining trend and recover winter steelhead.

C. Program Effects on NMFS ESA-Listed Salmonid Populations (HGMP Sect. 2)

i. Current population status and de-listing scenarios identified in existing/current recovery plans (HGMP 2.2.2)

Comment:

- 1 According to the HGMP the “Sandy winter steelhead assessed abundance (674) is above the critical level, but below the viable level.” Based on Table 2.2.2(a) the Sandy River wild ESA-listed winter steelhead are high risk of extinction, it is a primary population and the delisting goal is 1,519 wild winter steelhead. The population at that level would be considered “Very Low” risk of extinction and the confidence in that estimate is “exceeded.”

Table 2.2.2(c) provides total numbers of wild winter steelhead from 1992 to 2010. By adding the wild fish up in four year groups from 1992 to 2007 the average wild steelhead run size ranges from 1,714 to 610 adult winter steelhead.

<u>Years</u>	<u>Average Winter steelhead run size</u>
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1992 – 1995	1,714
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1996-1999	610
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2000-2003	836
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2004-2007	746
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2010	969
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Comment:

- 1 There is no discussion about the time line used in Table 2.2.2(c), but data is available back to 1955 for wild steelhead run size (ODFW Steelhead Data Report 1991; Phil Howell et al. 1985) provide data on wild steelhead run size in the Sandy River going back to 1955. The HGMP should use all available data rather rely on a recent slice of the available data. This is an error of omission and a shifting baseline all wrapped up together and introduces a bias into the HGMP document regarding wild steelhead abundance in the Sandy River Basin and the extent of their decline.

ODFW Steelhead Data Report 1991:

<u>Years</u>	<u>Average Winter Steelhead Run Size</u>
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1956-1959	3,628 (based on sport harvest)
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1960-1962	7,414 (based on sport harvest and Marmot Dam count)
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Comment:

- 1 I did not go beyond 1962 because the first returns of unmarked hatchery fish returned to the Sandy River in 1963 inflating the number of steelhead in the river and since the hatchery fish were not externally marked, it is impossible to determine the size of the wild run.

Phil Howell, et al 1985:

<u>Years</u>	<u>Average Winter Steelhead Run Size</u>
1955-1958	3,287
1959-1962	3,973
1963-1966	4,598

Comment:

- 1 The wild steelhead run evaluation for the mid 1950s through the early 1960s shows that the wild steelhead population was about 6 times greater than in the 1992 to 2007 period used in the HGMP. The lack of historical information to establish an estimate of wild steelhead abundance in the Sandy River should be explained in the HGMP.

The delisting goal for Sandy River wild winter steelhead is 1,519 (table 2.2.2(a)). The delisting goal is only 38% of the historic abundance of wild steelhead in the Sandy River. For an angler who has fished the Sandy River a lifetime from 1956 to 2012 the wild steelhead run crashed from 3,953 fish to less than a thousand. From his perspective the Sandy wild winter steelhead run is depleted. When compared to the estimated historic run size of 20,000 winter steelhead (Mattson 1955) it is clear that what seemed to be a large wild winter steelhead abundance in the 1950s and 1960s is already depleted by over 16,000 fish and the delisting goal is only 7.5% of the historic abundance. The HGMP fails to provide a historic context for wild steelhead abundance and therefore may be underestimating the actual potential for wild steelhead abundance in the Sandy River. In addition, the selection of a 1,519 wild steelhead delisting goal also may be underestimating the actual recovery potential of the Sandy River basin. By not including a historical context a new management framework is established, using a shifting baseline, that may be promoting a non-viable recovery plan for wild steelhead in the Sandy River.

The HGMP management framework anticipates continued hatchery production of summer and winter steelhead along with hatchery production of other species that all interact within the Sandy basin and in the Columbia River and estuary. The HGMP ignores the ODFW research that points out a reduction in the wild population is equal to the proportion of naturally spawning hatchery fish in the basin regardless of the type of hatchery program (Chilcote et al. 2011). It ignores the conclusion that hatchery steelhead are so unproductive that they “waste the habitat” (Kostow and Zhou 2006) while contributing to the decline in wild steelhead reproductive success through ecological and genetic interactions.

D. Relationship of Program to Other Management Objectives

i. Describe alignment of the hatchery program with any ESU-wide hatchery plan or other regionally accepted policies. Explain any proposed deviations from the plan or policies. (HGMP 3.1)

Comment:

- 1 The Sandy River HGMPs for summer and winter steelhead justifies the continued release of non-native hatchery steelhead for the sole purpose of harvest while ignoring the best available science that challenges the continuation of that hatchery program. The direction provided in the referenced policies and the winter steelhead HGMP are not entirely consistent. For example, the Native Fish Conservation Policy,

“...requires a conservation plan for each native stock, an assessment of the status of each native stock, a description of the desired biological status relative to measurable biological attributes, a description of short and long term management strategies to address the primary limiting factors, short and long term monitoring and research needs, and a description of measurable “trigger” criteria which would indicate a change in status or a need to modify or expand recovery efforts.”

The overriding obligation of the department and the commission is to prevent the serious depletion of any indigenous species in order to optimize benefits according to the Oregon Department of Justice (Coon 1997; McIntyre 2002). The HGMP fails to address the hatchery program as a major limiting factor for wild winter steelhead in the Sandy River by ignoring the best available scientific information (Chilcote et al 2011, Kostow et al. 2003, 2006; Araki 2008, 2009) and policy direction. By any measure the decline in wild winter steelhead indicates that management has been a failure and will continue to be a failure on the Sandy River because the hatchery program is not fully consistent with the Native Fish Conservation Policy and the Hatchery Management Policy, therefore placing wild steelhead at risk.

Hatchery Management Policy “...describes best management practices that are intended to help ensure the conservation of both naturally produced native fish and hatchery produced fish in Oregon through the responsible use of hatcheries.” Goal 2 says: “Contribute toward the sustainability of naturally produced native fish populations through the responsible use of hatcheries and hatchery-produced fish.” Given the scientific studies of hatchery fish impacts on wild fish such as reduction in reproductive success and fitness (Chilcote et al 2011; Araki 2008, 2009) and ecological impacts (Kostow et al 2003, 2006) the direction in the Hatchery Management Policy relied on in the HGMP cannot be accomplished.

ii. List all existing cooperative agreements, memoranda of understanding, memoranda of agreement, or other management plans or court orders under which the program operates. (HGMP 3.2)

- Lower Columbia River Conservation and Recovery Plan for Oregon Populations of Salmon and Steelhead

- Sandy River Subbasin Fish Management Plan
- Fisheries Management and Evaluation Plan for the Lower Columbia Steelhead
- US vs. Canada Treaty
- Native Fish Conservation Policy
- Fish Hatchery Management Policy
- Fish Health Management Policy
- Biological Opinion on Artificial Propagation in the Columbia River Basin. 1999.
- Incidental Take of Listed Salmon and Steelhead from Federal and Non-Federal
- Hatchery Programs that Collect, Rear and Release Unlisted Fish Species. Portland, Or.
- The Mitchell Act

Comment:

- 1 The HGMP should evaluate whether the agreements, policy and plans are supportive of ESA-listed salmonid recovery and their effect on Sandy River listed species. In addition, the HGMP should determine whether it is consistent with the agreements, policy and plans that do support recovery of ESA-listed species. For example, the purpose of the Mitchell Act Environmental Impact Statement was expanded to provide, for the first time, legal coverage for all federal hatchery operations in the Columbia River under the Endangered Species Act and other federal laws. Protecting wild salmonids, while operating a federally funded and directed hatchery program, is the key goal that the Mitchell Act EIS must accomplish. The Mitchell Act Environmental Impact Statement that included the Sandy Hatchery has never been finalized. Consequently, all Mitchell Act hatcheries have no legal coverage under the ESA.

iii. Ecological Interactions. (HGMP 3.5)

“(2) Species that could be negatively impacted by the program include:

...the winter steelhead are released as full-term yearling smolts so they are expected to promptly out-migrate through the Sandy River and the lower Columbia River with a minimum of ecological interaction with other species. The smolts are also released in the lower portion of the Sandy River where limited wild juvenile rearing occurs, so there is likely to be minimal competition between hatchery and wild salmonids.”

Comment:

- 1 The HGMP provides expectations that hatchery steelhead releases will have a “minimum of ecological interaction with other species,” but lacks information based on measurement of impacts. Consequently, the HGMP provides no specific information on impacts that hatchery winter steelhead releases have on ESA-listed species in the Sandy River, Columbia River, estuary, and ocean environments. The HGMP actually provides no more than an unsupported, conclusory belief that hatchery releases do not have an impact on ESA-listed species rather than factual proof for the claim.

“(a) Genetic Introgression - Genetic introgression may occur if hatchery adults spawn in the wild environment. This impact is minimized through the following actions:”

“The primary spawning and rearing habitats exist in the mainstem and tributaries above the former Marmot Dam (70%), although suitable habitat exists down river; hence, hatchery steelhead may breed with other hatchery fish or wild fish occupying the same habitat. Potential risks to wild winter steelhead include loss of genetic variation within and between populations, genetic drift, and domestication (resulting from hatchery selection). Spawning surveys and Marmot Dam counts indicate limited stray of hatchery winter steelhead but to address the potential risk, Department personnel conduct the following risk avoidance measures:”

- Hatchery smolts acclimate and volitionally emigrate out of Cedar Creek, a tributary to the lower Sandy River. Smolts are released into targeted areas to promote adult homing to lower subbasin areas (to promote lower river fisheries) and to Cedar Creek (for adult collection).
- We hope to maximize adult homing to the lower Sandy Basin, while reducing straying within the Sandy Basin and to nearby subbasins that support winter steelhead, such as the Clackamas River.
- The Department manages the hatchery program in accordance with the LCRCRP, which calls for limiting hatchery steelhead to less than 10% of the natural spawner population in the natural spawning habitat for winter steelhead in the Sandy River.”

Comment:

- 1 The HGMP notes that wild steelhead spawn in the lower as well as the upper Sandy River, but are trying to concentrate hatchery impacts on ESA-listed species in the lower 30% of the river, saying, “We hope to maximize adult homing (of hatchery steelhead) to the lower Basin.” To accomplish this “hope” the HGMP proposes to use acclimation of hatchery fish even though ODFW’s own research shows that acclimation is not a reliable means by which to control stray hatchery spawners. When Kenaston et al. (2001) conducted a 3-year experiment with hatchery steelhead to evaluate whether a 30-day acclimation period in the waters of their release site would increase adult returns to the site, they found that acclimation, “... provided only a 5% average increase in the number of returning adults, leading to the conclusion that acclimation is not helpful in achieving higher returns to release sites.” Acclimation as a strategy in this HGMP or for any of the HGMPs therefore is not a scientifically-supportable means of reducing or minimizing impacts to listed fish.

In addition Dittman et al. 2010, found, “While homing was clearly evident, the majority (55.1%) of the hatchery fish (spring chinook) were recovered more than 25 km from their release sites, often in spawning areas used by wild conspecifics. Hatchery and wild fish displayed remarkably similar spawning distributions despite very different imprinting histories, and the highest spawning densities of both hatchery and wild fish occurred in the same river sections. These results suggest that genetics, environmental and social factors, or requirements for specific spawning habitat may ultimately override the instinct to home to the site of rearing or release.”

There are two problems revealed in the HGMP regarding the management of hatchery winter steelhead and the reduction of straying hatchery fish:

(1) The HGMP incorrectly assumes that the protection of ESA-listed species including wild winter steelhead is confined to the upper river. ODFW admits that wild ESA-listed salmonids use the whole river, but ignores the fact that the ESA requires the recovery of natural fish in their natural environment. The HGMP ignores both federal law and the biological requirements of the species under federal protection. The HGMP admits that wild ESA-listed winter steelhead utilize the lower 30% of the Sandy River for spawning and rearing, but dismiss its importance to species recovery in order to operate their hatchery program for harvest. The HGMP does not evaluate this impact on ESA-listed salmonids.

(2) The HGMP relies on acclimation to return hatchery winter steelhead to the lower river sport fishery, when their own and other scientific studies of acclimation show that it does not prevent excessive straying of hatchery salmonids. The HGMP sets up a condition whereby the lower 30% of the river will be managed as a sacrifice area dedicated to the harvest of hatchery steelhead rather than the recovery of ESA-listed wild winter steelhead. At the same time, acclimation will not prevent straying of hatchery winter steelhead in the upper 70% of the Sandy River being managed to protect wild ESA-listed winter steelhead and other ESA-listed species such as spring chinook and coho salmon. These “risk avoidance measures” do not support the recovery of wild ESA-listed winter steelhead.

The stray hatchery winter steelhead of 10% stray rate is not evaluated in the HGMP even though ODFW’s own scientists have published peer reviewed studies indicating that the decline in wild salmonids is affected by the number of naturally spawning hatchery fish and that the impact is in proportion to percent of the naturally spawning population composed of both hatchery and wild fish. Therefore a stray rate of 10% would suggest, based on ODFW’s own staff research, that wild steelhead production would be reduced by 10%. Relying on Table 3 in the HGMP, the average hatchery steelhead return (1997-2004) was 2,093 adult steelhead which included returns to Marmot Dam fishway, Sandy Hatchery and estimated harvest. For this period a 10% stray rate would be about 209 hatchery steelhead. The actual stray rate may have been more for the HGMP does not provide information on the actual return rate for hatchery winter steelhead, only those that were observed. Spawning ground counts would provide, if provided, additional information on the number of stray hatchery steelhead, but that would also have been inconclusive since spawning ground surveys for steelhead are difficult due to high off color water and access problems to all areas, especially snow-bound areas.

Consequently, since a more up to date data set is not available and the HGMP provides no estimate of a hatchery winter steelhead stray rate, 209 strays must be considered a minimal number. Nonetheless, that would mean a minimum of 1,672 stray hatchery winter steelhead influencing the productivity of ESA-listed wild winter steelhead over two complete life cycles. The impact of the hatchery program over the last 114 years (1898 -2012) would represent a persistent contribution to the decline of wild winter steelhead due to egg mining and for

reasons related to negligible survival of hatchery product and exportation of eggs to other hatchery locations outside the Sandy basin between 1898 and 1960.

The HGMP is not placed within the historical context of hatchery operations in the Sandy basin beginning in 1898 so it is impossible to establish the impact of the hatchery program on wild steelhead and to determine how the proposed HGMP would actually improve on hatchery practices. Historically, the estimated wild steelhead run in the Sandy was 20,000 fish per year (Mattson 1955) and now it is less than 1,000. ODFW has a record of moving the conservation baseline for Sandy River wild winter steelhead. In 1996 the wild winter steelhead escapement goal over Marmot Dam was 4,900 fish, that was reduced to 1,730 fish in 1998 and finally to 1,519 in 2010. The delisting goal is only 1,519 wild steelhead, even though there is information showing that the wild run was larger and the goal may underestimate the productive capacity of the Sandy River.

The HGMP does not include an estimate of mortality to wild winter steelhead from all sources identified in the plan. For example there is mortality associated with the ODFW take permit, incidental harvest related kill in the Sandy and in the Columbia River, the take of wild steelhead for breeding, impact of stray hatchery summer steelhead and harvest fisheries, and the impact of stray hatchery fish on the reproductive success of wild steelhead. Lacking an assessment of the mortality profile for wild steelhead the HGMP fails to properly evaluate the risk that the hatchery program and its associated impacts have on ESA-listed steelhead.

iv. Describe fisheries benefiting from the program, and indicate harvest levels and rates for program-origin fish for the last twelve years (1999-2011), if available. (HGMP 3.3.1)

“The Oregon department of Fish and Wildlife proposes to continue the adult steelhead harvest regime currently in place in the Lower Columbia River ESU. This regime has been structured and implemented over a number of years to provide what we believe to be highly significant protection to both adult and juvenile winter steelhead. Our long-term intent is to provide consumptive fisheries for hatchery winter and summer steelhead while minimizing fishery-associated mortality on wild winter steelhead.”

Comment:

- 1 The HGMP relies upon ODFW’s belief that the structure of the hatchery-harvest program is “highly significant protection to both adult and juvenile winter steelhead,” but provides few measurable facts or any analysis to support this belief. ODFW also claims that the hatchery-harvest structure advanced in this HGMP will be effective in “minimizing fishery associated mortality on wild winter steelhead.” The term “minimize” is used frequently in the HGMP even though it is a relative term lacking conditions that can be monitored. By using minimize the reader has the expectation that the impact, if any, would be negligible, but that assumption would be wrong because there is no scientific basis to evaluate what the term means or to monitor its application, and the HGMP also makes no effort to explain what the term means or evaluate how the elements of the hatchery program will actually minimize impacts to listed fish. The decline of wild winter steelhead and their protection under the ESA indicates that the hatchery-harvest structure applied by ODFW to winter steelhead in the Sandy has failed to

prevent its serious depletion and provides little in the way of specific information on how that condition would be corrected.

“Under Alternative 3 of the Sandy Basin Plan Amendment (ODFW 2001), the entire run will be comprised of in basin stock. It is known that it will change the fishery by moving it to later in the winter. However it is thought that it will become a stronger run and provide an excellent fishery.”

Comment:

- 1 The HGMP does not evaluate the risk to ESA-listed wild steelhead that may result for a shift to a hatchery program utilizing native winter steelhead as the brood stock for the hatchery program. Instead the HGMP states that “it is thought” this change in hatchery stock will provide “an excellent fishery.” Recent scientific evaluation of hatchery programs utilizing wild steelhead as brood stock showing a reduced fitness and reproductive success in the native brood stock hatchery fish (Araki 2008,2009; Chilcote et al. 2011, Reisenbichler et al. 1977) were not included in the HGMP assessment.

For example, Kostow (2004) said: “In conclusion, this study demonstrated large average phenotype and survival differences between hatchery-produced and naturally produced fish from the same parent gene pool. These results indicate that a different selection regime was affecting each of the groups. The processes indicated by these results can be expected to lead to eventual genetic divergence between the new hatchery stock and its wild source population, thus limiting the usefulness of the stock for conservation purposes to only the first few generations.”

The early run wild winter steelhead were affected by the hatchery program in the 1960s, causing them to become functionally extinct in most rivers as the sport fishery attracted to the hatchery based fishery overharvested the wild run and hatchery fish interbred with wild fish, reducing the fitness of the wild population. By shifting the hatchery program to a native broodstock using later run wild steelhead as a source for production, the Sandy and other rivers are likely to experience a decline in wild ESA-listed steelhead with late run timing. This can be caused by a greater harvest impact from the sport fishery, and ecological and genetic impacts from naturally spawning hatchery summer and winter steelhead. By not evaluating these likely effects on the wild steelhead, the HGMP fails to provide a factual evaluation for this shift in the hatchery program.

v. Relationship to habitat protection and recovery strategies (HGMP 3.4)

“The Sandy River basin is a diverse system, containing important fish habitat that requires appropriate protection and recovery strategies to help improve native salmonid populations in the basin.”

Comment:

- 1 While the habitat objectives listed in the HGMP are important, there is no objective that relates the diversity of habitat to the life history diversity of ESA-listed salmonids that utilize these habitats. In order for the wild salmonids to successfully spawn, rear and compete their life cycle, an objective that integrates the habitat requirements for each species and stock with the life history of those fish is required. For example, W.F. Thompson (1959) said: "So our 'Home Stream' becomes a chain of favorable environments connected within a definite season in time and place, in such a way as to provide maximum survival. It is very apparent that there are in any river system, or in different rivers, various possible combinations or chains of this sort which can be connected in time and space in a variety of ways." The HGMP fails to include that necessary perspective and an objective to implement it.

"Wild juvenile salmonids using the Columbia River may be affected by releases of Sandy Hatchery winter steelhead. However, the winter steelhead are released as full-term yearling smolts so they are expected to promptly out-migrate through the Sandy River and the lower Columbia River with a minimum of ecological interaction with other species. The smolts are also released in the lower portion of the Sandy River where limited wild juvenile rearing occurs, so there is likely to be minimal competition between hatchery and wild salmonids."

Comment:

- 1 Expectations may or may not work out, but they are not the same as data collected through a monitoring and evaluation program to evaluate smolt residualism and basing the HGMP on facts. A factual basis for concluding there is minimal impact is necessary. In addition, "minimal" impact is not measurable and it is meaningless for describing the actual impact on ESA-listed fish. The HGMP is incapable of determining the ecological impact of the hatchery program for winter steelhead on ESA-listed fish because it is based on opinion and judgment rather than on a factual basis, usually expressed as conclusory statements rather than as a reasoned explanation derived from facts and scientific principles. Wild ESA-listed salmonids utilize the whole river so the idea that the lower river is the best place to absorb hatchery impacts is an attempt to restructure the life history diversity of ESA-listed salmonids that are dependent on the habitat diversity of the whole Sandy watershed. In fact wild winter steelhead spawn and rear in the lower river and in tributaries of the lower river, so treating 30% of the watershed as a habitat of lower value in order to justify intense hatchery impacts, is a policy decision not supported by biological facts. It also runs counter to recovery of ESA-listed species in the Sandy River.

vi. Genetic Introgression and Broodstock Collection, Selection and Rearing (HGMP 3.5(2)(a) and (2)(b))

Comment:

- 1 The HGMP correctly identifies the hatchery stock as having distinct characteristics due to domestication selection and relaxed selection in the hatchery environment that produces a fish that is distinct in fitness, phenotypic traits, and reproductive success from the wild form of winter steelhead. This shift from a wild form to a cultured form of fish introduces

complications for recovery of ESA-listed wild steelhead that cannot be “entirely avoided.” In fact the hatchery is introducing a new stock of steelhead into the Sandy River even though it may be derived from the wild stock, and in so doing is introducing a stock that is incompatible with the wild steelhead. The hatchery represents a “one-size-fits-all” stock for harvest purposes whose impact on ESA-listed winter steelhead cannot be controlled, producing impacts that impose serious limiting factors affecting recovery of the wild stock. The only way to mitigate these impacts that range from harvest mortality on wild fish in a targeted hatchery stock fishery to ecological and genetic impacts for spawning and rearing of wild fish is to have specific objectives that can be measured and evaluated. The HGMP does not include a description of the wild steelhead life history and genetic character so that changes to those characteristics and behaviors can be measured. A biological baseline for wild steelhead is needed and a monitoring and evaluation program that can identify impacts is necessary, but the HGMP lacks that direction.

vii. Competition and Carrying Capacity (HGMP 3.5 (2)(c))

“Carrying capacity is a function of both a population of its environment, and can be defined as the “upper limit on the steady-state population size that an environment can support” (Brannon et. al. 1999).”

Comment:

- 1 If anything is apparent it is that habitat is not a steady state environment because its capacity fluctuates on a seasonal, annual, and long-term basis. Consequently, the model of a steady state environment fails to address the variability of that environment to rear wild salmonids. Consequently, the release of 160,000 hatchery winter steelhead and 75,000 summer steelhead smolts and half a million coho smolts as well as hatchery spring chinook and strays from all hatchery releases will have a variable and uncontrolled impact on wild ESA-listed species. The habitat certainly varies, but the hatchery program is steady state production that does not vary with changes in the habitat. It is nearly impossible to predict habitat changes in order to make adjustments in the hatchery releases, so the hatchery releases will dominate the habitat utilized by wild ESA-listed salmonids. This means that the productivity of the habitat will be constantly dominated by hatchery releases. Hatchery production is a product of agency policy and external agreements and mitigation agreements, so changes in hatchery production to accommodate changing environments or to reduce impacts on wild salmonids is beyond the control of the hatchery program. The HGMP does not acknowledge this problem and does not attempt to establish a biologically based assessment that would make adjustments in the hatchery program as habitats change.

“**Size at release** – To minimize competitive impacts (or density dependent effects), ODFW releases large (180-250 mm) steelhead as recommended by the NMFS (1999 NMFS) to promote swift emigration and prevent residualization; and subsequently minimize temporal and spatial overlap for food and cover.”

Comment:

- 1 Most wild populations are less than 180 mm as smolts. This size difference can be due to domestication selection in hatchery fish (Reisenbichler 2008) and can increase ecological interactions between hatchery fish and ESA-listed wild salmonids through predation and competition. The HGMP should evaluate the risk of releasing large hatchery steelhead smolts on wild salmonids and provide documentation that large hatchery smolts causes a reduction in non-migratory hatchery steelhead. The tradeoff is to raise hatchery smolts from 180 mm to 250 mm to reduce residualism and increase predation or to release them at the same size as wild smolts and increase residualism. Since the hatchery winter steelhead program has consequences (Paquet et al. 2011) for wild steelhead recovery, those tradeoffs should be stated in the HGMP. Recovery of ESA-listed species ought to be the primary concern of the agencies and supported by the HGMP. A hatchery program for the purpose of harvest that introduces unavoidable conflicts for wild salmonid recovery under the ESA should result in a decision to terminate the harvest hatchery program in order to recover ESA-listed species.

“Number of fish released – The number of late run winter steelhead released from this program is 160,000. This number of fish released is considered “moderate in magnitude – relative to other Columbia River production programs and is not expected to cause serious density dependent effects in the Sandy basin or lower Columbia River reaches (USFWS 1999).”

Comment:

- 1 The HGMP speculates that the hatchery winter steelhead releases are not “expected” to cause “serious” density dependent effects in the Sandy or the Columbia River. This speculation must be included in a monitoring and evaluation program rather than adopted based on an opinion. The HGMP should include a statement that links this opinion to a specific monitoring evaluation and research program in the HGMP.

“Adult removal – The Department believes that over 70% of the natural spawning habitat of winter steelhead in the Sandy basin occurs above the former Marmot Dam (primarily in the Salmon River and Still Creek basins). Adult hatchery fish and adult wild fish may coexist (and spawn) in the lower Sandy basin; however, since the majority of steelhead spawn and rear in the upper Sandy basin and hatchery winter steelhead have high affinity for their release point in Cedar Creek, interactions are believed to be minimal.”

Comment:

- 1 The HGMP speculates that stray hatchery winter steelhead will have “minimal interactions” with ESA-listed wild steelhead, but this expectation should be validated by a monitoring, evaluation, and research program. This section should be linked with a specific ME&R plan in the HGMP.

“To minimize direct mortality (or consumption) on wild fish, NMFS directed ODFW via the 1999 Biological Opinion to release large winter steelhead smolts at 171-237 mm forklength

(mean forklength = 209 mm) to promote swift emigration, prevent residualization and subsequent predation on residing fish species. Within the Sandy River Basin, winter steelhead naturally migrate at 120-220 mm forklength (mean forklength = 139 mm (USFS, 2001)). Hence, hatchery steelhead are skewed from the natural population size structure by approximately 33%. The benefits of having swift emigration versus managing releases to match natural population size structure is an impact that the Department will investigate as resources become available.”

Comment:

- 1 The HGMP recognizes that releasing hatchery steelhead at the size directed by NMFS may cause problems, but funding is not available to prove its validity. The ODFW must make a commitment to monitor and evaluate the validity of hatchery smolt size and its expected benefits that include reduced predation on ESA-listed salmonids, predator attraction, and reduced residualization. Without verification, the release of larger hatchery steelhead smolts represent an unquantified impact on wild ESA-listed salmonids, making the HGMP inadequate. The HGMPs must demonstrate that protective measures intended to prevent harm to wild fish are guaranteed to occur, and there is no information in the HGMPs that does so.

In addition, for this HGMP and all of the other HGMPs, please evaluate the recent studies which show that hatchery fish predation on wild fish may be significant and which provide a framework for evaluating when such interaction is most likely to be significant (Sharpe 2008, Naman 2008).

E. Broodstock Origin and Identity (HGMP Sect. 6)

i. History (HGMP 6.2.1)

“The Sandy Hatchery winter steelhead program began in 1955 through an approval by the Oregon State Game Commission. Since then, broodstocks of different origin were used including: Big Creek; Eagle Creek; Alsea; and Sandy. Table 17 shows release of winter steelhead of different broodstock origin.”

Comment:

- 1 The HGMP does not include a complete history of winter steelhead hatchery releases in the Sandy River beginning in 1898 to the present. According to Howell et al. (1985) Chambers Creek winter steelhead were released in the Sandy River. Releases of non-native hatchery steelhead began in 1955 and lasted until 2000 (45 years or 15 hatchery steelhead generations). Non-native hatchery summer steelhead were first released in the Sandy River in 1975 and are still released in 2012 (37 years). Prior to 1964 all hatchery steelhead were released above Marmot Dam and spawned in Salmon River, Still Creek, Devil Canyon Creek, Lost Creek, and Clear Fork of the Sandy River. From 1955 through 1963 (8 years or 2 steelhead generations) winter hatchery steelhead were released into the Sandy in the portion of the river that ODFW now considers the primary (70%) wild winter steelhead spawning and rearing area. With the removal of Marmot Dam, which was used to block hatchery steelhead from the upper basin, the entire Sandy River is now open to spawning and rearing of hatchery fish, a condition that has affected wild winter steelhead from 1955 – 1963.

From 1971-1980 the hatchery and wild sport harvest ranged from 3,301 to 13,025 (average 8,107 steelhead). Since wild steelhead are more aggressive than hatchery steelhead and contribute to the fishery two wild fish for each hatchery fish, the impact of the hatchery-harvest program would be substantial. A complete history of hatchery steelhead releases in the Sandy River should be included in the HGMP. This would include releases dating back to 1898. The HGMP should also include evaluation of hatchery steelhead genetic introgression with wild steelhead and harvest impact on wild steelhead. Without this information in the HGMP, the assessment of the steelhead hatchery program on wild winter steelhead is incomplete and even misleading.

ii. Past and proposed level of natural fish in broodstock (HGMP 6.2.3)

“From 2000 to 2002, the hatchery broodstock was comprised of 100% wild fish. From 2004 to 2011, the goal was to incorporate 30% of the broodstock with wild steelhead. Beginning with approval of this plan, no wild fish will be incorporated into the hatchery broodstock; however, in the future, if the natural population is determined to be viable, integration of wild fish into the brood stock may be considered.”

Comment:

- 1 The HGMP should describe in this section the data required to determine the wild ESA-listed winter steelhead are viable and the monitoring and evaluation program procedures that will be used to make that determination. The level of funding should be stated and whether it has been secured.

iii. Genetic or ecological differences (HGMP 6.2.4)

“Due to the recent development of this broodstock from the wild winter steelhead population, the hatchery and wild populations are not thought to have diverged to any significant extent.”

Comment:

- 1 Again the HGMP relies on opinion, belief and speculation rather than factual information. Since hatchery winter and summer steelhead can now spawn and rear throughout the Sandy River, it is important for the HGMP to determine the impact of the hatchery program on wild steelhead. The HGMP should link the genetic and ecological differences between hatchery and wild steelhead to a monitoring, evaluation, and research program, identify the monitoring and evaluation procedures that will be used to make that determination and state the level of funding needed and secured. A recent study (Christie 2012) demonstrates that genetic divergence can occur within a single generation, belying the HGMP’s statement that the captive and wild populations likely have not diverged. The HGMPs must provide data and scientific analysis of their statements regarding genetic divergence in the face of the best available science.

F. Monitoring and Evaluation of Performance Indicators (HGMP Sect. 11)

i. Monitoring and Evaluation (HGMP 11.2)

“Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from monitoring and evaluation activities. There are no additional risk aversion measures, beyond those identified earlier in this document (Sections 4.2, 5.8, 6.3, 7.9, 8.5, 9.1.7, 9.2.10, 10.11), applied specifically because of monitoring activities.”

ii. Broodstock Collection, Selection and Rearing (HGMP (3.5 (2)(b))

Comment:

- 1 The only way to mitigate these impacts that range from harvest mortality on wild fish in a targeted hatchery stock fishery to ecological and genetic impacts for spawning and rearing of wild fish is to have specific objectives that can be measured and evaluated. The HGMP does not include a description of the wild steelhead life history and genetic character so that changes to those characteristics and behaviors can be measured. A biological baseline for wild steelhead is needed and a monitoring and evaluation program that can identify impacts is necessary, but the HGMP lacks that direction.

iii. Competition and Carrying Capacity (HGMP 3.5 (2) (c))

Comment:

- 1 The HGMP does not acknowledge this problem and does not attempt to establish a biologically based assessment that would make adjustments in the hatchery program as habitats change. The HGMP should include the data required to determine hatchery steelhead (summer and winter stocks) impact on carrying capacity of the spawning and rearing environments for ESA-listed winter steelhead and competition for food, cover and space within that spawning and rearing habitat. The HGMP should also include the funding needed and whether it is secured or left to some undefined time.

G. Broodstock Collection (HGMP Sect. 7)

i. Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish resulting from the broodstock collection program. (HGMP 7.9)

“None is expected.”

“Refer to sections 6.2.3 and 3.5 (part b) of this document for a review of risk aversion measures that will be employed to minimize and reduce adverse genetic and ecological effects to listed natural populations that may occur as a result of broodstock collection.”

Comment:

- 1 | As stated above the HGMP does not propose an adequate response to the risks that the hatchery program for steelhead (summer and winter stocks) is likely to impose on ESA-wild salmonids in the Sandy River.

H. Mating (HGMP Sect. 8)

i. Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed fish resulting from the mating scheme. (HGMP 8.5)

Comment:

- 1 | The HGMP should include a monitoring and evaluation program on hatchery mating protocols to determine that the hatchery produced fish at the Sandy and other hatcheries including the South Santiam hatchery are followed and the objectives for the mating protocols are being achieved. The HGMP needs to state specific objectives for the mating protocol that can be evaluated rather than provide generalized direction such as “minimize the likelihood for adverse genetic or ecological effects...”

I. Incubation and Rearing (HGMP Sect. 9)

i. Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish under propagation. (HGMP 9.2.10)

- “To minimize the potential for adverse impacts of niche-displacement on listed fish (or density-dependent effects) ODFW rears program fish to achieve the size of 180-250 mm prior to release...”

Comment:

- 1 | See our comments above.
- “Acclimated release (versus direct release of large groups of fish) is believed to reduce the impact of density-dependent effects.”

Comment:

- 1 | See our comments above.
- “Fish culture techniques, such as adjusting feed rates and length grading, have been used to separate fish groups (by size) at the hatchery.”

Comment:

- 1 Grading hatchery fish and emphasis on fast growth increases domestication selection and genetic diversity impacts within the hatchery. The HGMP should monitor and evaluate objectives to control domestication selection and loss of genetic diversity. If there are no objectives to control domestication selection and loss of genetic diversity, the HGMP should be revised to include measurable protocols. The monitoring and evaluation program should be expanded to determine that objectives to specifically limit genetic and ecological impact are effective within the ecosystem where hatchery fish interact with wild fish.

- “To minimize the risks of transmission of disease agents/pathogens from hatchery reared fish to listed natural fish strict fish health management protocol is applied at all the hatchery facilities.”

Comment:

- 1 The HGMP should define a monitoring and evaluation program to determine whether disease control within the hatchery is protecting wild salmonids that the hatchery fish interact with in the natural ecosystem. This would establish a feedback loop of information that confirms the disease control protocols within the hatchery and improve protection of ESA-listed salmonids from disease infection from hatchery fish.

J. Release (HGMP Sect. 10)

i. Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from fish releases. (HGMP 10.11)

- “All hatchery-reared winter steelhead smolts are released into Cedar Creek or the lower mainstem of the Sandy River where it is believed there is minimal overlap with wild juvenile winter steelhead, coho or spring Chinook rearing habitat.”

Comment:

- 1 The HGMP should develop a monitoring and evaluation program to determine whether this supposition is actually true. The purpose of the HGMP is to present a factual description of the hatchery program rather than rely on belief and speculation.

- “All Sandy Hatchery winter steelhead smolts are reared to and released at a size that is optimal for rapid emigration from Cedar Creek and the Sandy River.”

Comment:

- 1 The HGMP should establish a monitoring and evaluation program to determine whether the size of the hatchery steelhead smolts are actually optimal and achieve the purpose for size manipulation which is to reduce residualized hatchery smolts. In addition, the HGMP should monitor the interaction of hatchery steelhead with other ESA-listed steelhead to determine predation, predator attraction, and competition with wild salmonids.

- “All Sandy Hatchery winter steelhead smolts are acclimated for a minimum 2-3-week period to promote adult homing to the lower Sandy River and to Cedar Creek, Sandy Hatchery.”

Comment:

- 1 The HGMP should include direction to monitor and evaluate the hatchery steelhead acclimation program to determine homing and stray rates in the Sandy River.

- “All Sandy Hatchery winter steelhead smolts are released downstream of primary natural production areas and below the mouth of Cedar Creek.”

Comment:

- 1 The HGMP should include direction to monitor and evaluate the straying of hatchery steelhead below the mouth of Cedar Creek and the Sandy River Hatchery to identify the impact of hatchery steelhead on the wild steelhead that spawn in the lower portion of the Sandy River and its tributaries. The HGMP should also monitor and evaluate the straying of hatchery steelhead and impacts on ESA-listed salmonids above the mouth of Cedar Creek.

- “Future acclimation/release strategies may be employed to help to reduce potential stray into the primary natural production areas in the upper Sandy Basin and/or augment regionally important fisheries in the lower river.”

Comment:

- 1 The HGMP should include a description of augmenting “regionally important fisheries in the lower Sandy River and potential impacts on Columbia River and lower Sandy River wild salmonids. The HGMP should contain direction to provide monitoring and evaluation of all proposed hatchery acclimation and release strategies.

- “All (100%) of the Sandy Hatchery winter steelhead smolts are fin-marked (adipose fin-clip) to differentiate between natural and hatchery-origin fish.”

- 1 **Comment:** All hatchery fish should also get an internal tag so that Stray hatchery fish from this program can be identified for their hatchery of origin. In that way, Sandy River hatchery fish can be identified in other watersheds where they might spawn and corrective action can be taken to reduce strays into other watersheds.

- “Mark quality checks (to identify the percentage of unmarked fish) are performed on Sandy Hatchery winter steelhead smolts prior to release.”

Comment:

- 1 | The HGMP should provide direction regarding the percentage of the hatchery steelhead to be successfully marked, and whether that marking objective is protective of ESA-listed salmonids in the Sandy River.

- “Only health certified fish will be released.”

Comment:

- 1 | The HGMP should provide a list of diseases that if present in any portion of the hatchery fish would cause them to not be released into the Sandy River or any other river.

K. Conclusion

The HGMP as written is not sufficient to provide a scientific basis for protection of ESA-listed salmonids including wild winter steelhead in the Sandy River and in the Columbia River, Columbia River estuary, and the near shore environment from impacts of hatchery salmonids. The HGMP relies on qualitative criteria such as beliefs, opinion, speculation, and judgment rather than quantitative evaluation that can be measured for effectiveness in controlling impacts of hatchery origin fish on ESA-listed wild salmonids. We have made suggestions that would help improve the HGMP so that it is more protective of the ecosystem within which the hatchery operates. It is our sincerest hope that this work is not in vain.

IV. Spring chinook HGMP

A. Introduction

The purpose of the hatchery spring chinook program in the Sandy River is to provide fish for harvest, not to recover salmon threatened with extinction and listed for protection under the federal Endangered Species Act. The HGMP provides performance measures and monitoring, research and evaluation programs intended to lessen, but not remove the deleterious impact on wild ESA-listed spring chinook salmon.

The HGMP presents no analysis of whether or how the performance measures, monitoring, and other mitigation will be successful in preventing harm to wild fish or in allowing wild fish in the Sandy River Basin to recover.

B. General Program Description

i. Type of program (HGMP 1.6)

“Isolated Harvest - The primary objective of this program is to augment the Sandy River, Lower Columbia, and ocean spring chinook fisheries with hatchery reared, in-basin origin spring Chinook.”

Comment:

- 1 Since the wild spring chinook in the Sandy River basin are threatened with extinction, the primary objective of the hatchery program should be to support recovery of ESA-listed spring chinook not harvest. Once the threatened wild spring chinook are recovered, the primary objective of the hatchery program could be returned to harvest augmentation. The HGMP is not designed to support recovery of ESA-listed spring chinook as long as the primary purpose is to produce fish for harvest rather than recovery.

ii. Purpose of program (HGMP 1.7)

“The intent of the program is to produce quality spring chinook that are genetically similar to wild spring chinook in the Sandy River and provide a fishery for sport and commercial fishers. This program aims to provide fish for harvest in the Lower Columbia River commercial and recreational fisheries and the Sandy River recreational fishery.”

“The primary objectives of the Sandy Hatchery, as outlined in the Sandy Hatchery Operations Plan 2011, are:”

“Objective 1: Foster and sustain opportunities for sport, commercial, and tribal fishers consistent with the conservation of naturally produced native fish.”

“Objective 2: Maintain genetic resources of native fish populations spawned or reared in captivity.”

Comment:

- 1 The primary objectives of the Sandy Hatchery as stated in the HGMP does not include objective 2 of the ODFW Hatchery Management Policy:

“Objective 2: Contribute toward the sustainability of naturally produced native fish populations through the responsible use of hatcheries and hatchery-produced fish.”

The HGMP provides no explanation for leaving this policy direction out of the Sandy Hatchery Operations Plan of 2011. Since Hatchery Management Policy Objective 2 is the only “out-side-the-fence” objective in the policy that would provide some protection of wild ESA-listed spring chinook in the Sandy River. Therefore, some explanation for its deletion should be provided. It is obvious that by excluding this policy direction that there will be less emphasis on recovery of the ESA-listed spring chinook. This omission also fails to satisfy the criteria for approval of the HGMPs pursuant to the ESA 4(d) rule.

iii. Justification for the program (HGMP 1.8)

“The Sandy Hatchery spring Chinook program is managed to augment harvest for spring Chinook fisheries while minimizing potential risks to wild Chinook, coho, and steelhead populations.”

Comment:

- 1 ODFW does not provide a definition of “minimizing” when referring to potential risks presented by the hatchery program. The monitoring program reliant on spawning ground surveys is not adequate to determine the ecological or genetic impact of hatchery spring Chinook on ESA-listed spring Chinook and other ESA-listed fish. The ODFW hatchery policy directs that each hatchery program shall describe how the hatchery objectives are to be monitored and evaluated. Neither the HGMP nor the related EA explains what “minimizing” means nor how operation of the Hatchery will “minimize” risk to wild fish. Without this explanation and analysis, the HGMP does not comply with the criteria of the 4(d) Rule, 50 C.F.R. § 223.203(b)(5), and the failure of the EA to evaluate whether the proposed action complies with the relevant requirements of the substantive statute in question—the Endangered Species Act—is a violation of NEPA.

“The major concern regarding the sport fishery is its potential impact on listed fish. The harvest of the Sandy River hatchery-origin spring chinook is managed to comply with the Fisheries Management and Evaluation Plan (FMEP) for Lower Columbia River Chinook that explains the management implications for holding a sport fishery where hooking mortality of listed fish may occur. Current fishing regulations in the Lower Columbia River ESU require that all unmarked adult spring chinook be released back to the water unharmed.”

Comment:

- 1 Current commercial harvest regulations not selective so there is an allowance for the kill of wild spring chinook. The sport fishery is required to release wild spring chinook in the Columbia and

Sandy River fisheries, but it is unknown what the actual incidental mortality rate on released wild ESA-listed spring chinook is and whether it is supportive of recovery for these fish that are threatened with extinction. Consequently, the HGMP provides no evaluation of these fisheries and the cumulative mortality of ESA-listed spring chinook in the Sandy River.

**iv. List of program “Performance Indicators”, designated by “benefits” and “risks”.
(HGMP1.10)**

“Performance Standard (1): Contribute to mitigation agreements between the NOAA Fisheries, City of Portland, and the State of Oregon.”

“Indicator (1)(a): Achieve a smolt to adult survival rate adequate to collect sufficient adult broodstock to produce 300,000 spring Chinook smolts for release into the Sandy River Basin, while providing for consumptive fisheries in the Sandy River, Lower Columbia River, and Pacific Ocean.”

“Monitoring and Evaluation: Monitor adult returns, smolt production, and hatchery survival rates. These metrics are reported annually in the ODFW Annual Fish Propagation Report (www.dfw.state.or.us/fish/hatchery/). Perform best rearing strategies to meet spawning and production goals.”

“Performance Standard (2): Program goals are aligned with authorized federal, state, regional, and local fisheries conservation and restoration initiatives.”

“Indicator (2)(a): Program complies with Oregon Native Fish Conservation Policy(NFCP), the Sandy River Basin Plan, and the Lower Columbia River Conservation and Recovery Plan for Oregon Populations of Salmon and Steelhead (ODFW 2010).”

“Monitoring and Evaluation: Conduct periodic program policy and goal reviews in relation to the Lower Columbia River Conservation and Recovery Plan, NFCP, Sandy Basin Plan, and hatchery program management, practices, and facilities.”

Comment:

- 1 All of the above items are components of the HGMP that have also been part of the hatchery operation plans for the past five years. As can be seen from the annual spawning ground reports for Sandy River spring chinook the 10% stray rate for hatchery fish was exceeded in six out of eight years of record with some years following the removal of Marmot Dam having 60% to 76% stray rates. This ODFW data would suggest that management of hatchery fish for the purpose of harvest is contributing to the decline of ESA-listed wild spring chinook and not compliant with standards of the Native Fish Conservation Policy, Oregon Hatchery Management Policy, the Lower Columbia River Conservation and Recovery Plan for Oregon Populations of salmon and steelhead among others. The HGMP should provide data showing compliance with adopted standards and when those standards are not achieved, explain the reason for non-compliance and the impact on ESA-listed species.

Table 1. Composition of spring Chinook salmon in the Upper Sandy basin (above Marmot Dam) based on carcasses recovered, and presence or absence of thermal marks in otoliths (source, ODFW annual spawning reports).

Year	Fin-Clipped	Un-clipped Hatchery ^a	Unclipped Wild	Percent Wild ^b
2002	3 ^c	26 (18)	121	81 (19)
2003	9 ^c	14 (12)	106	82 (18)
2004	2 ^c	8 (4)	207	95 (5)
2005	0 ^c	41 (16)	220	84 (16)
2006	9 ^c	24 (10)	207	86 (14)
2007 ^d	2 ^c	15 (8)	186	92 (8)
2008 ^e				
2009 ^f	32	--	52	40 (60)
2010 ^f	42	--	32	24 (76)

^a Number in parentheses is percentage of unclipped fish that had a thermal mark (unclipped hatchery fish).

^b Percentage hatchery is in parentheses.

^c Fish were sorted at the dams and all or most of fin-clipped fish were removed.

^d Marmot Dam was removed in 2007, fish ladder was operational to July 18; fish weir was operated until Oct. 19.

^e Progress report not yet finalized. Non published data is available from Kirk Schroeder at ODFW. USFS did not conduct spawning surveys or carcass recovery in 2008.

^f Data is preliminary based on USFS carcass counts and does not include ODFW carcass counts or otolith thermal mark analysis.

“Harvest and Socio-Economic Effectiveness:”

“Performance Standard (3): Contribution of Sandy Hatchery spring Chinook to the Sandy River sport fishery, the Lower Columbia River sport and commercial fisheries, and the ocean sport and commercial fisheries.

“Indicator (3)(a): Number of adult hatchery-origin spring Chinook caught in the Sandy River sport fishery, the Lower Columbia River sport and commercial fisheries, and the ocean sport and commercial fisheries.”

“Monitoring and Evaluation: Collect catch data from fish buyers, CWT recoveries from commercial and sport sampling programs, dock side and on-river creel samples, and harvest cards.”

Comment:

- 1 An important aspect of evaluating socio-economic effectiveness is to determine not only the catch but to evaluate the cost to produce that catch. ODFW maintains that even though the Sandy Hatchery program is supported with public funds that because it is a mitigation program any cost analysis of benefits provided are unwarranted. In other words evaluating economic effectiveness of the hatchery program is off the table. Consequently, this standard is misleading because the cost to produce a salmon that is harvested is not evaluated. We asked a natural

resource economist, Dr. Hans Radtke, to review the Sandy River hatchery programs and evaluate the cost of operations and the cost to produce a salmon that is actually harvested. In his paper (Radtke 2011) the cost to produce a harvested hatchery spring chinook is \$304 per fish. The HGMP should provide the annual cost to produce the hatchery product by species in order to provide the public with a complete assessment of economic effectiveness of the hatchery program.

“Performance Standard (5): Despite elimination of the fish sorting facility at Marmot Dam (which was removed in 2007), maintain the upper Sandy Basin (above the confluence of the Salmon and upper Sandy rivers) as a wild fish sanctuary.”

“Indicator 5(a): Release hatchery smolts in Cedar Creek (a tributary to Sandy River) and in a lower Sandy River acclimation site(s). Selection of a single or multiple release sites will be based on scenario that leads to achieving goal of reducing hatchery fractions on the spawning grounds (stray) to less than 10% in the upper Sandy Basin.”

“Indicator 5(b): The number of hatchery spring Chinook in the natural spawning population in primary production areas of the upper basin shall presumably remain below 10%.”

Comment:

- 1 In our response to Performance Standard 2, we provided information from ODFW records that the 10% hatchery spring chinook stray rate has been exceeded, often dramatically, in 6 of the last 8 years. Consequently, this performance standard is not being accomplished and it is contributing to genetic and ecological impacts on ESA-listed salmonids in the Sandy Basin. In addition, the HGMP does not provide for differential fin clipping of hatchery fish released at acclimation sites, such as the Bull Run site, which were not differentially clipped in 2012, thereby preventing any effective monitoring of whether or not acclimation is successful in preventing straying. Previous efforts to acclimate hatchery-bred fish to release sites in Cedar Creek failed miserably to prevent straying of spring Chinook into the upper basin, based on the stray rates during the years since removal of Marmot Dam. The HGMP provides no data or scientific information or analysis of why acclimation is expected to be successful in the future when it has failed so miserably in the past.

“Performance Standard (6): Maintain similar life history characteristics between hatchery broodstock and wild spring Chinook in the Sandy River basin.”

“Indicator (6)(a): Hatchery broodstock shall be monitored to assess similarities to wild spring Chinook in regard to run timing, size, sex composition, fecundity, adult:jack ratio, and age.”

“Monitoring and Evaluation: Prior to the removal of Marmot Dam in 2007, life history characteristics for both hatchery and wild fish were monitored by ODFW and/or PGE staff at the Marmot Dam facility. In the future, life history characteristics of hatchery origin and wild spring

Chinook will be monitored through analysis of hatchery returns (run timing and age composition), spawning ground surveys, and juvenile outmigrant monitoring.”

Comment:

- 1 The HGMP should also provide direction to establish a genetic and life history diversity benchmark for wild spring chinook in the Sandy River and update it every life cycle (about every 5 years) to determine the degree of change in these important diversity attributes. The HGMP should provide direction for development of metric or narrative triggers that when encountered would initiate modification of the hatchery program to better protect wild spring chinook and support their recovery.

“Performance Standard (7): Provide nutrient enrichment and food web benefits in natural salmon spawning streams of the Sandy River Basin.”

“Indicator 7(a): Hatchery fish in excess of broodstock requirements may be placed in streams for nutrient enrichment.”

“Monitoring and Evaluation: Track the number and location(s) of carcasses distributed for nutrient enrichment. Monitor ability to consistently respond to planned nutrient enhancement needs as appropriate for Oregon watersheds.”

Comment:

- 1 The HGMP should provide direction for development of a nutrient enrichment standard from salmonid carcasses including spring chinook in the Sandy River. This standard would be applied and supported by the natural spawner abundance needed from wild spring chinook and other species. This is recommended because naturally spawning salmon provide important ecological functions that cannot be supplied by placed carcasses and analogues, for live salmon distribute themselves in the basin bringing nutrients to places not accessible by a truckload of salmon carcasses. Live salmon also clean the gravel, improving the spawning habitat, and deposit nutrients in places where their juveniles will rear.

“Performance Standard (12): Minimize impacts to naturally produced adult spring Chinook.”

“Indicator (12)(a): Weir/trap operation in the upper Sandy basin and Sandy Hatchery operations do not result in significant stress, injury, or mortality to naturally produced salmonid populations.”

“Monitoring and Evaluation: Monitor the number of mortalities in all adult collection facilities for each species.”

Comment:

- 1 The HGMP should provide direction regarding the trap or weir on the spawning location of wild ESA-listed chinook, for ODFW has information from other rivers where weirs are used that force

spawning below the weir by wild salmon. These locations are often not the most favorable for successful reproduction and by forcing some wild fish to spawn in such areas there are fewer spawners in the most productive habitats above the weir. This shift in spawning area may have an effect on reproductive success and recovery of ESA-listed chinook, nutrient enrichment of spawning areas, and genetic impacts due to fewer spawners and low effective population size. In addition, weirs concentrate salmon and become target areas for illegal kill of wild salmon, jeopardizing recovery of ESA-listed fish. To address this problem effectively the HGMP should provide direction for law enforcement at weir and traps sites. Also, scientific studies confirm that weirs are an imperfect barrier to preventing interbreeding of hatchery and wild fish (Seamons 2012). The HGMP provides no data, scientific documentation, or analysis for its conclusory statement that trapping, holding, and handling wild fish does not result in significant stress, injury or mortality to wild fish, and the revision to the EA must contain such information to support this statement.

“Performance Standard (13): Minimize impacts to naturally produced juvenile spring Chinook.”

“Indicator (13)(a): Hatchery fish will be released in time and space, and in a condition that minimizes the interaction with listed fish.”

“Monitoring and Evaluation: Monitor smolt development using available indicators, e.g. age, size and coloration of smolts at the hatchery to assure smolts are full-term at release. Utilize distinct release locations at or downstream of Sandy Hatchery.”

Comment:

- 1 The HGMP should provide direction that addresses predation from released smolts on wild ESA-listed salmonids and predator attraction that increases the mortality of wild smolts and juveniles. A monitoring program that evaluates the mortality to wild ESA-listed salmonids from hatchery smolt releases is a key factor in management of the hatchery product to support rather than to impede recovery. This performance standard does not address other significant the risks and impacts imposed on ESA-listed salmonids in the Sandy River. There is also no detailed information or data provided in the HGMP or related EA describing where and when smolts are being released, no description of the time during which different life stages of different species are in the Sandy River Basin, no evaluation of whether these release timing/location measures are successful in preventing impacts to juvenile salmonids, and no description of any monitoring plan that would answer the question of whether these measures will, in fact, “minimize” the effects on listed fish.

“Performance Standard (14): Maintain genetic and ecological characteristics of wild population.”

“Indicator (14)(a): Reduce stray of hatchery spring Chinook in the upper Sandy River basin (above the confluence of the upper Sandy and Salmon rivers) through construction of off-station acclimation ponds, weirs/traps, and other stray reduction measures.”

“Monitoring and Evaluation: ODFW and/or PGE staff previously monitored the trap at Marmot Dam to assess hatchery stray above past release sites. No marked salmonids were passed above Marmot Dam prior to removal in 2007. Corvallis Research along with local District staff currently conduct annual spawning surveys throughout the basin to determine distribution and spawning success.”

- 1 **Comment:** In order to “maintain genetic and ecological characteristics of wild population” the HGMP should provide direction to conduct an inventory of the wild spring chinook population genetic structure, life history characteristics and phenotype diversity, creating a benchmark of characteristics that the managers can use to evaluate change over time. Conducting annual spawning ground surveys is important but compliance with this performance standard relies on more than fish counts and distribution. The HGMP includes no information that would allow the agency to evaluate whether off-station acclimation, weirs/traps, and other stray reduction measures will be effective, including no scientific studies and no analysis explaining how these measures will or will not operate successfully in this system.

“Performance Standard (15): Maintain the current productivity of the wild, naturally spawning population.”

“Indicator (15)(a): The wild population trends toward the delisting abundance criterion in the Lower Columbia River Conservation and Recovery Plan for Oregon Populations of Salmon and Steelhead (Chapter 8), or other measurements of health determined in the adaptive management process of the plan.”

“Monitoring and Evaluation: Conduct spawning ground surveys to quantify redd and spawner abundance. Obtain estimates of abundance for juvenile outmigrants from U.S. Forest Service smolt traps to assess trends in spring Chinook productivity from select sub-basins.”

Comment:

- 1 The HGMP relies on counting fish and it is important to have some indication or estimate of spawner abundance and smolt production from the watersheds in the Sandy basin. Other aspects important to the “maintenance of current productivity” include such factors as life history characteristics. For example, some proportion of the wild juvenile out-migration may be composed of 0-age fish and fall migrants. Knowing how many smolts are produced per female is another factor that gives insight into the productivity of the wild population. Habitat improvements designed to provide habitat conditions needed by each of the life stages of juveniles and for adults are also needed. The HGMP should provide direction on these and other factors important to the productivity of wild spring chinook and a monitoring and evaluation program designed to measure these productivity factors. The purpose should be to maintain the life history diversity of the wild population and the habitats that support that diversity. What is not clear in this standard is the goal of maintaining current productivity. Is the HGMP saying that the ESA-listed spring chinook can be recovered given current productivity, that is, without increasing that productivity to rebuild the population? Hatcheries have adult spawner goals and egg goals to maintain production.

(see **1.11.1 Proposed annual broodstock collection level (maximum number of adult fish)**).

“Under the current program, a total of 200 adults will be collected to meet the smolt production goal of 300,000. This number allows for an adult mortality of approximately 30 adults, and is expected to yield a maximum total of 300,000 smolts for release (300,000 is the target release number).”

Comment cont’d:

- 1 Why do hatcheries have spawner and egg goals but wild populations do not? The HGMP should provide direction to adopt spawner abundance and egg deposition goals for ESA-listed wild salmonids while making allowances for prespawning mortality. Having conservation requirements by species and stock per watershed would provide an important standard for achieving productivity needed to recover ESA-listed salmonids.

C. Relationship of Program to other Management Objectives (HGMP Sect. 3)

i. Ecological interactions (HGMP 3.5)

“Wild juvenile salmonids using the Columbia River may be affected by releases of Sandy Hatchery spring Chinook. However, the spring Chinook are released as full-term yearling smolts so they are expected to promptly out-migrate through the Sandy River and the lower Columbia River with a minimum of ecological interaction with other species.”

“Management efforts are taken to reduce the negative ecological interaction of hatchery fish on wild fish. Potential negative interactions that may occur are (a) genetic introgression, (b) competition, (c) disease transmission, and (d) predation. Although risks associated with this fish propagation program are not completely known, a brief summary of the potential risks, and the activities taken to avoid, minimize, or monitor such risk is described below.”

Comment:

- 1 The HGMP bases its conclusion on a “minimum of ecological interaction” between hatchery spring chinook and other species due to the “expected” rapid out-migration of hatchery spring chinook smolts. This is an insufficient evaluation of ecological impact. The HGMP should describe a scientifically sound evaluation of ecological impacts from hatchery spring chinook smolts on ESA-listed species in the Sandy Basin that can be used to identify ecological interactions and provide the information that would help find a solution. See also comment on section 1.8 above regarding the failure of the HGMP to explain or evaluate whether and how the management efforts would “minimize” or avoid risks to wild fish.

“(a) Genetic Introgression - Genetic introgression may occur if hatchery adults spawn in the wild environment. This impact is minimized through the following actions:”

- “With few exceptions, all hatchery fish are marked and returning hatchery adults with visible fin clips will be sorted and removed from naturally produced upstream migrants to the extent possible by ODFW staff through sorting operations at a weir/trap located at the mouth of

Cedar Creek, weirs/traps in select upper basin tributaries and in the lower Bull Run River, or deployment of seines/tangle nets in select areas of the upper basin.”

Comment:

- 1 The HGMP says, “With few exceptions, all hatchery fish are marked,” but it is important to know how many fish are not marked for they will look like wild spring chinook on the spawning grounds and calculation of the hatchery stray rate will be difficult if not impossible. These unmarked hatchery spring chinook are a source of genetic introgression and ecological impacts on ESA-listed spring chinook, making recovery more difficult. In addition, spring chinook migrate into the Sandy River when river flows are high and there is debris in the river, making the use of traps and weirs more difficult. Such conditions can take a trap or weir out and hatchery fish can pass upstream. These uncounted fish may or may not be observed in spawning ground counts, making estimates of genetic and ecological impacts more difficult. These unobserved and counted hatchery strays represent an unquantified risk to the recovery of ESA-listed salmonids including wild spring chinook threatened with extinction.
- “An acclimation site(s) will be developed in the lower Bull Run River to reduce potential stray upstream of Cedar Creek on the Sandy River. Low flows in Cedar Creek during times when adult spring Chinook are present and migrating can prevent these fish from accessing the stream and returning to the hatchery. It is expected that smolts acclimated in the Bull Run River will effectively home to, and enter, this system when they return as adults due to the unique water source and greater summer/early fall flows. Returning hatchery adults will be removed from the Bull Run using a weir/trap system (proposed) preventing them from interacting with wild fish.”

Comment:

- 1 The HGMP should provide an monitoring and evaluation plan to determine the effectiveness of the Bull Run River trap and weir program for collecting fish and homing of hatchery adults to the Bull Run River for the purpose of reducing the stray rate of hatchery spring chinook and their natural spawning with wild ESA-listed spring chinook. The HGMPs illustrate that previous efforts to acclimate spring Chinook to the hatchery site have failed, as hatchery fish have strayed in significant proportions into the upper basin. The HGMP provides no data or scientific studies or analysis of why “it is expected” that fish acclimatized in the Bull Run River would return to that system, particularly in light of the fact that fish acclimatized at the hatchery have not, resulting that the statement is unsupported and conclusory. Furthermore, in 2012, the hatchery fish released in the Bull Run River did not have a differential fin clip to distinguish them from hatchery fish released elsewhere in the system, making it impossible to monitor and evaluate whether returning hatchery fish are “acclimated” fish returning to each release site or rather straying hatchery fish acclimated or dumped into the system at another location.

“Hatchery brood originate from local Sandy Spring Chinook and are currently taken across the adult return period to the extent possible in proportion to returns in order to limit selection for specific run timing. These measures should help limit the impacts of any hatchery fish which do happen to spawn in the wild. Early returning adults are not collected for brood due to relatively low survival found in fish collected and transferred prior to June 15. Opportunities to reduce risk

of mortality in adults collected prior to June 15 will be investigated and could lead to changes to adult collections.”

Comment:

- 1 Measures to “limit impacts of any hatchery fish which do happen to spawn in the wild” should be monitored and evaluated. The HGMP should include a monitoring plan for such measures to determine their effectiveness and provide information to correct problems. By not collecting early returning migrant hatchery spring chinook there is a potential to increase the stray rate of hatchery fish and interbreeding with wild spring chinook. Stray hatchery fish will have an ecological impact on wild ESA-listed spring chinook and expose these wild fish to genetic introgression impacts. A monitoring program should be described in the HGMP to effectively address these potential impacts. In addition, it is important to state whether funding is available for this work.

“Since 2002 (2000 brood year), spring Chinook released from Sandy Hatchery were acclimated for a 2-3 week period prior to release. Acclimation allows fish to imprint on Cedar Creek water and return to the Sandy Hatchery as adults. Beginning with the 2011 release, spring Chinook smolts will be acclimated at Sandy Hatchery and offstation acclimation pond (lower Bull Run River) for a minimum of 2-3 weeks. Acclimation time will be expanded in the future if it is determined to be necessary to reduce stray into the upper basin and existing infrastructure/operation allows the additional acclimation time.”

Comment:

- 1 The HGMP should describe the monitoring and evaluation program that will be used to determine the effectiveness of acclimation and identify solutions for problems. ODFW has done research on acclimation of salmonids (Kenaston 2001) “...conducted a 3-year experiment with hatchery steelhead to evaluate whether a 30-day acclimation period in the waters of their release site would increase adult returns to the site, they found that acclimation provided only a 5% average increase in the number of returning adults, leading to the conclusion that acclimation is not helpful in achieving higher returns to release sites.” The EA for HGMPs cites several previous efforts to acclimatize hatchery fish in the Sandy Basin which were unsuccessful in preventing straying.

“(b) Competition - Freshwater carrying capacity may be compromised if hatchery spring Chinook competitively displace wild fish in their natural rearing habitats. Although there are little data to substantiate whether competitive interactions are occurring in the Sandy basin, there is a chance that it may occur in lower river reaches. The following are several strategies ODFW uses to avoid (or minimize) risks associated with hatchery and wild spring Chinook competitive interactions and habitat carrying capacity concerns:”

“Spring Chinook smolts are released at a size that supports swift emigration and little residualization. This should minimize spatial and temporal overlap, thereby reducing competition with wild juveniles for food and cover.”

“The number of hatchery spring Chinook released from this program is considered

“moderate in magnitude relative to other Columbia River production programs and is not expected to cause serious density dependent effects in the Sandy Basin or lower Columbia River reaches” (NMFS 1999).”

“(c) Disease Transmission – Because hatchery spring Chinook are reared at other hatchery facilities, but are acclimated, released, and return to the Sandy River basin, they are potentially a source of pathogen and disease transmission to wild fish populations. ODFW recognizes the importance and magnitude of fish disease and health, and hatchery spring Chinook are managed to minimize disease transmission to wild populations. To prevent introduction, spread, or amplification of fish pathogens, all hatchery activities are conducted in accordance with guidelines developed under ODFW Fish Health Management Policy, the Pacific Northwest Fish Health Protection Committee and according to protocols outlined by the Integrated Hatchery Operations Team (IHOT 1996). Further, ODFW Fish Pathologists, along with hatchery staff, regularly monitor fish health and conduct fish disease examinations. Monitoring efforts include virus sampling, abnormal fish loss investigations, and pre-transfer and pre-liberation inspections.”

“(d) Predation - Hatchery spring Chinook released into nursery habitats may residualize within the sub-basin and directly prey on naturally produced salmon and steelhead fry. Due to their location, size, and time of emergence, newly emerged Chinook salmon fry and fingerlings are likely to be the most vulnerable to predation by hatchery released fish (NMFS 1999). However, direct predation by hatchery fish on naturally produced fish in migration corridors is believed to be low (NMFS 1999). In addition to direct predation, large groups of hatchery fish may attract alternate predators in rearing habitats and migration corridors, such as pinnepeds, birds, and other fish species.”

Comment:

- 1 Ecological impact from hatchery spring chinook on wild, ESA-listed spring chinook should be monitored and evaluated. The HGMP should provide a monitoring and evaluation plan to identify problems and corrective solutions. It is insufficient to rely on belief, opinion, and speculation that such ecological interactions are not taking place or at such a rate as to have no consequence. The HGMP is essentially guesswork, without factual basis, scientific support for its conclusions, or reasoned analysis supporting the conclusions.

In addition, for this HGMP and all of the other HGMPs, please evaluate the recent studies which show that hatchery fish predation on wild fish may be significant and which provide a framework for evaluating when such interaction is most likely to be significant (Sharpe 2008, Naman 2008).

“(3) Species that could positively impact the program include: any hatchery or wild fish that dies or is deposited within the sub-basin for the purposes of stream enrichment. Collected hatchery-origin broodstock in excess of production needs may be distributed throughout the Sandy River in order to increase the nutrient supply. Decaying carcasses of salmonid species may contribute nutrients that increase productivity in the sub-basin.

“(4) Species that may be positively impacted through the program include: any freshwater or marine species that depend on salmonids as a nutrient or food base. Pacific salmon carcasses are important for nutrient input back to freshwater streams (Cederholm et al. 1999). Many species are known to utilize juvenile and adult salmon as a nutrient food base (Groot and Margolis 1991; McNeil and Himsworth 1980). Declines in wild salmonid populations during the last few decades could have reduced overall ecosystem productivity. Hatchery production has the potential for playing a role in the population dynamics of predator-prey relationships and community ecology during low productivity and shifting climatic cycles.”

D. Broodstock Origin and Identity (HGMP Sect. 6)

i. Genetic or ecological differences. (HGMP 6.2.4)

“Due to the recent development of this broodstock from the wild spring Chinook population, the hatchery and wild populations are not thought to have diverged to any significant extent.”

Comment:

- 1 | The HGMP should provide a funded monitoring and evaluation program to address changes in the genetic baseline and character of the wild ESA-listed spring chinook from interbreeding of hatchery and wild salmon. In order to develop an effective monitoring and evaluation program it would be necessary to establish a genetic diversity and phenotypic baseline for wild ESA-listed spring chinook so that changes can be identified and changes in the hatchery program can be made to address problems. Lacking this monitoring and evaluation program the HGMP must rely on general observations, opinions and estimates of significance, which is unable to actually measure the genetic changes between hatchery and wild spring chinook and the risk that a diverged hatchery stock will have on wild fish when the hatchery strays interbreed with wild chinook.

ii. 6.3

Comment:

- 1 | Even though this risk aversion reference was provided it does not exist in the HGMP.

E. Conclusion

The HGMP provides performance measures and monitoring, research and evaluation programs to lessen, but not remove the deleterious impact on wild ESA-listed spring chinook salmon. Many of the performance measures are based on belief, expectations, opinion and speculation rather than on criteria that can be measured and their effect on wild salmonids determined on a factual basis. We have responded to many issues in this HGMP in an effort to improve its usefulness as a tool to help recover threatened spring chinook and improve the scientific basis of the plan. We are hoping that our comments will improve this HGMP.

V. Coho HGMP

A. Introduction

Historically, coho were abundant in the Sandy River, numbering upwards of 15,000 coho. See Taylor, B. 1998. However, by the late 1990's they were nearly extinct leading to the listing as endangered under the Oregon Endangered Species Act. In 2005, Lower Columbia River were listed under the federal ESA.

The HGMP and the corresponding analysis of the impacts on Lower Columbia River coho do not provide a sufficient analysis to approve the HGMP under the ESA Section 4(d). It needs to be updated post Marmot Dam removal – there are many sections that still refer to the future as “after Marmot Dam is removed.” The dams have been gone for 5 years, enough time to monitor and establish trends.

NMFS provided an exhaustive review of the Lower Columbia River Coho prior to the listing decision, 70 Fed. Reg. 37160 (June, 28, 2005) and more recently by Ford (2011). In the listing decision, NMFS even stated that, “we cautioned that long-term reliance on the continued operation of these hatchery programs is inherently risky.” This analysis and precautionary approach has not been incorporated into the HGMP. Lower Columbia River coho in the Sandy are at a high risk of extinction and the hatchery will continue to keep the coho in that risk category.

B. General Program Description (HGMP Sect. 1)

i. Funding sources, staffing level and annual hatchery program operational costs (HGMP 1.4)

Comment:

- 1 Section 1.4 notes that the funding for the Sandy Hatchery program is primarily funded by ODFW with some support from federal funding at Bonneville and Cascade hatcheries. There is no more Mitchell Act funding for the coho program but it is still listed in Section 1.10 as a legal mandate. This HGMP should make it very clear that there is no longer a legal mandate for the coho program. Thus, the 500,000 target for release is entirely voluntary. There is no specific information about projected funding provided in the HGMP. Protection of ESA-listed species requires guaranteed commitments, and the HGMP does not explain how funding will be guaranteed to perform the monitoring and evaluation that is required to ensure against harm to ESA-listed fish.

ii. Purpose of the Program (HGMP 1.7)

Comment:

- 1 In Section 1.7, the purpose of the program fails to identify that it must be operated in a way that doesn't interfere with the survival and recovery of the wild coho at a high risk of

extinction. Notably, the program also transports and releases coho into the SAFE program at Youngs Bay and Blind Slough, but the HGMP states those programs are discussed in another HGMP. What HGMP and when was it approved? Without another approved HGMP, those transfers should also be included in this current HGMP. Otherwise those transfers will continue illegally even after this HGMP is approved.

“Objective 2: Contribute toward the sustainability of naturally produced native fish populations through the responsible use of hatcheries and hatchery produced fish.”

Comment:

- 1 Objective 2 should be eliminated. This hatchery very deliberately does not contribute to the natural produced coho. At best, it avoids and minimizes impacts to the wild listed coho. Furthermore, Objective 3 has been disproven in many studies such as Araki, H et.al., 2008 and 2009, Chilcote, M et al., 2011, Chilcote, M. 2002, Berejikian, B and M. Ford, 2004, where segregated programs were shown to exert significant evolutionary pressures on the native population such that they do not resemble the native population that originally made up the broodstock.

iii. Justification for the program (HGMP 1.8)

“The Sandy River coho program is managed as a segregated hatchery program. The current program utilizes only hatchery-produced Sandy River coho returning to the Sandy Hatchery as broodstock.” The program purports to be designed “to minimize the risk of potential impacts to listed salmonids.”

Comment:

- 1 ODFW does not provide a definition of “minimize” when referring to potential risks presented by the hatchery program. The monitoring program reliant on spawning ground surveys is not adequate to determine the ecological or genetic impact of hatchery coho on ESA-listed coho and other ESA-listed fish. The ODFW hatchery policy directs that each hatchery program shall describe how the hatchery objectives are to be monitored and evaluated. Neither the HGMP nor the related EA explains what “minimize” means nor how operation of the Hatchery will “minimize” risk to wild fish. Without this explanation and analysis, the HGMP does not comply with the criteria of the 4(d) Rule, 50 C.F.R. § 223.203(b)(5), and the failure of the EA to evaluate whether the proposed action complies with the relevant requirements of the substantive statute in question—the Endangered Species Act—is a violation of NEPA.

Comment:

- 1 Section 1.8 discusses the justification of the program as a harvest but fails to discuss the economic costs and benefits of the program. In fact, Radke, H. 2011 found that the coho cost \$61 per fish caught while the economic gain is only \$58, resulting in a \$3/fish deficit. This is an important consideration in the justification discussion and should be analyzed. The HGMP fails to acknowledge in this section that the stray rate has increased in recent years due to improved

monitoring. These stray rates, as high as 24%, were likely always present but never monitored. This becomes an important consideration in Section 1.10 and other places in the HGMP where performance standards, monitoring, and ensuring minimization of impacts to wild fish by hatchery fish are relevant.

“The natural spawning escapement in the Sandy Basin is managed to achieve at least 91% wild coho in this spawning population (i.e. no more than 9% may be hatchery stock). Data from the former Marmot Dam trap and ongoing spawning surveys indicate few hatchery coho migrate upstream of Cedar Creek and Sandy Hatchery (refer to Table 1.12b and 2.2.2d for stray rate information).”

Comment:

- 1 | In the meantime, the above bullet on pg. 6, should be removed.

iv. List of “Performance Indicators”, designated by “benefits” and “risks”. (HGMP 1.10)

“Performance Standard (1): Contribute to mitigation agreements between NOAA Fisheries and the State of Oregon (Mitchell Act).”

“Indicator (1)(a): Achieve a smolt to adult survival rate adequate to collect sufficient adult broodstock to produce 500,000 coho smolts for release into the Sandy River basin. An additional 500,000 smolts are produced for the Select Area Fishery Evaluation (SAFE) Net Pens from Sandy River Hatchery broodstock.”

“Monitoring and Evaluation: Monitor adult returns, smolt production, and survival rates. These metrics are reported annually in the ODFW Annual Fish Propagation Report (www.dfw.state.or.us/fish/hatchery/).”

“Performance Standard (2): Program goals are aligned with authorized federal, state, regional, and local fisheries conservation and restoration initiatives.”

“Indicator (2)(a): Program complies with Oregon Native Fish Conservation Policy, the Sandy River Basin Plan, and the Lower Columbia Conservation and Recovery Plan for Oregon Populations of Salmon and Steelhead.”

“Monitoring and Evaluation: Conduct periodical program policy and goal reviews in relation to hatchery program management, practices, and facilities. Conduct annual spawning ground surveys to determine compliance with established policies.”

Comment:

- 1 | In Section 1.10, the HGMP must reflect reality. For example, Performance Standard (1) is no longer applicable. Performance Standard (2) is being violated because there is no ESA authorization for the hatchery program. The USFWS 1999 Biological Opinion did not provide authorization for the program because coho were not listed at the time, and furthermore there

- 1 has been no reconsultation with the additional listings of numerous stocks including coho. Thus, the entire operation of the coho program has been in violation of the ESA.

The monitoring for Performance Standard (2) is insufficient. The HGMP rules require ODFW to “(H) adequately monitor and evaluate to detect and evaluate the success of the hatchery program and any risks potentially impairing the recovery of the listed ESU.” Adequate monitoring would include spawning surveys and juvenile surveys to ensure that the vast assumptions made by the HGMP are accurate. Currently, there is no downstream monitoring for interactions even though the HGMP indicates they release large sized smolts to emigrate quickly and avoid conflict in the lower river with wild coho. That assumption has never been tested and should be included in this monitoring. Cf. Performance Standard (11) where only hatchery smolt development is monitored. In addition, basin wide spawning surveys should be conducted annually.

“Ecosystem function:”

“Performance Standard (6): Provide nutrient enrichment and food web benefits in natural salmon spawning streams of the Sandy River Basin.”

“Indicator (6)(a): Hatchery fish in excess of broodstock requirements may be placed (as carcasses) in streams for nutrient enrichment.”

“Monitoring and Evaluation: Track the number and location(s) of carcasses distributed for nutrient enrichment. Monitor ability to consistently respond to planned nutrient enhancement needs as appropriate for Oregon watersheds. Monitor effectiveness of nutrient supplementation.”

“Indicator (6)(b): Hatchery carcasses placed for nutrient enrichment will comply with ODFW and Oregon Department of Environmental Quality (DEQ) guidelines for disease control and water quality.”

“Monitoring and Evaluation: ODFW’s Fish Pathology Section screens carcasses for possible disease and gives final approval for all nutrient enrichment projects prior to project initiation.”

Comment:

- 1 Under ecosystem function, Performance Standard (6) ODFW has not provided any monitoring program to indicate that the nutrient enrichment is having an effect. Are juveniles monitored? Are tissue samples taken to determine nutrient uptake? This monitoring needs to be much more expansive.

“Performance Indicators addressing “RISKS”:

Comment:

- 1 Section 1.10.1 identifies the performance indicators relative to “risk.” Given that this is a high risk hatchery program (segregated fisheries program) on top of a population that is at high risk

of extinction (Ford, M, 2011), this section must be significantly more robust with extensive monitoring included that will produce meaningful results. For example, the effluent monitoring only looks at NPDES covered pollutants despite more and more chemicals being used at the hatchery, such as formalin. ODFW needs to be monitoring the effluent for more constituents.

“Performance Standard (10): Minimize impacts to naturally produced adult coho.

Indicator (10)(a): Weir/trap operation at the Sandy Hatchery does not result in significant stress, injury, or mortality to naturally produced salmonid populations. Pass all naturally produced (unmarked) coho upstream of the hatchery in order to achieve full seeding of habitat in Cedar Creek.”

“Monitoring and Evaluation: Monitor the number of fish handled, frequency of trap operation, and mortalities in the adult collection trap for both hatchery and naturally produced fish of each species. Record data and monitor unmarked coho passed upstream in order to assess success of reintroduction effort. Monitor the number of outmigrating smolts through smolt trap operations in order to assess natural production in Cedar Creek upstream of the hatchery.”

“Performance Standard (11): Minimize impacts to naturally produced juvenile coho.”

“Indicator (11)(a): Hatchery fish will be released in time and locations, and in a condition that minimizes the interaction with listed fish. NMFS compliant fish screens installed at Sandy Hatchery to protect outmigrating fish resulting from natural production upstream of the hatchery (Note: The water intake screen replacement at Sandy has been scheduled for summer 2012 to make it compliant with the NOAA Fisheries screening criteria).”

“Monitoring and Evaluation: Monitor smolt development using available indicators, e.g. age, size, and coloration of smolts at the hatchery to assure smolts are full-term at release. Utilize release locations downstream of the former Marmot Dam site. Evaluate effectiveness/compliance of fish screen device and provide routine maintenance.”

Comment:

- 1 Performance standards (10) and (11) are weak at best. There is no juvenile monitoring occurring. Furthermore, there is no monitoring of the interspecies affects. For example, coho smolts are known to predate on juvenile chum which could significantly affect ODFWs efforts to reintroduce chum into the Sandy River. The agency also fails to acknowledge that the stray rates are increasing and does not pursue any alternative strategy such as a reduction in releases. Nor does the agency acknowledge in this section that the fish screen is likely impinging juvenile coho and steelhead in Cedar Creek. As noted above (comment to section 1.8), the HGMP provides no definition of what it means to “minimize” impacts. There is no data or scientific studies or reasoned analysis to explain why the measures proposed will minimize impacts to wild coho, or why trapping, holding, and handling wild coho will not harm them, nor any data or information about the timing and the location of releases to be able to support the conclusion that the releases of hatchery-bred coho will not harm wild ESA-listed fish.

“Performance Standard (12): Manage the Sandy Basin with emphasis on natural production of wild fish.”

“Indicator (12)(a): The number of hatchery coho spawning in the natural spawning habitat for coho salmon in the Sandy Basin shall not exceed 10% of the naturally spawning population.”

“Monitoring and Evaluation: Conduct annual spawning ground surveys to assess the number of hatchery fish spawning in the natural spawning habitat for coho salmon in the Sandy Basin. (Note: a limited number of hatchery coho were observed at Marmot Dam prior to removal and in ongoing surveys throughout the primary natural production areas for coho salmon in the Sandy; see below Table 1.12b).”

“Performance Standard (13): Minimize potential adverse impacts to naturally produced coho in natural spawning habitat if high stray rates exceed those adopted under the *Lower Columbia River Conservation and Recovery Plan for Oregon Populations of Salmon and Steelhead*.”

“Indicator (12)(a): The number of hatchery coho spawning concurrently with wild coho in natural spawning areas shall not exceed 10% of the naturally spawning population.”

“Monitoring and Evaluation: Conduct annual spawning ground surveys to assess the number of hatchery fish spawning concurrently with wild fish in natural spawning areas of the Sandy Basin.”

Comment:

- 1 Performance standards (12) and (13) fail to acknowledge the high stray rate, do not identify budget and personnel to conduct the annual monitoring and fail to include any adaptive management actions in the face of the high stray rate. Furthermore, the note under Table 1.11.2 indicates alternative acclimation may be considered. There should be an analysis in this HGMP addressing that possibility. As indicated with spring Chinook, the acclimation has been a horrible experiment that is failing and resulting in large amounts of take of the wild Chinook.

v. Indicate alternative actions considered for attaining program goals, and reasons why those actions are not being proposed. (HGMP 1.16)

Comment:

- 1 Section 1.16 is a curious section. Notably none of the issues raised have anything to do with the facilities’ and programs’ impact on the wild coho. It does not discuss the double index study, its authorization or results in the Sandy, nor how to minimize passage of those fish above the hatchery dam (Issue 2 and Issue 2, Alternative 1). Issue 1 provides an adaptive management approach that is not discussed anywhere else in the document or the EA, despite the fact that the stray rates are increasing.

Instead, in the alternatives section, the agency dismisses the adaptive management and any other alternative that will not be supported by recreational fishing community in the Sandy –

no matter how necessary the action is to comply with the ESA. And there are no alternatives that discuss terminating the program, shifting the entirety of the program to the SAFE program (cf Issue 1, Alternative 2 that only discusses increasing some not all of the transfers).

In the alternatives section, ODFW should be proposing meaningful alternatives that can be implemented and that have a primary goal of compliance with the ESA and not interfering with the wild coho population. The alternatives do not do this sufficiently. In fact, some of them are not alternatives at all because they are bound to happen (Issue 3, Alternative 1).

“Issue 1; Alternative 3: If hatchery coho stray rates exceed ODFW adopted standards after Marmot Dam is removed, investigate options for developing alternate release sites and adult trapping facilities in the lower Sandy, such as in the Bull Run River.”

“Pros & Cons: ODFW conducted an evaluation of potential acclimation sites with a focus on spring Chinook since monitoring indicates straying does not appear to be an issue for coho and steelhead (See Table 2.2.2d information for on the proportion of hatchery coho found in the natural spawning habitat of the Sandy River). If future monitoring indicates that straying of coho is creating risk to wild fish, ODFW will investigate opportunities along with the risks of developing additional off-station acclimation ponds. If feasible and successful, risks to naturally produced coho populations in the upper basin from interactions with hatchery strays could be reduced. Effects to recreational anglers in the lower Sandy River would be minor, and a fishery could be created in the vicinity of any new release/trapping site. It is expected that Sandy River anglers and sport fishing groups would support this alternative. There should also be no impact to ocean or lower Columbia River recreational and commercial fisheries. The alternative is consistent with the purpose of the program and existing mitigation agreements. Agreements with other parties may be needed for trap site development, and there would be increased program costs associated with transporting smolts to the alternate location and operating a remote trapping location; funds are currently not available for a large scale acclimation program but we are currently pursuing opportunities for sighting an acclimation pond in the Bull Run River.”

Comment:

- 1 In Issue 1, Alternative 3, ODFW must analyze how the proposed acclimation facility would be consistent or interfere with the goals and requirements of the HCP in the Bull Run. It is highly questionably that the spring Chinook program is permissible under the requirements of the HCP, so it is likely that the coho program in the Bull Run would be problematic as well.

“Issue 4; Alternative 2: In combination with restoring fish passage at the water intake dam, install a UV, ozone, or similar water treatment system to reduce pathogen risks potentially created by fish passing upstream of the facility in Cedar Creek.”

“Pros & Cons: The action could reduce pathology risks associated with restoring access to approximately 12 miles of habitat in Cedar Creek (*“Issue 4, Alternative 1”*). Hatchery production would be protected. The action could also reduce potential risks to listed and unlisted species from disease that could originate or amplify in the hatchery. The project requires a substantial financial investment, though, and funding has not been identified. ODFW shifted rearing strategies for coho which allows operations to continue without

the need for expensive pathogen control systems.”

Comment:

- 1 Finally, Issue 4, Alternative 2 is a very important water quality alternative that needs to be flushed out and discussed throughout the document. Without this alternative, the impact of the hatchery operations on disease and effluent are much higher. Ex on pg. 35 under Disease Transmission where this should be discussed in much greater details, as well as in Section 4, Water Source.

C. Program Effects on ESA-Listed Salmonid Populations

i. List all ESA permits or authorizations in hand for the hatchery program

Comment:

- 1 Section 2.1 must accurately reflect that there is no ESA authorization for the hatchery. Submission of the HGMP is insufficient. NMFS must approve it based on a thorough analysis and ensure its consistency with Section 4(d) of the ESA. That has not occurred. As previously discussed, the USFWS Biological Opinion is no longer valid either, if it ever even was applicable. There is simply no legal authorization for this hatchery program.

ii. Description of ESA-listed salmonid population(s) affected by the program (HGMP 2.2.1)

Comment:

- 1 Section 2.2.1 must provide an extensive review of the status of the population. It is telling that the HGMP doesn't acknowledge that the wild, listed coho are at high risk of extinction. They are not self-sustaining – the long term lambda is negative and was only greater than 1 (barely) until 2005. Ford, M. 2011. This risk level should have significant bearing on the operation of the hatchery. As noted on pg. 22, the goal for coho recovery is significantly higher than current status. How will the hatchery assist in achieving that goal?

Despite the fact that ODFW did not identify the hatchery as a risk factor to the wild population, more recent data and the Ford, M. 2011 review indicate otherwise. As for the indirect effects, the HGMP should discuss the very real predation on chum salmon and the impacts of the program on the reintroduction of chum into the Sandy. (HGMP, pg. 20). Finally on pg. 24, the HGMP must provide data through 2011, not 2007, citing to Table 2.2.2(c) and should describe the spawning ground survey protocols.

We take issue with the description of the area above the former Marmot Dam site as a wild fish sanctuary. While designated as such, it is not managed as one. There is extensive fishing on hatchery fish, resulting in incidental if not direct take of wild fish (see ODFW 2012 fishing regulations allowing take of wild steelhead), weirs, and hatchery straying. This is hardly a wild fish sanctuary.

Table 2.2.2(d). Proportion of hatchery coho at Marmot Dam (1999-2007) and at spawning grounds (2008-10) from basin-wide spawning surveys.

Year	Total Coho	Wild Coho	Hatchery Coho ^{a/}	% Hatchery
1999	160	160	0	0.0%
2000	742	730	12	1.6%
2001	1,396	1,380	16	1.1%
2002	311	310	1	0.3%
2003	1,178	1,173	5	0.4%
2004	1,047	1,025	22	2.1%
2005	755	745	10	1.3%
2006	842	835	7	0.8%
2007	687 ^{b/}	687	0	0.0%
2008	1,168	1,168	0	0.0%
2009	1,667	1,493	174	10.4%
2010	924	700	224	24.2%

Source: ODFW Marmot Dam counts

^{a/} Hatchery fish identified by adipose fin-clip were removed from the system beginning in 1998.

^{b/} Partial count due to Marmot Dam removal on October 17, 2007.

Comment:

- 1 Table 2.2.2(d) is a game changer. Previously all management decisions were made based on Marmot dam counts, but without the benefit of lower river spawning surveys. ODFW had assumed that only 30% of the spawning habitat was below the former dam site. However this data undermines all of those assumptions. Coho are straying at higher rates, and they are using more of the lower river for spawning. ODFW can no longer claim their Best Management Practice releases smolts below primary spawning grounds. The HGMP and the EA must both do a more extensive analysis of the stray rates, propose actions to minimize those stray rates, and review all of their performance standards and BMPs in light of the new data. None of that has happened. The HGMP also contains no analysis of where coho spawn, where the surveyed spawning grounds are located, nor what proportions of wild and straying hatchery coho will pass through weirs/traps proposed in the HGMPs compared with ones that will proceed unimpeded to spawning grounds.

On pg. 27, ODFW states that incidental take is not expected to occur, however in 2011 they passed juvenile coho above the dam in Cedar Creek despite the fact that the intake pipe had a non-compliant screen and likely resulted in impingement of juveniles. The water withdrawals are also having an effect on both juveniles and adults. Finally, as stated previously, there is no analysis or data to justify the conclusion that impacts are minimized by rapid emigration. On pg. 28, the HGMP is seeking take authorization for the operations; they do not currently have it. The contingency plan is woefully inadequate. Take levels for Spring Chinook have been exceeded for 5 years and ODFW did not consult with NOAA sufficiently to change practices until

2010. The contingency plan must be more robust and require immediately ceasing the questionable practice and initiating consultation with NOAA.

D. Relationship of Program to Other Management Objectives (HGMP Sect. 3)

Comment:

- 1 This section must also include an analysis of consistency with the ESA, the Oregon Chum recovery plan and Portland Water Bureau's Habitat Conservation Plan. It is notable that despite the primary obligation for fish management as "the conservation of naturally produced native fish in the geographic areas to which they are indigenous" the HGMP never discusses how the program is actually conserving the species. To the contrary, the HGMP prioritizes user groups and recreational harvest in the HGMP and alternatives. On pg. 30, the HGMP makes a broad statement that it is consistent with all the above policies, plans, agreements and permits, but fails to include the critical ones it is not compliant with, such as the ESA.

i. Relationship to harvest objectives (HGMP 3.3)

Comment:

- 1 Section 3.3 should include an analysis of the costs, as detailed in Radke, H. 2011, as well as the alternative of harvest on wild coho as is done in the Oregon Coast Coho ESU. Without this analysis, the comparison and conclusions are unsupported.

ii. Relationship to habitat protection and recovery strategies (HGMP 3.4)

Comment:

- 1 Section 3.4 needs to include a discussion of the weirs and potential acclimation pond as those are within designated critical habitat and have not yet received ESA authorization.

iii. Ecological Interactions (HGMP 3.5)

Comment:

- 1 Section 3.5 fails to discuss any meaningful ecological interactions, including the impacts of the coho hatchery program on chum recovery (see also pg. 35, predation where this discussion should be repeated). The description is broad and not specific to the Sandy River. The assumptions and conclusions that there are no or minimal interactions is untested. Juveniles may not outmigrate quickly, and if they don't, what will ODFW do in response? (See also pg. 35, Competition where this issue should be discussed).

Not monitoring the outmigration is a very convenient method to justify an action. Similarly, with respect to the stray rate, ODFW says that "appropriate measures will be taken..." but has not taken any. Also, as discussed previously, there may be a high level of genetic introgression due to domestication selection. (Araki, H. et al., 2008 and 2009; Chilcote et al., 2011.)

E. Water Source (HGMP Sect. 4)

Comment:

- 1 This section should describe the flows in Cedar creek, pre and post construction, the intake screen program and the impact that had on the 250 coho that were passed in 2011. This section should also discuss catastrophic losses and what will happen in the event a pump shuts down or a flood overtakes the hatchery.

F. Facilities (HGMP Sect. 5)

Comment:

- 1 This is the first section that discusses the transport of fish to Bonneville and Cascade hatchery. This section should discuss the impact, including mortality, and cost of the transportation. Section 5.8 should also include a discussion of flooding on the effluent pond and hatchery and the measures taken in those instances.

G. Broodstock Origin and Identity (HGMP Sect. 6)

Comment:

- 1 The EA needs to include a discussion of the long term broodstock program for coho. There is extensive literature, as previously cited, indicating strong domestication affects. Extensive genetic testing should be initiated, especially in areas where there is known high stray rates. The listing decision highlighted the ongoing hatchery programs as one of the limiting factors for recovery and the reason for listing (Ford, M. 2011), which Section 6.2.4 and Section 6.3 should discuss given that there are no efforts to reduce that domestication selection nor a guarantee of success if you do (Chilcote, M. et al., 2011).

H. Broodstock Collection (HGMP Sect. 7)

Table 7.8. Number of fish used for nutrient enrichment projects in the Sandy River Basin.

Year	Stream	# of Carcass/Species	Miles Treated
1997	Still Creek	400 Coho	1.5
1998	Still Creek	400 Coho	1.5
1999	Still Creek	400 Coho	1.5
2000	Still Creek	396 Coho	1.5
2001	Salmon River	75 Chinook	13
	Sandy River	19 Chinook	2
	Camp Creek	1,213 Coho	5
	Clear Fork	1,212 Coho	5
	Clear Creek	1,212 Coho	5
2002	Salmon River	161 Chinook	13
	Sandy River	244 Coho	2
	Camp Creek	216 Chinook	5
		1,056 Coho	
	Clear Fork	1,300 Coho	5
	Clear Creek	1,381 Coho	5
	Lost Creek	244 Coho	2
2003	Camp Creek	815 Coho	3
	Clear Fork	1,400 Coho	4.5
	Clear Creek	470 Coho	1.5
2004	Lost Creek	250	1
	Clear Fork	2,914	3.75
	Camp Creek	1,949	3.5
2005	Lost Creek	750	2
	Clear Fork	3,250	3.75
	Camp Creek	2400	3
2006	Sandy River	6,269 coho	
2007	Sandy River	2,952 coho + 304 Chinook	
2008	Sandy River	4,657 coho + 212 Chinook	
2009	Sandy River	3,657 coho	
2010	Sandy River	6,512 coho + 379 Chinook	
	Cedar Creek	39 coho	

Comment:

- How many of the carcasses and where are placed in the various tributaries? Table 7.8 provides some idea of magnitude but not location or monitoring that is occurring for the program. Furthermore, the high numbers since 2007 indicate that there are many hatchery fish that are returning to the hatchery and not being harvested in the fishery. ODFW should consider, and include as an alternative in Section 1, a reduction to the program to minimize the surplus. Also, it is important to note if these surplus adults are tested for disease prior to being placed in the streams for nutrient enrichment. This should also be discussed in Section 8 and Section 9.

I. Incubation and Rearing (HGMP Sect. 9)

Comment:

- 1 Describe any disease testing that is occurring from fish passed above the hatchery in Cedar Creek. Also, on pg. 52, the HGMP discusses prophylactic treatments without a discussion of how those chemicals and antibiotics are impacting the effluent. The effluent compliance cannot rest on compliance with the NPDES permit alone. It must consider these other antibiotics in the effluent as well.

i. Indicate the use of “natural” rearing methods as applied to the program (HGMP 9.2.9)

Comment:

- 1 In Section 9.2.9, because the conventional hatchery program is considered highly detrimental to the wild populations (HSRG 2009), ODFW should include as an alternative the evolution to the natural rearing techniques. Without those techniques, ODFW risks losing the program entirely for its take of wild fish.

J. Release (HGMP Sect. 10)

Comment:

- 1 As previously stated, this section should include monitoring to test the assumptions about quick, volitional releases that do not interact with wild juveniles, acclimation that minimizes straying and releases downstream from primary spawning grounds (Section 10.11). Section 10.7 should discuss the double index study, its purpose and need under Section 10.7.

K. Monitoring and Evaluation of the Performance Standards and Indicators (HGMP Sect. 11)

Comment:

- 1 As stated throughout these comments, the monitoring is wholly inadequate. The agency spends too much time monitoring the hatchery fish at the facility and not enough time studying them in the wild or their impact on wild fish. Even more egregious is the lack of creek samples even though harvest is considered the primary goal of the hatchery. ODFW should understand how and where people are harvesting coho, how many, and the overall cost. It may be very possible to provide the same level of fishing consumption without the hatchery or with a reduced hatchery, however that has not been analyzed or proffered as an alternative. There is anecdotal evidence that ODFW is going to scale back monitoring this year. The HGMP should identify personnel and budget to conduct the monitoring to ensure that it will occur.

VI. Environmental Assessment

2 | A. Executive Summary

The Environmental Assessment is fatally flawed in many respects. First, it uses the wrong legal standard under the ESA's Section 4(d) which requires the hatchery program to provide for the "conservation of such species." Second, NOAA Fisheries must also review the actions proposed, especially the mitigating and monitoring practices relied on, to ensure that they are reasonably certain to occur, and have a high likelihood of success to overcome the impact caused by the hatchery programs. Third, it underestimates the benefits of the no action alternative, which would eliminate the effects of hatchery fish on the Sandy River. Fourth, it woefully underestimates the *impacts* of the proposed alternative to continue the status quo of the four existing hatchery programs on the Sandy River. Fifth, it fails to consider a number of reasonable alternatives that would satisfy the purpose and need of the program while having fewer impacts on the wild population. In these comments, reasonable alternatives are provided for further analysis that would continue to support a recreational fishery in the Sandy River while simultaneously contributing to the recovery of the wild listed salmon stocks. Finally, if the agency continues to pursue the proposed action, or even some of the alternatives provided in these comments, the EA must conclude that the actions are likely to significantly adversely affect threatened and endangered species and complete an Environmental Impact Statement (EIS) after proper scoping and issuance of a draft EIS. Only if the agency pursues the no action alternative would the EA be appropriate as written to conclude that the action is not likely to adversely affect the listed species such that an EIS is required. As a result of these flaws, the signatories to these comments must conclude that:

- 1) Among all the dangers that hatchery fish present to their wild, native counterparts, introgression of hatchery-stock genes and resultant loss of genetic diversity in the wild population is the most serious and the most immediately critical one. It is irreversible. Once those adaptive wild genes are lost, they are gone for good. As elaborated below, ODFW has essentially ignored or downplayed the striking genetic difference between wild fish and any existing hatchery stock. There is no time to waste—the introgression of hatchery-stock genes must be stopped at once.
- 2) ODFW's overall approach to mitigating the effects of hatchery stock on wild fish is backwards and needs to be reversed. The agency has historically tested, and proposes to continue testing its various hypotheses—for example, local "conditioning" of hatchery smolts to prevent straying—at massive scales. Hundreds of thousands or even millions of hatchery fish are continually injected on the hope that the latest unproven tweak will be effective, despite the long history of failure. Given the probability and huge negative consequences of being wrong, ODFW should be required to conduct its experiments at small scale first. Only if and when a technique is proven effective should it be allowed to scale up. The data on the Sandy are clear that the grand experiment in that river has failed and is preventing the recovery of wild salmon.

Neither ODFW nor NMFS present any evidence that the introgression of the Sandy hatchery stock will be any less damaging to wild fish than would any other hatchery stock. It is merely an unsupported assumption on their part that the Sandy hatchery stock produced from Sandy River wild fish will prove to be more fit than previous stocks. Whereas, in actual fact, ODFW's own research points in the opposite direction. Chilcote et al. found no evidence that local broodstock-derived hatchery stocks were any more reproductively fit than other hatchery stocks of anadromous salmonids. (Chilcote, M. W., K. W. Goodson, and M. R. Falcu. 2011. [Reduced recruitment performance in natural populations of anadromous salmonids associated with hatchery-reared fish](#). Canadian Journal of Fisheries and Aquatic Sciences 68:511-522.).

NMFS has failed to use the precautionary approach in reviewing and analyzing the Environmental Assessment. As a result, the wild salmon and steelhead in the Sandy River will continue to decline and fail to recover.

B. The 4(d) standard

- 3 | The proposed actions are seeking approval under Section 4(d) of the ESA. The Environmental Assessment must look at the legal standards in that section, as well as the criteria in the 4(d) rule, and determine if the HGMPs meet the requirements. Based on our review, the HGMPs do not meet the standard. The statute states, "Whenever a species is listed as a threatened species...the Secretary shall issue such regulations as he deems necessary and advisable for the conservation of such species. (emphasis added) (16 U.S. C. §1533(d)). Conservation is further defined as "to use and the use of all methods and procedures which are necessary to bring any...threatened species to the point at which the measures provide pursuant to this changer are no longer necessary." 16 U.S. C. §1532(3)). This means that the hatchery programs reviewed and approved under the 4(d) rules must actually contribute to the recovery of the species, not merely appreciably reduce the likelihood of survival or recovery. *See NWF v. NOAA*, 481 F.3d 1224 (9th Cir. 2007); *see also* Jeffers, J. "Reversing the Trend Towards Species Extinction, or Merely Halting It? Incorporating the Recovery Standard into ESA Section 7 Jeopardy Analysis." 35 Ecological Law Quarterly 455 (2008).
- 4 | The no action alternative and the proposed action were not reviewed under this analysis. Furthermore, an exhaustive review of the Draft EA does not find a single reference to where the proposed action would actually improve the conservation of the species. All indications of the proposed action having a beneficial effect on the listed species are all based on a relative comparison to the existing illegal activities of the hatchery. This is the incorrect baseline. *See* 50 C.F.R. § 402.02 (directing that the environmental baseline includes "actions ... that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process." Any beneficial affects to the species must be considered against the no action alternative, not the currently unauthorized operations. Based on the correct baseline, the hatchery operations proposed in the 4 HGMPs appreciably reduce the likelihood of recovery and fail to "bring the species to the point at which the measures [of the ESA] are no longer necessary."

- 5 Notably, the history of the hatcheries is such that since winter steelhead, Chinook and coho were listed in 1998 and 1999, the hatchery has continued to operate to the detriment of the listed populations – none of the populations have increased their population trend in 12 years despite the removal of Marmot and Little Sandy dams, the development and commitment of over \$100 million in the Portland Water Bureau’s Habitat Conservation Plan, and the U.S. Forest Services’ removal of all fish passage barriers, and implementation of the Northwest Forest Plan regulations. See Lower Columbia River Conservation and Recovery Plan for Oregon Populations of Salmon & Steelhead, August 6, 2010 Appendix C, pp21, 25, 30) (hereinafter “Lower Columbia River Conservation Plan”). To the contrary, actions taken by ODFW to minimize the impacts of the hatcheries, such as incorporating wild broodstock into the hatchery programs starting in 2002, acclimation of smolts at alternative locations, and adipose fin clipping all hatchery fish to improve monitoring, have all shown to actually increase the impacts on the species (see EA pg. 35, 37, 40, 86, and 93 showing that the stray rates of increased in that time).
- 6 The HGMPs propose more of the same, except they propose to increase devastating practices, such as additional acclimation ponds and placing four weirs into four tributaries for four months each year in ad finitum. Given the data and the proposed actions, the HGMPs clearly do not meet the standard required under 4(d) and should be rejected outright.
- 7 Assuming for argument’s sake that NMFS does determine that despite the overwhelming data to the contrary, the proposed action actually contributes to the recovery of the listed species, NMFS must still show how the HGMPs meet the 4(d) rule criteria under Limit 5, Hatchery and Genetic Management Plans. 65 Fed. Reg. 42422, 42477 (July 10, 2000); 50 C.F.R. §223.203(5). There are numerous requirements that must be satisfied. As detailed in our comments on the individual HGMPs, the HGMPs fail to satisfy at least 4 of the requirements and NMFS has failed to follow two additional requirements. Not only do the HGMPs not satisfy these requirements, the HGMPs and the Draft EA make no effort to analyze whether and how the programs and management actions described in the HGMP *could* satisfy the criteria Specifically, the HGMPs do not:
- (A) enumerate results desired to measure the success or failure of the program
 - (E) evaluate, minimize and account for the propagation program’s genetic an ecological effects on the natural populations including disease transfer, competition, predation, and genetic introgression caused by the straying of hatchery fish.
 - (H) adequately monitor and evaluate to detect and evaluate the success of the hatchery program and any risks potentially impairing the recovery of the listed ESU
 - (I) evaluating monitoring data and making any revisions of assumptions, management strategies or objectives that data show are needed.

- 8 Further, NMFS has failed to initiate consultation as required under (J) or require any conditions or alterations to strengthen the programs despite their significant shortfalls required under Section (k)(vi).
- 9 For these reasons, the HGMPs should be rejected for failing to meet the requirements of the ESA under Section 4(d) and the regulations in §223.203(5).

C. Effects of the Action need to be reasonably certain to occur

- 10 The effects of the action, in this case the proposed action of the 4 HGMPs, must comply with §50 CFR 402.02 (2012). These regulations defined “effects of the action” as, “direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action...[including] actions that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process. In direct effects are those that are caused by the proposed action and are alter in time, but still are reasonably certain to occur.” The reliance on actions that were not likely to occur resulted in an arbitrary and capricious “no jeopardy” decision on the 2000 Federal Columbia River Power System (FCRPS). *NWF v. NMFS*, 254 F. Supp. 2d 1196 (D. Or. 2003).
- 11 Within the EA, there are numerous instances where NMFS relies on actions which are not reasonably certain to occur, or even worse, not likely to succeed. For example, the only monitoring that ODFW is proposing to do is to monitor the recolonization of coho salmon and winter steelhead in Cedar Creek above the existing hatchery (EA at 21). In other places, NMFS appears to rely on the monitoring of others such as the Portland Water Bureau and US Forest Service (EA at 21). This fails to mitigate the effects of the action. ODFW has not shown any resources to fund or staff a Sandy hatchery monitoring program, and NMFS reliance on third parties is misplaced because those monitoring efforts are not designed to show the
- 12 effectiveness or success of the hatchery programs. In disclosing information about the effects of the action in the EA, NMFS must look to the underlying substantive statute (the ESA) and disclose for public review high quality information regarding whether there is a guarantee that mitigation measures actually will be adopted, implemented, funded, and, ultimately, successful.
- 13 Paradoxically, NMFS seems to acknowledge the absence of this analysis early in the EA when it states, “it is unknown if the operation of the weirs/traps will be successful in removing enough of the hatchery spring Chinook salmon to meet the 10% goal, while at the same time minimizing impacts on natural-origin spring Chinook that are handled and released during collection activities.” EA at 15. But then NMFS goes on to conclude that, “the spring Chinook salmon [hatchery] program would be expected to have a beneficial impact on the natural-origin Sandy River spring Chinook salmon population relative to current impacts if the proposed actions for the spring Chinook salmon hatchery program are successful in reducing the

- proportion of hatchery spring Chinook spawning naturally, thus reducing impacts on the natural populations.” (EA pg 83). ODFW has not committed to monitoring the weirs, upstream spawning surveys or downstream impacts with sufficient certainty for NMFS to make this conclusion (EA at 14 simply says that they currently monitor but do not make any commitment to future monitoring). No information whatsoever is provided regarding assurance of future funding, or whether NMFS funding under the Mitchell Act will be used (and – if so – what the environmental impacts of such funds will be). Furthermore, as the comments on the spring Chinook HGMP detail, this assumption fails to incorporate the best available science which disproves the conclusion. In addition, ODFW and NMFS fail to identify any adaptive management if the strategy fails. There is no Plan B. There is no reopener clause in the HGMP, it is allowed to continue indefinitely with a 5 year check in. There is simply no precaution being taken to protect the wild listed fish in light of documented impacts from the acclimation facilities and weirs.
- Another example of where NMFS mistakenly relies on actions that are not reasonably certain to occur is in the Bull Run watershed. First, NMFS fails to document that there is no monitoring occurring of the proposed acclimation facility (EA at 14). Despite an extensive commentary on the need for monitoring and evaluation (EA at 67), NMFS fails to identify which monitoring programs are occurring and funded into the future in the HGMPs. As stated in the individual HGMP comments, the commitment is only to “current” monitoring, not any future monitoring.
- The only monitoring in the Bull Run watershed is by the City of Portland Water Bureau. They are instructed to remove their smolt trap prior to the release of the acclimated hatchery fish so as not to interfere with downstream migration. Yet two days later when they returned the smolt trap, hatchery fish were encountered and did not have a differential mark by which ODFW or anyone else could study the effectiveness of the acclimation facility (Burke Strobel, PWB, personal communication). Furthermore the EA at 17 indicates that the offsite acclimated smolts *may* have a differential mark, but are not requiring it. Thus, there is no mechanism in place to assure that acclimation facility is working to reduce stray rates or that any other monitoring evaluating the success or impact of the hatchery program will occur into the future.
- In another egregious example, NMFS acknowledges that the Sandy River hatchery programs rely on 7 additional hatcheries to rear Sandy River hatchery fish (and fails to discuss any impacts as a result of frequent transport or the impacts of those facilities on the domestication of the hatchery fish, or the impact of funding under the Mitchell Act for the operations of those hatcheries). However, NMFS incorrectly states that those hatcheries have been evaluated as part of the Upper Willamette Biological Opinion and determined not to jeopardize listed salmon and steelhead (EA at 16).

To the contrary, the Willamette BiOp specifically states that it does not apply to the hatcheries, instead it requires each of those hatcheries to pursue approval through the HGMP process. The Willamette Hydropower Biological Opinion implements Reasonable and Prudent Alternatives that specifically call on ODFW to secure NMFS-approved HGMPs for the hatcheries. These HGMPs have not been approved, thus they cannot be relied on by NMFS to reduce the effects of the action, but rather further evidence of ODFW's continuing impacts on ESA listed fish activity in multiple watersheds throughout the state without any ESA authorization.

The Action Agencies will work cooperatively with the State of Oregon to ensure that Willamette Project hatchery programs are not reducing the viability of listed ESUs/DPSs.

6.1.1 Implementation of Hatchery and Genetic Management Plans (Willamette Basin-wide): The Action Agencies will implement the actions described in the Willamette Hatchery and Genetic Management Plans (ODFW 2003, 2004a, 2005a, 2007a, 2008a, 2008b) for spring Chinook, summer steelhead, and rainbow trout, after NMFS approval of these plans. Implementation of these actions requires cooperation with the State of Oregon, who partially funds and operates many of the facilities associated with the Hatchery Mitigation Program.

Rationale/Effect of RPA 6.1.1: The HGMPs provide the detailed management plan for each hatchery program throughout the entire life cycle of the fish. Adherence to the HGMP is necessary since the fine details of the hatchery programs are not (and should not be) included in the Supplemental BA.

The effect of this measure will be to reduce and minimize adverse effects of hatchery programs on UWR Chinook and steelhead. There are many specific protocols and guidelines for spawning, raising, and releasing hatchery fish that need to be implemented to be in accordance with best management practices for reducing impacts to ESA-listed stocks.

Willamette BiOp Pg. 9-73 **6.2:** The Action Agencies will preserve and rebuild genetic resources through conservation and supplementation objectives to reduce extinction risk and promote recovery. These actions rely in part on cooperation with the State of Oregon, which partially funds and operates many of the facilities associated with the Hatchery Mitigation Program.

Implementation of Hatchery and Genetic Management Plans (Willamette Basin-wide): When approved by NMFS, the Action Agencies, in cooperation with ODFW, will implement the actions described in the NMFS-approved Willamette HGMPs for spring Chinook, summer steelhead, and rainbow trout.

Rationale/Effect of RPA 6.2.1: This measure is identical to that described as RPA measure 6.1.1, but is included here because of the importance of HGMPs to practices that rebuild genetic resources.

(Willamette Biological Opinion at Chapter 9).

- 19 In another egregious example, NMFS relies on the adequacy of the weirs, despite no scientific literature supporting their success and evidence that the specific weirs on the Sandy are having detrimental impacts on the wild listed fish as described later in these comments. However, a basic question was never answered – are the weirs approved? To date, ODFW has not received any ESA authorization for the weirs. Nor has ODFW received any Clean Water Act permits from the US Army Corps of Engineers under Section 404, or under Section 401 (under the authorization of Oregon Dept. of Environmental Quality). Nor does this Draft EA, nor any other NEPA document, evaluate the environmental impact of locating and operating the weirs. Thus, even though NMFS is ignoring evidence to the contrary, it cannot rely on the weirs because they are operating illegally.
- 20 As a result, NMFS improperly analyzes the effects of the action, concluding in multiple places that the proposed action will have a beneficial impact on the ESA listed salmon and steelhead, by relying on actions that are not reasonably certain to occur, are not likely to be successful or are currently operating in violation of the ESA and Clean Water Act. Thus, NMFS should reject the HGMPs and order all current operations to cease.

D. Benefits of the No Action Alternative

- 21 Chapter 4 analyzes the effects of the two proposals and dramatically underestimates the benefits of the no action alternative. The Sandy River was once home to 15,000 Coho, 20,000 winter steelhead and 10,000 spring Chinook and 10,000 fall Chinook. See Barbara Taylor (Dec. 1998). The No Action alternative is the only alternative that will ensure the wild listed populations start to trend towards recovery and get close to their historical abundances. However NMFS analysis completely underestimates the benefits of the no action alternative in achieving these numbers.
- 22 First, in the water quality discussion, NMFS does not discuss any impacts from fish food, chemical use such as formalin, effects of flooding on the settling pond contents that would no longer be an issue with the no action alternative (comparatively, NMFS does not discuss the impacts of these effects with the proposed action). These are effluent affects that are not adequately evaluated by punting to the 303(d) compliance since the 303(d) list has not included these site specific chemicals. Nor does NMFS evaluate the very real possibility of flooding in the Sandy River and the impact on the settlement pond. Regardless, the no action alternative would eliminate those impacts.
- 23 In multiple places, NMFS states that the no action alternative will have an overall beneficial effect on Chinook (EA at 71), coho (EA at 75), and winter steelhead (EA at 78). Yet, incomprehensibly, NMFS concludes that the biological risk categories “are not expected to

- change under the No-Action alternative, but there may be a beneficial effect because the current hatchery programs pose increased risk to these populations.” EA at 72. EA at 75, EA at 78. However, the Lower Columbia Conservation Plan (Aug. 2010), currently before NMFS for adoption as a federal recovery plan, identifies that reduction of the hatchery impact will significantly improve the extinction risk categories in some cases like diversity of spring Chinook to the Very Low risk category. Notably, in the recovery planning process, ODFW refused to model a more realistic situation in the Sandy River that included the removal of two dams, improvements for passage in tributary habitat, \$100 Million investment in habitat improvements under the Portland Habitat Conservation Plan, and potentially the elimination of the hatchery. The closest analysis is a combination of the “Max Harvest and Hatchery” and the very subjective “Max Feasible – ALL” which in the case of Spring Chinook would result in over 9000 returning adult wild spring Chinook, more than 7 times greater than the proposed recovery standard which ODFW cannot meet under the proposed HGMPs. Contrary to NMFS conclusion, the biological risk categories are likely to be significantly reduced by the no action alternative.
- 26 Under the genetics category, NMFS continues to artificially suppress the benefits of the no action alternative. This is the only alternative that would meet NMFS requirements to achieve less than a 5% stray rate. There have been numerous studies of late that have documented the damning effects of stray rates on the survival and recovery of wild fish, especially on the productivity and diversity of the wild population. See e.g. Araki, H et al. 2009. Carry-over effect of captive breeding reduces reproductive fitness of wild-born descendants in the wild. Biol. Letters doi:10.1098/rsbl.2009.0315 and the studies cited therein. See also, Chilcote, M. W., K. W. Goodson, and M. R. Falcy. 2011. [Reduced recruitment performance in natural populations of anadromous salmonids associated with hatchery-reared fish](#). Canadian Journal of Fisheries and Aquatic Sciences 68:511-522. These studies demonstrate that the effects of straying are substantial across multiple generations, and that broodstock protocols are insufficient to overcome the impact. Only the no action alternative would be consistent with this best available science.
- 27 NMFS understates the benefits of the removal of the acclimation facilities and the weirs. These currently result in water withdrawals, contaminated effluent, passage barriers, behavioral changes, spawning between hatchery and wild fish and increased poaching, all of which would be eliminated by the no action alternative.
- 28 Finally, and probably most important, NMFS fails to analyze how the no action alternative can actually achieve the purpose and need of the hatchery programs faster, cheaper and without any impacts to the wild populations. The goal of the hatchery programs is to increase recreational harvest as mitigation for overall dam impacts in the Columbia River system under the Mitchell Act. However, the Mitchell Act does not require that mitigation to come in the form of hatcheries. EA at 11. Instead, investments in habitat improvements, research and monitoring can also be considered mitigation under the Mitchell Act. As discussed above, the removal of the hatchery program may result in nearly 9,000 wild adult Spring Chinook, far more than have been seen in the Sandy in nearly 30 years. See Lower Columbia River Conservation Plan at Appendix C pg. 21.

E. Effects of the Proposed Action

- 29 The inadequacy of the effects analysis of the proposed action is laid out in much more extensive detail in the specific comments on each HGMP, however it is important to highlight some of the more egregious and obvious examples here relative to the sufficiency of the EA. These are in addition to the numerous examples cited above to demonstrate how the EA fails to meet the legal standards and fails to supply high quality information that would provide data and analysis of environmental impacts which are missing from the ODFW-developed HGMPs. These additional examples demonstrate NMFS ignorance of the best available science and contrary evidence.
- 30 NMFS conveniently ignores the return data over the last 20 years. A review of the EA Table 3 (pg 35) highlights some striking problems (cf. Lower Columbia River Conservation Plan at Appendix C pg. 21). First, since the salmon and steelhead have been listed under the ESA, the population has not rebounded despite the removal of two dams and extensive investment in habitat improvements. In 2002 ODFW started incorporating wild ESA listed salmon for broodstock and in 2003, ODFW changed the acclimation strategy. Notably, these changes were ineffective and led to a delay of the removal of Marmot Dam. The data have also demonstrated that the population has continued to fluctuate but not recover, and winter steelhead have declined dramatically since 1997. EA at 35. ODFW is extremely cognizant of these results and changed their recovery standard appreciably from over 4900 wild winter steelhead in 1998 to only 1,519 in 2010 without any scientific justification. See NFS 60 Day Notice, April 13, 2011.
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- 33 Ironically, the recovery plan target for Spring Chinook abundance is only 1,230, which are fewer fish than when NMFS reviewed the listing decision and determined that the Sandy River Spring Chinook were at high risk of extinction and again in 2011 when NMFS determined Sandy River spring Chinook were at moderate risk of extinction (EA at 34). In other words, the recovery target is the same level of fish *that resulted in the listing in the first place*. The 2011 Biological Review of the status of the species specifically highlighted hatcheries as a reason for the continued risk of spring Chinook, "High hatchery production continued to pose genetic and ecological risks to natural populations and to mask their performance. Most populations in this ESU had not seen as pronounced increases in recent years as occurred in many other geographic areas." See Ford, 2011 at 126. Notably, the Ford (2011) did not include the stray rates in the Sandy River because the ODFW data from 2010-2012 were not available. It is unclear if the Biological Review Team would reach the same risk category conclusion in light of the extreme stray rates of spring Chinook.
- 34
- 35 In a number of places, NMFS refers to the implementation of Best Management Practices (ex: EA at 12) but does not describe those best management practices or the sources of them except when describing the Ecological Interactions of the various programs on EA pg. 88, EA 93-94, and EA 100. The EA does not describe why these are believed to be Best Management Practices (BMPs), any science supporting these BMPs, or any more recent science or data that discredits the effectiveness of these BMPs (see Araki et al., 2009 and Chilcote et al., 2011). The EA cites to troubling new numbers showing increased, or rather recently discovered existing stray rates of coho below the former Marmot Dam site. EA at 93. However, steelhead have not
- 36

been monitored below the former Marmot dam site to confirm the stray rate is less than 5%. The situation regarding hatchery and native steelhead in the river may be much the same as with Chinook salmon and is simply masked by the lack of appropriate monitoring following the removal of the Marmot Dam. There is no information in the Draft EA describing where spawning surveys for steelhead and coho were undertaken, and therefore no way to comment meaningfully on the figures provided for stray rates and whether they reflect the actual distribution of fish in the system. We therefore believe that, until the results of appropriate studies are available, a program similar to that proposed for Chinook salmon be implemented for Steelhead in the Sandy River.

- 37 NMFS failure to show alarm over the possible genetic introgression of hatchery into the wild stock is astounding, in view of their own stated standards. Citing its 1995 workshop (p. 64), the EA states that "NMFS applies the Grant (1997) guideline that non-local hatchery stray rates should be managed such that less than 5 percent of the naturally spawning population consists of non-local strays". Yet in the next paragraph, they give the ODFW a pass on that standard by simply stating that ODFW's "hatchery maximum stray rate target of 10 percent was identified as the level necessary to meet delisting goals for the naturally spawning population, and reflects the similarity between the hatchery and naturally produced spring Chinook salmon (ODFW 2010)." NMFS provides no explanation why something less than the best available science should be accepted and no rationale to explain this discrepancy.
- 38 NMFS also appears to treat the weirs as BMPs but fails to cite to any science that supports that conclusion. Furthermore, NMFS own scientists raise considerable doubt about the benefits of weirs over the impact on wild fish. See Williams, J.G. Effects of Hatchery Broodstock Weirs on Natural Production, 1989. See also Garcia de Leaniz, C. 2008, Weir Removal in Salmonid
- 39 Streams: Implications, Challenges and Practicalities. Hydrobiologia 609:83-96. In addition, there is evidence that the weirs are far less effective than NMFS indicates. For example, there is video of hatchery fish spawning below the weirs, and more than twice as many redds surveyed below the weir than above it, indicating a significant fallback effect that increases the potential for hatchery and wild Spring Chinook spawning interactions. See Mia Sheppard, <http://oregonsteelhead.blogspot.com/2011/10/are-wild-chinook-becoming-extinct-on.html>
- 40 Nor does the analysis accurately reflect the impacts of the weirs. NMFS only cites to the fact that there were no direct mortalities in the handling of natural origin adults at the weirs, EA at 85 and 87, but does not discuss any of the additional impacts that were observed. As stated
- 41 above, there were alterations to behavior that led to additional hatchery spring Chinook spawning with wild spring Chinook. Analysis by Kirk Schroder at ODFW shows that in 2009 there was a 25% stray rate in the Salmon River, a 63% stray rate in Still Creek, a 57% stray rate in ZigZag River, and a combined total of 62.5% in other upriver tributaries. In 2011, after the weirs were employed, Schroder found that the stray rate had actually increased to 62% in the Salmon River, fell slightly in Still Creek to 48%, remained the same in Zig Zag at 58% and increased to 84% in the other upstream tributaries. NMFS must review and disclose and evaluate this data in the EA. Overall the hatchery spring Chinook stray rate increased from 53% to 60% despite the use of weirs to try to minimize the stray rates. Although the weirs were only in place for a short time, the stray rates still exceed the numbers when there was no weir at all.

- This raises significant doubts about the effectiveness of the weirs at reducing the stray rate, and certainly undermines the conclusion that the use of the weirs would “be expected to have a beneficial impact on the natural-origin Sandy River spring Chinook salmon population relative to current impacts if the proposed actions for the spring Chinook salmon hatchery are successful in reducing the proportion of hatchery spring Chinook spawning naturally...” EA at 83. In addition, contrary to NMFS statement that the operation of the hatchery programs do not have an impact on the anchor habitat or spawning areas, EA at 83, the weirs very clearly block passage to spawning grounds.
- NMFS also makes baseless conclusions on the genetic effects of the proposed action. NMFS concludes that the spring Chinook hatchery program may impact the life history characteristics of the natural origin fish, “but these impacts are expected to be minimal because the hatchery spring Chinook salmon were derived from natural-origin Sandy River spring Chinook salmon populations, and the program has incorporated natural-origin spring Chinook salmon into the broodstock to maintain similarities between the hatchery and natural-origin spring Chinook salmon.” EA at 83. However, the EA directly contradicts this conclusion, and provides no reasoned basis explaining how it arrived at the conclusory statement that impacts are “expected to be minimal.”
- The spring Chinook and winter Steelhead recovery actions at pg. 38 and 45 state that the action of incorporating broodstock is “under review” and was in fact eliminated in 2011. This is due to an exhaustive recent study from ODFW and former NMFS scientists documenting the failure of the wild broodstock programs to overcome the genetic impacts on the wild stock. See Chilcote et. al., 2011. Furthermore, NMFS fails to acknowledge that this broodstock program only started in 2002 and prior to that time the hatchery only used returning hatchery fish which in some cases originated completely outside of the basin. Prior to 2002, the Spring Chinook were Clackamas stock, and summer steelhead were and continue to be from South Santiam stock. Furthermore, there is direct evidence that the use of wild broodstock was not successful in integrating the population, possibly in part because of the years of mixing of wild and hatchery fish prior to 1997. (David Teel, NMFS employee, personal communication. Finding that there are substantial numbers of spring Chinook in the Columbia River, but few above the Willamette River Confluence, that exhibit genetics associated with the Upper Willamette. A few spring Chinook exhibit genetics closer to the Lower Columbia River and Gorge populations). Thus, it is impossible to support the conclusion that the impacts are expected to be minimal.
- Even if the ODFW were to stop releasing hatchery smolts into the river tomorrow, that would not be sufficient to completely address the immediate crisis of genetic introgression. Given the life history of these fish, we know that for the next few years, hatchery Chinook previously released in the Sandy River will be returning and, without an efficacious program in place to avoid it, will be interbreeding with native Chinook. Therefore, ODFW's efforts to “condition” hatchery Chinook smolts to avoid “straying” could not have any influence on this problem for the next three to five years; assuming that “anti-straying conditioning” will ever achieve the efficiency desired. The solution to this issue seems to be an immediate implementation, qualification and ongoing monitoring of the weir systems rather casually mentioned in ODFW's HGMPs.

- 47 Finally, NMFS completely fails to analyze the impact of the proposed action and the no action alternative on the commitments and success of the Portland Water Bureau's Habitat Conservation Plan and the Marmot and Little Sandy Dam removals. [The HCP, approved by NMFS in 2009](#), mandates that the Water Bureau mitigate the impacts of the Bull Run water and hydropower facilities by working to recover ESA listed salmon and steelhead in the Bull Run. In contrast to this requirement, NMFS is now concluding that the deliberate acclimation of fish in the Bull Run intending to attract hatchery fish into this watershed, and the necessity of a weir blocking fish passage is appropriate. NMFS has failed to analyze how the proposed action inhibits the success of the HCP. Furthermore, in 2007 PGE removed Marmot Dam and Little Sandy Dam, restoring flows to the Little Sandy River for the first time in 100 years. PGE and all of the signatories to the settlement agreement, including Native Fish Society, committed to the dam removal under the promise of wild fish recovery. The proposed action undercuts the original motivation to the dam removal, the recovery of wild fish in the Little Sandy River, and the promise of a barrier free river. NMFS must analyze these effects of the proposed action.

F. Alternatives

NMFS only considers two alternatives in the Environmental Assessment despite more alternatives that would better meet the purpose and need of the program at lower cost and with less impact to the wild, ESA listed populations.

- 49 First, the no action alternative assumes that there would be no recreational fishing opportunities in the Sandy. EA at 110. This is contradicted in three instances. First, a number of fishing guides have indicated they would prefer to see the river return to a wild only river and do not believe that it would affect their business or clientele, in fact the opposite, they believe it would improve dramatically. Oregonian OpEd "Wild Fish, sustainable jobs April 7, 2011.
- 50 Second, ODFW's own recovery plan indicates that there could be a 7 fold increase in the number of wild spring Chinook in the river, far greater than experienced in 30 years. NMFS has previously approved a limited wild fish harvest on ESA listed Oregon Coast Coho that show evidence of recovery, as well as a wild spring Chinook fishery in the John Day River for ESA listed fish. NMFS could consider doing the same here when the population reaches a certain level of abundance. In the case of Oregon Coast Coho, the abundances returned within 5 years of ending the hatchery programs. In the Sandy River, hatchery fish will be returning during that entire time, potentially eliminating any lag between a harvest on hatchery fish and a harvest on a healthy wild population of spring Chinook or steelhead. This analysis could also show that there would be little impact on the direct and indirect economic expenditures.
- 51
- 52 Furthermore, the cost of the program would be substantially less than the existing programs, saving the state and federal government millions of dollars to invest in fisheries elsewhere or in habitat actions that will enhance and speed up the recovery of the wild populations in the Sandy. The cost of the existing programs are high. See Radtke, H. 2011. Sandy River Hatchery Economic Effects. The cost per harvestable coho was \$61, for Winter Steelhead it was \$140 and for Spring Chinook it was \$304 with an average cost across species of \$90 while the economic

gain is only \$58. That translates to the proposed action resulting in a \$32 per hatchery fish economic deficit whereas the no action alternative would result in a \$58 per fish economic gain.

- 53 Other alternatives that should be analyzed include using the Sandy Hatchery to rear other fish for release outside of the Sandy River, much the same way that it relies on 7 other hatcheries for a part of its operations. This could eliminate crowding and facility problems at other hatcheries, and still continue to support robust recreational fisheries and meet the purpose and need of the program as well as the Mitchell Act “mitigation” obligations. For example, there are facility issues at Eagle Creek hatchery in the Clackamas River that could benefit from use of an additional facility. This would also result in the retention of current ODFW hatchery employees while still resulting in the wild fish benefits described in the no action alternative.
- 54 Another alternative not considered is NMFS approval of the HGMPs with mandatory conditions requiring guaranteed funding of the activities proposed under the HGMPs, including mitigation and monitoring, together with conditions that will insure that, if stray rates for all species are not reduced below the 5% NMFS standard, specific and certain-to-occur measures will be taken
- 55 to modify or halt the hatchery operations to meet the recovery goal. Reduction or elimination of hatchery impacts is feasible and has been achieved by ODFW on other rivers in Oregon, and NMFS can condition approval of the HGMPs on specific showing of *actual* success of the program, not hypothetical success unsupported by analysis.
- 56 Another alternative is to redirect the Mitchell Act funding to fully monitor and research the removal of the hatchery program, increasing the number of ODFW staff working on the River. It is notable that there is a dearth of scientific literature on the benefits of removing a hatchery program because it has happened in very rare instances and research and monitoring were not funded. Given the volumes of scientific literature demonstrating the different impacts of hatcheries on wild salmon recovery, this alternative along with the no action alternative and the above proposed alternatives, would be consistent with the Best Available Science, the standards of ESA 4(d) and the Portland Water Bureau’s Habitat Conservation Plan.

G. The EIS requirement

- 57 If NMFS continues to pursue the proposed action, a full EIS is required. This program was originally included in the broader Mitchell Act EIS and is currently being segregated. If NMFS pursues the proposed action, all operations on the Sandy River should cease until the full Mitchell Act EIS is approved, and only then should the HGMPs be evaluated under Section 4(d) and Section 7.

Legal Issues

i. NMFS must prepare an Environmental Impact Statement (EIS) for its proposed action

NEPA “declares a broad national commitment to protecting and promoting environmental quality.” *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 348 (1989); see 42 U.S.C. §

4331. “To insure this commitment is infused into the ongoing programs and actions of the Federal Government, the act also establishes some important action-forcing “procedures.” *Robertson*, 490 U.S. at 348 (citing 115 Cong. Rec. 40416 (1969) (remarks of Sen. Jackson)). NEPA directs that, to the fullest extent possible, all federal agencies must prepare an Environmental Impact Statement (EIS) whenever they propose “major federal actions significantly affecting the quality of the environment.” 43 U.S.C. § 4332(2)(C); 40 C.F.R. § 1508.9. In short, an agency must take a “hard look” at the potential environmental impact of a project.

58 NMFS’s proposed action is the approval of ODFW’s four HGMPs for the Sandy Hatchery. Draft EA at 5. A threshold question under NEPA is whether the proposed action may significantly affect the environment, thereby triggering the requirement for an EIS. *Blue Mountains Biodiversity Project v. Blackwood*, 161 F.3d 1208, 1212 (9th Cir. 1998) (citing 42 U.S.C. § 4332(2)(C)). If an agency is uncertain whether a proposed action may have a significant effect on the environment, it may first prepare an Environmental Assessment (EA). 40 C.F.R. § 1508.9. The purpose of an EA is to provide the agency with sufficient evidence and analysis for determining whether to prepare an EIS or to issue a FONSI. *Metcalf v. Daley*, 214 F.3d 1135, 1143 (9th Cir. 2000) (citing 40 C.F.R. § 1508.9). “Because the very important decision whether to prepare an EIS is based solely on the EA, the EA is fundamental to the decision-making process.” *Id.* If an agency decides not to prepare an EIS, it must supply a “convincing statement of reasons” to explain why a project’s impacts are insignificant. *Blue Mountains*, 161 F.3d at 1212. “The statement of reasons is crucial to determining whether the agency took a ‘hard look’ at the potential environmental impact of a project.” *Id.*

59 Whether there may be a significant effect on the environment requires consideration of two broad factors: “context and intensity.” See 40 C.F.R. § 1508.27; 42 U.S.C. § 4332(2)(C). Context refers to the setting in which the proposed action takes place. *Id.* at § 1508.27(a). Intensity means “the severity of the impact.” *Id.* at § 1508.27(b). The regulations describe these factors in full as follows:

(a) Context. This means that the significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of the proposed action. For instance, in the case of a site-specific action, significance would usually depend upon the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant.

40 C.F.R. § 1508.27(a).

(b) Intensity. This refers to the severity of impact. Responsible officials must bear in mind that more than one agency may make decisions about partial aspects of a major action. The following should be considered in evaluating intensity:

- (1) Impacts that may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial.
- (2) The degree to which the proposed action affects public health or safety.
- (3) Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.
- (4) The degree to which the effects on the quality of the human environment are likely to be highly controversial.
- (5) The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.
- (6) The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.
- (7) Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.
- (8) The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources.
- (9) The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.
- (10) Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.

40 C.F.R. § 1508.27(b). These factors are non-exclusive, and the potential presence of even one significant factor is sufficient to require the preparation of an EIS. *Ocean Advocates v. U.S. Army Corps of Eng'rs*, 402 F.3d 846, 865–66 (9th Cir. 2005).

- 60 | As described in detail in these comments, both the context of the proposed action and its intensity are significant. The context of a proposed action to continue operation of the Sandy Hatchery is unique, and the proposed action must be considered in terms of its localized effects on the Sandy River Basin and the remaining population of wild fish that inhabit the basin. Over the past decade, significant improvements have been made to ability of the Sandy River Basin to support a self-sustaining wild fish population. Two dams have been removed, freeing up over 50 miles of additional natural spawning grounds, and nearly \$100 million has been committed to the conservation and restoration of good fish habitat in the basin. There are no dams in the mainstem Columbia River to impede movement of fish from the Sandy River to the ocean and back. The continued operation of a fish hatchery and the continued introduction of hatchery-bred fish that cause harm to wild fish into a system that is otherwise uniquely poised to allow

recovery of a sustainable wild fish population makes the proposed action significant in terms of context. The need to preserve the upper Sandy River Basin (above the former Marmot Dam site) as a “wild fish sanctuary,” and the importance of the wild steelhead, spring Chinook, and Coho in the Sandy River to the survival and recovery of the listed species also demonstrate that the context of the proposed action is significant.

- 61 In addition, several of the intensity factors are triggered by the proposed action. The continued operation of the Sandy Hatchery as described in the HGMPs and continued introduction of hatchery-bred fish into this system will have significant adverse impacts to wild steelhead, spring Chinook, and Coho that spawn in the Sandy River Basin. The Draft EA indicates that the purpose for approving the HGMPs is to provide an “important” recreational activity. Draft EA at 52. Even if on balance NMFS believes the approval of the HGMPs to be beneficial, the “importance” of the recreational fishery and the dramatic adverse effects of the hatchery-bred fish on wild fish show there are significant adverse effects and allegedly significant beneficial effects that must be analyzed in an EIS.
- 62 The Sandy River Basin is full of significant, unique characteristics requiring preparation of an EIS, including many dozen miles of designated Wild and Scenic Rivers, 50 miles of newly-opened spawning habitat, and designated critical habitat for steelhead and spring Chinook. The effects of the proposed action are likely to be highly controversial. A proposal is highly controversial when there is “a substantial dispute [about] the size, nature, or effect of the major Federal action rather than the existence of opposition to a use.” *Blue Mountains*, 161 F.3d at 1212. In this instance, a substantial dispute exists about the effects of continued introduction of hatchery-bred fish on the native wild fish population in the Sandy River Basin and whether those effects can be mitigated. The Draft EA acknowledges this in stating that it is unknown whether proposed mitigation actually will occur or be effective in preventing harm to wild fish and allowing recovery of the wild population in the Sandy River. Draft EA at 15. The fact that so many consequences of the proposed action are unknown, *see e.g.*, Draft EA at 15, 86, 89, 94, 96, 99–100, 102–06, 110, and the continuing decline of wild fish populations in the Sandy River Basin with the likelihood those populations will be extirpated or never recover to self-sustainable levels, illustrates that the proposed action involves possible effects on the human environment that are highly uncertain and involve unique or unknown risks.
- 63 NMFS’s decision whether or not to approve the HGMPs, and whether to impose any additional conditions on that approval to ensure the survival and recovery of wild fish, will be precedent-setting: NMFS has not approved an HGMP for any hatchery program since NMFS promulgated the regulation under ESA Section 4(d), and there has been continued decline of wild fish populations and additional protections for critical habitat added during that period, making the proposed action significant and warranting preparation of an EIS and circulation of a complete and thorough draft EIS for public review. The proposed action is intimately tied to other actions, such as continued operation of dams and hatcheries on the Columbia and Willamette Rivers and their tributaries, which cumulatively have a significant impact on the listed fish that spawn in the Sandy River Basin. The potential destruction of the Sandy River Basin wild fish runs from continued operation of the Sandy Hatchery would cause the destruction of a significant

scientific, cultural and historical resource, as well as adversely affecting species that are listed as threatened under the Endangered Species Act (ESA) and designated critical habitat for two of the species. Continued operation of the Sandy Hatchery threatens violations of the ESA and NEPA. For all these reasons and based on the additional detail provided in these comments, the proposed action is “significant” in its intensity, and NMFS should prepare an EIS.

ii. NMFS has failed to make high quality information available to the public

- 64 Under NEPA, an agency is obligated “to make available to the public high quality information . . . before decisions are made and actions are taken.” *W. Watersheds Project v. Kraayenbrink*, 632 F.3d 472, 492 (9th Cir. 2011). In order to take a “hard look” at environmental effects, the agency must provide an adequate description of the actions contemplated in its alternatives, including the proposed action. 40 C.F.R. § 1502.14(b). NEPA “guarantees that the relevant information will be made available to the larger [public] audience.” *Robertson*, 490 U.S. at 349. . The EA must “provide the public with a basis for evaluating the impact” of the proposed action. *Idaho Sporting Cong. v. Thomas*, 137 F.3d 1146, 1150 (9th Cir. 1998). Any hard data supporting the analysis in the EA or in any eventual Finding of No Significant Impact (FONSI), or in an EIS if NMFS decides to prepare one, must be disclosed in the EA or EIS itself. See *Blue Mountains*, 161 F.3d at 1214.
- 65 The draft EA does not disclose information regarding where and how the proposed mitigation for the harm to wild fish will occur. The underlying HGMPs, for example, only indicate where there are “potential” locations for weirs/fish traps in the upper Sandy basin. e.g. spring Chinook HGMP at 7. Similarly, the draft EA and the HGMPs do not provide clear, accurate and high quality information about where and when proposed releases of smolts will occur so that NMFS can evaluate whether or not such releases will prevent harm to wild fish and allow for the survival and recovery of wild steelhead, spring Chinook, and Coho. In addition, the draft EA and the HGMPs do not provide adequate baseline data disclosing the current conditions of wild fish in the Sandy River basin or the historical (pre-Marmot-dam removal and post-Marmot-dam removal) and current rates at which hatchery-bred spring Chinook, steelhead, and coho are straying into the spawning grounds of what ODFW has indicated must be maintained as a “fish sanctuary.”
- 66 “[W]ithout establishing . . . baseline conditions . . . there is simply no way to determine what effect [an action] will have on the environment, and consequently, no way to comply with NEPA.” *Half Moon Bay Fisherman’s Marketing Ass’n v. Carlucci*, 857 F.2d 505, 510 (9th Cir. 1988). NMFS fails to provide basic information about how the HGMPs will be carried out, and therefore has no basis on which to adequately analyze the effects of the proposed action, and the public is left to guess at what the facts actually are and what the effects of the proposed action actually would be.
- 67 For example, the draft EA states that “the proportion of hatchery spring Chinook salmon in the naturally spawning population exceeds the 10 percent goal” identified in the Recovery Plan. Draft EA at 15. However, NMFS provides no information on *how much* of the current spawning

population of spring Chinook are of hatchery origin. The only information presented, on Table 3, is a hopeless hodge-podge of data from fish counts and spawning surveys without identification of what information comes from what source, making it essentially unintelligible. This Table, and other information presented regarding the proposed action (including the map on page 7 that shows misleading information) violate NMFS's obligation under NEPA that its environmental analyses "shall be written in plain language ... so that decisionmakers and the public can readily understand them." 40 C.F.R. § 1502.8.

68 In fact, ODFW's 2010 spring Chinook spawning surveys found that 76% of the spring Chinook in the upper Sandy River Basin were of hatchery origin, compared to 52% of the fish in 2009, 45% of the fish in 2008, and an average of 11% in the six years prior to the removal of the Marmot Dam. Kirk Schroeder (ODFW) Sandy Basin Spring Chinook Spawning Surveys – 2010. This vast percentage of hatchery-origin fish was uniformly high across all of the tributaries to the Sandy River. *Id.* However, the Draft EA never discloses the extent to which hatchery-bred fish currently dominate the runs in the Sandy River Basin.

69 NMFS presents no information regarding the percentage of steelhead and Coho salmon that are of hatchery origin in the spawning grounds for those species, even though such information is available for spring Chinook and is essential for determining the current baseline of the magnitude by which the proportion of hatchery fish in the Sandy Basin exceeds the 10 percent goal. NMFS must disclose the current stray rates (proportion of hatchery-bred fish) in the spawning areas for steelhead and Coho, or provide an explanation for why this data is not presented or why it could not be acquired. Because of this misleading, inaccurate, or missing information, the Draft EA does not accurately describe the baseline against which the proposed action must be evaluated for whether or not it will achieve the recovery goal or any scientifically-based stray rate that would insure against harm to the wild fish present in the system. In the event that NMFS has or develops additional information or analysis, it must present it in a supplemental NEPA document to allow an opportunity for public review and comment.

iii. The Draft EA provides insufficient information and analysis regarding mitigation and its potential effectiveness

70 If the agency decides not to prepare an EIS, the agency's FONSI must set forth a "convincing statement of reasons" to explain why the action will not have a significant impact on the environment. *Blue Mountains*, 161 F.3d at 1212; *see also* 40 C.F.R. §§ 1501.4(e), 1508.13. NEPA regulations require that the federal agency discuss possible mitigation measures as a means to "mitigate adverse environmental impacts." 40 C.F.R. § 1502.16(h). An adequate discussion of mitigation measures requires the agency to analyze the effectiveness of the proposed mitigation and determine whether they constitute an adequate buffer against the negative impacts that may result from the authorized activity. *S. Fork Band Council of W. Shoshone v. U.S. Dep't of Interior*, 588 F.3d 718, 727 (9th Cir. 2009). A perfunctory description, or mere listing of mitigation measures, without supporting analytical data, is insufficient. *Nat'l Parks & Conservation Ass'n. v. Babbitt*, 241 F.3d 722, 734 (9th Cir. 2001) (quoting *Idaho Sporting Cong.,*

137 F.3d at 1151) (“NPCA”). NMFS has provided no basis in the Draft EA for evaluating or concluding whether mitigation measures proposed actually will occur, or whether they will be effective.

71 For example, the Draft EA states that most information about the effects of proposed mitigation, and whether proposed mitigation actually will occur or be effective in preventing harm to wild fish and allowing recovery of the wild population in the Sandy River is “unknown.” See *e.g.*, Draft EA at 15, 86, 89, 94, 96, 99–100, 102–06, 110. The Draft EA also indicates that mitigation measures are not certain to occur, and nowhere does NMFS evaluate whether or not the proposed mitigation will be successful—yet the discussion of likely beneficial impacts or minimal adverse impacts or decreasing impacts is entirely dependent on those measures being successful. See, *e.g.*, Draft EA at 15, 83, 87. NMFS does not present any data or analysis to allow meaningful evaluation of the likely efficacy of the proposed mitigation measures.

72 What information does NMFS have that ODFW intends to carry out the monitoring of weirs on a daily basis (or more frequently during periods of high migration) as stated throughout the Draft EA. NMFS needs to disclose whether ODFW has the capacity and the resources to carry out the monitoring activities described in the HGMPs and in the Draft EA, and therefore whether they are likely to occur, and whether the monitoring and mitigation will be effective. Indeed, the Draft EA contains no information, quantification, or evaluation of the amount of funding that will be available in the future to carry out the monitoring and evaluation programs that are described in the HGMPs. In particular, the Draft EA does not describe the level of funding that NMFS intends to provide under the Mitchell Act or evaluate the environmental effects of that proposed funding—nor whether whatever funding will be provided by NMFS to ODFW through the Mitchell Act (together with other funding sources, which also are not identified in the Draft EA) will be adequate to guarantee that the Hatchery programs will not harm or prevent the recovery of ESA-listed fish in the Sandy Basin.

73 NMFS also needs to disclose the extent to which the proposed mitigation measures (acclimation, release timing, and use of weirs/traps) has or has not been successful in other places to mitigate the harm that hatchery-bred fish cause to wild fish. As it stands in the Draft EA, there is no explanation of *how* any of the planned mitigation actually will achieve the benefits or reductions of impacts that NMFS describes might occur “if” the mitigation measures are successful.

74 The Draft EA also provides no information analyzing the relative effectiveness of acclimation for reducing stray rates, despite acknowledging that there should be data available regarding this issue. For spring Chinook, for example, there was no acclimation prior to the 2002 releases. Between 2003 and 2005, a portion of the released spring Chinook smolts were acclimated at the Sandy Hatchery, and beginning in 2006 all smolt releases involved acclimation at the Sandy Hatchery.

75 Yet despite the move over the last decade to acclimation of smolts in the lower Sandy basin, the rates of straying have actually *increased* since the removal of the Marmot Dam. See Kirk Schroeder (ODFW) Sandy Basin Spring Chinook Spawning Surveys – 2010. NMFS fails to disclose

any information regarding the effectiveness of acclimation in preventing impacts to wild fish of the same or different species that are present in the Sandy River basin. Draft EA at 17, 71 (unsupported statement that “[t]he proportion [of] hatchery adults spawning in the wild would be expected to be reduced over the long term through their removal at weirs and traps ... and through fisheries that target adults returning to the hatchery and to the Bull Run acclimation site.”), 87 (describing that acclimation is “designed” to increase homing and the “goal” of acclimation without explaining or analyzing whether or not acclimation of the fish in the Sandy River will achieve these goals.

- 76 Similar descriptions of the decrease in genetic impacts “if” actions to reduce the proportion of hatchery-bred stock “are successful” and the prognosis that “[i]t would take a number of years to determine whether acclimation and release of hatchery spring Chinook at the Bull Run acclimation pond would reduce the proportion of hatchery spring Chinook reaching the primary spawning areas in the upper Sandy River Basin,” Draft EA at 87, provide neither an adequate description of the impacts of hatchery fish on wild fish nor any evaluation of the effectiveness of the proposed mitigation in preventing harm to wild fish. In the event that NMFS has or develops additional information or analysis, it must present it in a supplemental NEPA document to allow an opportunity for public review and comment.

iv. NMFS must consider a reasonable range of alternatives

- 77 NEPA requires that an agency “[r]igorously explore and objectively evaluate all reasonable alternatives.” 40 C.F.R. § 1502.14(a). The requirement that alternatives be given full and meaningful consideration applies to EAs as well as to EISs. *Native Ecosystems Council v. U.S. Forest Serv.*, 428 F.3d 1233, 1245–46 (9th Cir. 2005). By considering only the proposed action of approving ODFW’s HGMPs without any additional conditions, or “no action,” NMFS has failed to consider a reasonable range of alternatives in the draft EA.

Because NMFS is the federal agency primarily responsible for the protection of anadromous fish and for ensuring the survival and recovery of fish protected under the Endangered Species Act, NMFS has an obligation to consider in its NEPA document the substantive requirements of the statute which is driving the proposed action—here, the ESA. *Or. Natural Desert Ass’n v. BLM*, 625 F.3d 1092, 1109 (9th Cir. 2010) (“*ONDA v. BLM*”) (“the considerations made relevant by the substantive statute driving the proposed action must be addressed in NEPA analysis”).

- 78 As a result, for example, NEPA must consider and present for public review additional alternatives that would impose mandatory conditions on the operation of the Sandy Hatchery that would insure that the proposed operations of the Sandy Hatchery *would* be successful. There was no public scoping period for the draft EA, and therefore no prior opportunity for the public to evaluate alternatives, and NMFS therefore must circulate any new alternatives considered for public review and comment. Native Fish Society has suggested numerous alternatives above.

v. NMFS must disclose and analyze in the EA or EIS whether approval of the HGMPs will affect the likelihood of survival and recovery of wild fish or adversely modify or destroy designated critical habitat.

- 79 Because NMFS is addressing whether or not to approve the HGMPs under Section 4(d) of the ESA, NMFS must disclose and analyze in its NEPA document the relevant considerations for that approval for public review and comment. *Or. Natural Desert Ass’n*, 625 F.3d at 1109. The Draft EA does not evaluate whether the Proposed Action will contribute to the recovery of the species or result in the destruction or adverse modification of designated critical habitat from the continued release and presence of hatchery-bred fish, nor what level of take is expected to result from the proposed action. Although NMFS may be intending to use its ESA consultation process to evaluate these issues, as a matter of NEPA law and consistent with the “democratic decisionmaking” which NEPA is intended to foster, NMFS must disclose and evaluate the ESA-related questions and whether the proposed action is likely to violate the ESA in the NEPA document itself. NMFS has not done so in the Draft EA.
- 80 The considerations of whether the proposed action will affect the survival and recovery of the species, whether it will or will not result in adverse modification or destruction of critical habitat, and whether ODFW is likely to be able to comply with the terms of the HGMPs and therefore avoid unlawful take of fish are all issues which the ESA makes relevant to the decision whether or not to approve the HGMP and also to whether or not the proposed action has “significant” effects—and therefore are issues which NMFS must disclose and analyze as part of its NEPA document for public review and comment. As noted above, the Draft EA fails to disclose and evaluate properly the 4(d) recovery standard and related criteria and requirements which NMFS must satisfy under the ESA, and therefore fails to disclose this information for public comment as part of the process which NEPA requires.

H. Cumulative Impacts

- 81 The consideration of cumulative effects in the Draft EA inadequate. In a NEPA analysis, an agency must also consider the proposed action along with other actions, “which when viewed with other proposed actions have cumulatively significant impacts.” 40 C.F.R. § 1508.25(a)(2). A cumulative impact is defined as “the impact on the environment which results from the incremental impact of the actions when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions.” 40 C.F.R. § 1508.7. Under NEPA, cumulative impacts include direct as well as indirect effects, “which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable.” 40 C.F.R. § 1508.8(a).
- 82 In analyzing the cumulative effects of a proposed action, an agency must do more than just catalogue “relevant past projects in the area.” *City of Carmel-by-the-Sea*, 123 F.3d at 1160. The EIS “must also include a ‘useful analysis of the cumulative impacts of past, present and future projects.’” *Id.* This means a discussion and an analysis in sufficient detail to be “useful to a

decisionmaker in deciding whether, or how, to alter the program to lessen cumulative impacts.”
Id. The cumulative impacts analysis for a proposed project must examine past, present, and proposed/reasonably foreseeable actions that have cumulatively significant impacts or are similar in timing or geography. 40 C.F.R. §§ 1508.7, 1508.25, 1508.27(b)(7); *Tomac v. Norton*, 433 F.3d 852, 864 (D.C. Cir. 2006).

- 83 Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. 40 C.F.R. § 1508.7. The cumulative effects of the proposed action, combined with the cumulative effects of other proposed actions, must be described in detail and quantified. *Muckleshoot Indian Tribe v. U.S. Forest Serv.*, 177 F.3d 800, 810 (9th Cir. 1999). Broad and general statements, such as those presented in the Draft EA, “devoid of specific, reasoned conclusions” are not sufficient; neither are one-sided cumulative impact statements. *Id.* at 811.
- 84 The Draft EA has not detailed or quantified any other cumulative effects or projects that impact the wild fish in the Sandy River Basin which would be adversely affected by approval of the HGMPs and continued operation of the Sandy Hatchery. For example, the Draft EA does not discuss the impacts of ODFW’s promulgation and distribution of fishing regulations for 2011 that illegally allowed the catch and retention of wild steelhead, or other impacts from fisheries to the wild fish populations affected by the hatchery operation. The cumulative impacts discussion contains essentially *no* information about other impacts to the fish that live in the Sandy River Basin. Consistent with the overall lack of high quality information about the effects of the proposed action, the cumulative effects discussion essentially ignores the natural context in which the proposed continued operation of the Sandy Hatchery would take place, yet another example of NMFS’s failure to take a hard look at the consequences of approving continuation of a program which has resulted in the decline of wild fish in the Sandy River.

VII. Conclusion

85 The Draft EA, and the HGMPs on which it is based, barely scratch the surface of the analysis which NMFS is legally obligated to perform under NEPA, and provide no information or analysis regarding whether the HGMPs (and a NMFS decision to approve them as proposed) would satisfy the obligation to support the recovery of the ESA-listed fish that inhabit the Sandy River Basin and otherwise comply with the substantive requirements of the ESA. The lack of data, lack of scientific studies, lack of analysis, and lack of reasoned explanation for conclusory statements make the Draft EA and HGMPs inadequate to understand, much less evaluate, the likely impacts of the project on the wild fish which depend on the Sandy River and its tributaries for their survival and who, in the continued presence of artificially-bred fish released from the Sandy Hatchery, are likely to be extirpated.

As a result, NMFS in the Draft EA has failed to take a “hard look” at the issue before the agency, and this NEPA analysis can support no decision by NMFS other than to adopt the “no action” alternative and deny approval of the HGMPs. The inadequacy of the Draft EA, and the significance negative effects that the Hatchery programs have on the survival and recovery of ESA-listed species, at a minimum requires the preparation of an EIS and issuance for public comment a proper scoping notice and draft EIS that addresses the deficiencies in the current document. However, the unacceptable impacts of the continued operation of the Sandy River Hatchery on the terms proposed in the HGMPs, the threat of extirpation of the remaining wild fish populations in the Sandy River Basin, and the tremendous potential lost opportunity for wild fish recovery in a habitat that has been expanded and protected through an unprecedented series of beneficial actions are evident even from the limited information currently disclosed. As a result, we urge NMFS to adopt the “No Action” alternative and deny approval for the four HGMPs NMFS is evaluating for the Sandy River Hatchery.

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IX. Appendix A: Sandy River Steelhead Population History

Sandy River winter steelhead history (earliest smolt plants, escapements, run-sizes, & sport catch from Wagner 1967; later smolt plants ODFW fish liberations data; later escapements, run-sizes, & sport catch from Chilcote 2007 & Patterson & Alsbury 2011):

Figure 1. 1955-1960 escapements & run-sizes from Wagner 1967 data:

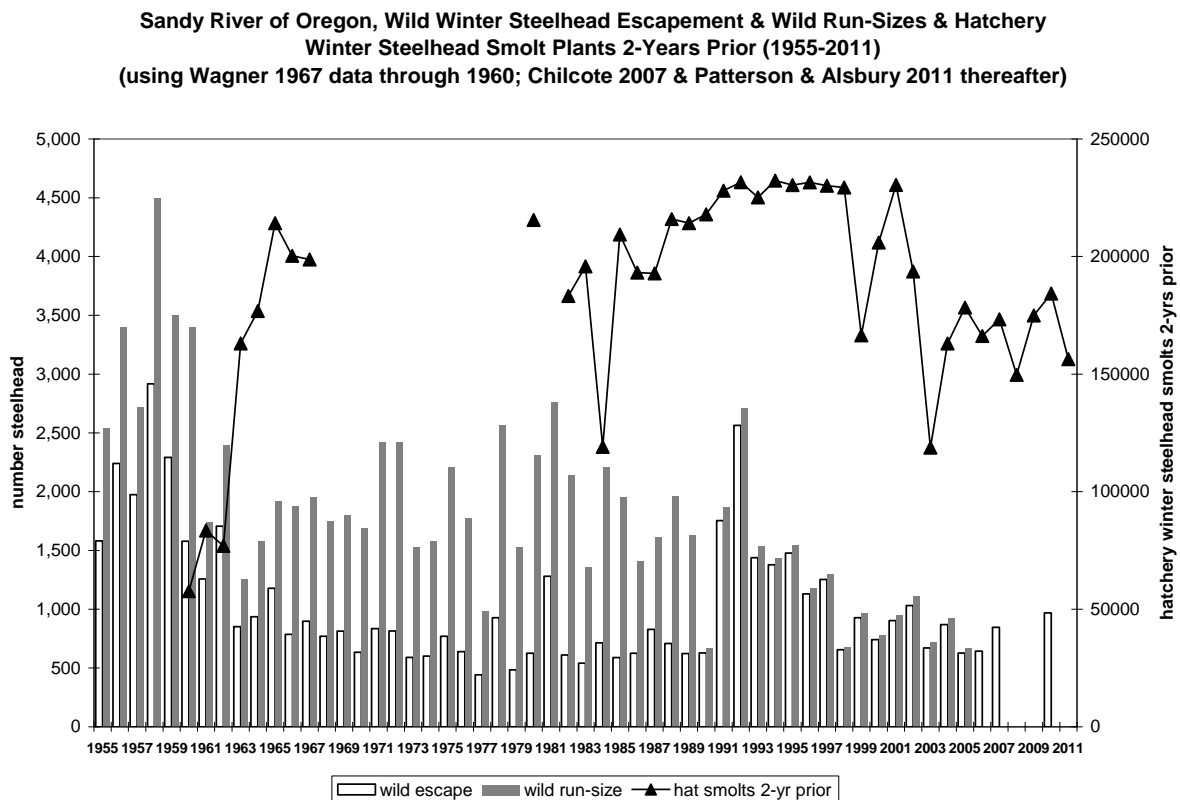


Figure 2. 1955-1966 escapements & run-sizes from Wagner 1967 data:

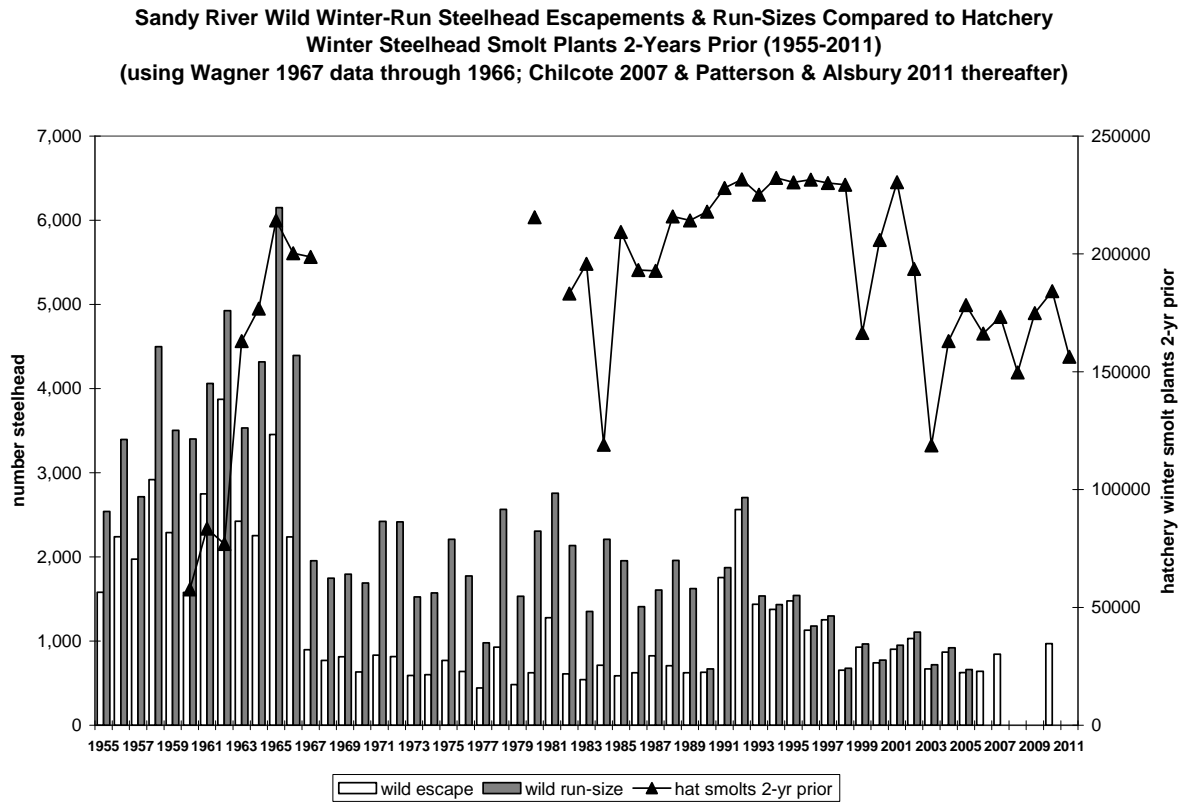


Figure 3. 1955-1960 escapements, run-sizes, & sport catch from Wagner 1967 data:

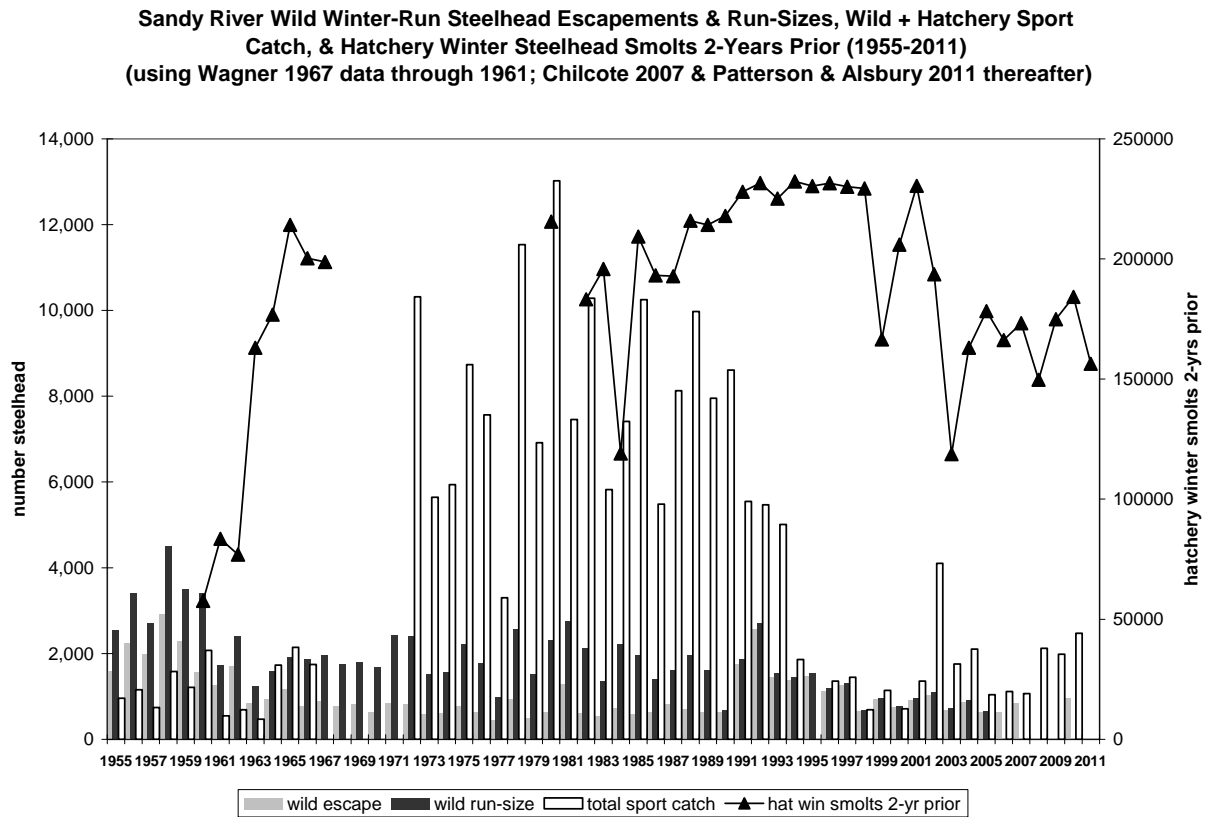
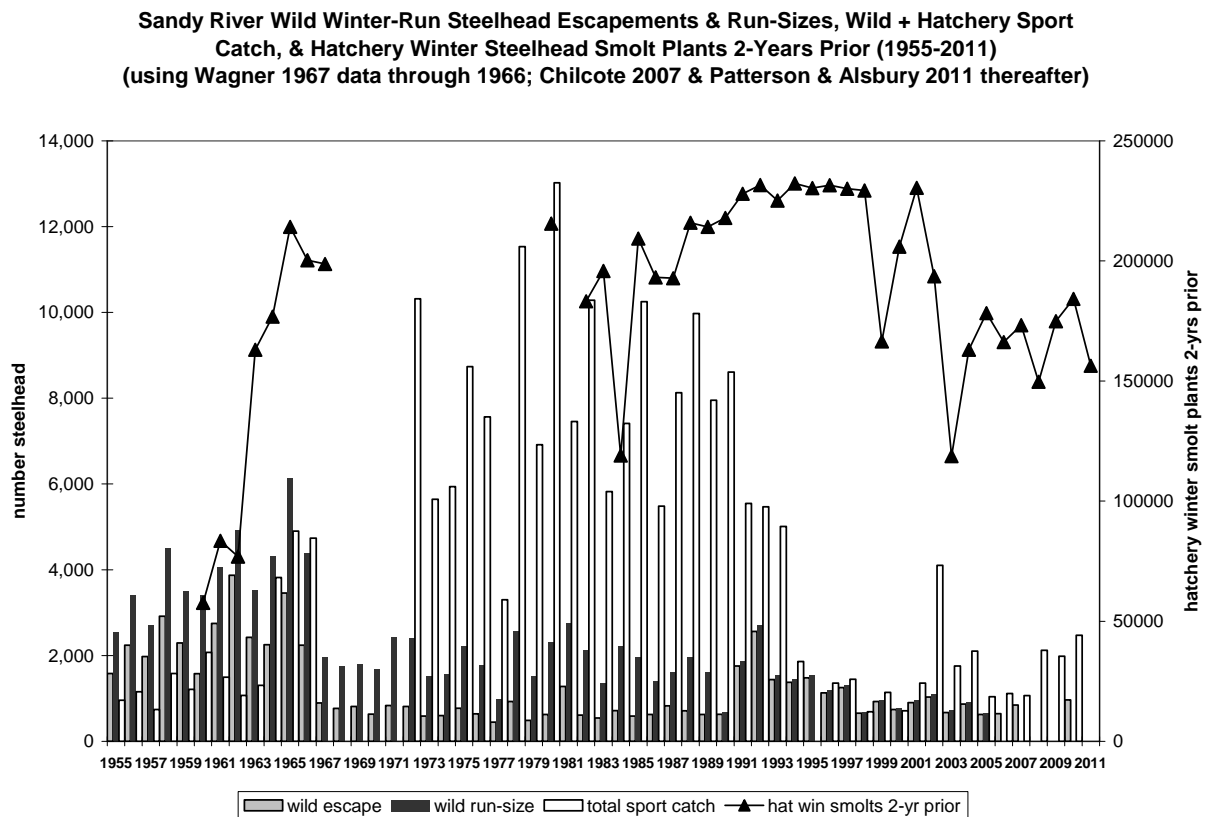


Figure 4. 1955-1966 escapements, run-sizes, & sport catch from Wagner 1967 data:



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TECHNICAL MEMORANDUM

To: Mark Sherwood, River Steward Program Director, Native Fish Society
From: C.W. Huntington, CBI Sr. Aquatic Biologist
Subject: Sandy basin salmon and hatcheries
Date: 09 July 2012

Per request, this memorandum addresses three questions posed in relation to an ongoing review of salmon hatchery programs in the Sandy basin. The memorandum first provides some very brief background material on the basin's salmon populations and hatchery programs, and then provides answers to the questions.

BACKGROUND

Past fish hatchery and harvest programs have combined with cumulative habitat alteration to severely deplete wild salmon populations in the lower Columbia River Basin [CRB] (McElhany et al. 2007; ODFW 2010; Ford 2011). Four of the stronger populations remaining in the lower CRB, which is dominated by at-risk to extirpated salmon runs, reside in the Sandy River basin (McElhany et al. 2007; ODFW 2010; Ford 2011). These stronger populations include Sandy coho, Sandy winter steelhead, Sandy spring Chinook, and Sandy late-fall Chinook. Each of these four populations has been identified as key to salmon recovery in the area and has been emphasized in recovery planning (ODFW 2010). The first three populations just identified are directly affected by hatchery programs in the Sandy basin that are under review by NMFS (2012), and the fourth may be affected by direct or indirect ecological interactions with hatchery fish produced by one or more of these programs (ODFW 2012a, 2012b, 2012c, 2012d). The salmon hatchery programs in the Sandy basin undoubtedly have their greatest effect on local populations of salmon, but may

have secondary effects on other salmon populations with which they share migratory corridors and foraging areas downstream of the Sandy basin.

ANSWERS TO THREE QUESTIONS

My answers to the three questions posed are given below.

Are the hatchery programs under review having unfavorable effects on wild salmon in the Sandy basin?

A recently published evaluation by Chilcote et al. (2011) that included three of the Sandy basin's salmon populations confirms that hatchery programs have unfavorable effects on the productivity of naturally spawning groups of anadromous salmonids. They conducted stock-recruitment analyses across 93 of the Pacific Northwest's salmon populations and found reductions in productivity that increased with the proportion of hatchery fish in the naturally spawning population. Results of their analysis suggest that the productivity of salmon populations was reduced by approximately 10, 19, 64, and 84 percent where the proportion of hatchery-origin spawners was 5, 10, 50, and 90 percent, respectively. These differences were attributed to some uncertain combination of genetic effects on fish fitness in the natural environment and ecological interactions between the wild and hatchery-origin fish. The proportion of hatchery fish in each spawning population was a surrogate for a multitude of potential hatchery-related effects, a few of which might have been more closely related to the magnitude of hatchery smolt releases (which went unexamined).

One could apply the general results of the Chilcote et al. (2011) analysis to the spring Chinook and winter steelhead of the Sandy basin, based on the proportions of hatchery-origin spawners (pHOS) those authors estimated for the populations. Doing so would suggest that the spring Chinook hatchery program in the Sandy may have reduced the productivity of the population of that species spawning naturally above Marmot Dam by 72% and the winter steelhead program may have reduced the productivity of the population spawning above the dam by 71%. These represent simplistic estimates that ignore basin-specific details, the potential for effects from the Sandy basin's hatchery program for non-native summer steelhead, and the potential cumulative direct or indirect ecological effects associated with hatchery salmon from other programs elsewhere in the CRB. However, they are large enough to make clear that past hatchery influences on these populations have been substantial. Recent changes to the salmon hatchery programs in the Sandy basin have

probably begun to reverse these impacts, as suggested by ODFW (2010), though the rates of reversal and extent to which they are fully reversible are uncertain.

Despite the uncertainty just noted, some unfavorable ecological effects of past hatchery practices, particularly those that were and are density-dependent, may be resolved rather quickly by reducing the number of hatchery fish released (Kostow 2008). For example, statistical analyses by Buhle et al. (2009) found that reductions in hatchery programs had rapid positive effects on the productivity of Oregon Coast coho populations. Reversals are likely to be considerably slower for genetically based changes to spawning populations, such as altered run and spawn timing.

What threshold value of pHOS is being used to judge the efficacy of efforts to minimize hatchery program impacts in the Sandy basin?

The answer to this question is unclear. Theoretical work (Ford 2002) and management recommendations by the HSRG (2009) would suggest a minimum management standard of pHOS<5% for those wild salmon populations associated with segregated hatchery programs and that are a primary focus of conservation efforts. As noted by the HSRG (2009), there may even be a significant favorable difference in the long-term genetic consequences for a salmon population when affected by a segregated hatchery program at pHOS=3% versus at pHOS=5%. NMFS (1999) suggested a 5% threshold. However, McElhany et al. (2007), perhaps reflecting the pervasive nature of hatchery programs in the lower CRB, suggested that a pHOS value of less than 10% reflects a relatively low risk situation for a salmon population. This pHOS threshold of <10% has been proposed by ODFW (2010) as the future management standard for the Sandy basin populations being discussed. More recently, NMFS (2012) has referred to both the 5% and 10% pHOS standards but does not clarify which one should actually apply in the Sandy basin. This seems likely to become a significant issue given that, all other things being equal, the more stringent 5% pHOS standard would require that a hatchery program be only half as large as it might be under a standard of 10%.

Whatever the pHOS standard, will meeting it eliminate hatchery effects on ESA listed salmon, particularly the Sandy basin's populations?

Probably not, but it may go a long way toward resolving the reversible effects of each Sandy basin hatchery program so long as pHOS remains closely associated with the magnitude of the program being considered, because smaller hatchery programs tend to have lower pHOS

and smaller programs generally have smaller impacts. If pHOS becomes disconnected from the magnitude of the hatchery program, such as might occur if temporary fish weirs are used and prove effective at screening large numbers of adult hatchery-origin fish from natural spawning areas in the Sandy, this becomes somewhat less certain and would depend on the unknown degree to which the populations were affected by cumulative downstream effects of hatchery programs in the Sandy and elsewhere.

Concerns about hatchery-origin salmonids have long focused on genetic fitness and the potential for interbreeding between hatchery-origin and wild fish to lower the performance of naturally spawning populations. However, there are growing concerns about the potential for density-dependent and other ecological interactions with hatchery fish to diminish the performance of wild salmon populations, both in their natal areas and downstream (Kostow 2008; Kostow 2011). Hatchery salmon could affect wild ones directly through competition in both freshwater (Kostow and Zhou 2006; Tatara and Berejikian 2012) and saline environments (Ruggerone et al. 2012); through direct predation (Naman and Sharpe 2012); indirectly by causing or masking overharvest in mixed-stock fisheries; or indirectly by influencing populations of predators that consume wild salmon. There is also the potential that hatchery fish will transmit or amplify fish diseases that affect the survival of wild salmon, though this has generally been weakly monitored or studied (Kent 2011).

One might think that the ecological effects of hatchery salmon on wild populations would be an important issue in the lower Columbia River, estuary, and plume. Fish produced upstream by a multitude of large hatchery programs must share migratory corridors, a substantially impaired estuary (NMFS 2008; ODFW 2010), and a common near-ocean environment (e.g., Daly et al. 2012). While difficult to study absent large experimental manipulations of CRB hatchery smolt output, such cumulative effects would be consistent with the results of retrospective analyses by Levin and Williams (2002; hatchery steelhead releases vs. emigrating wild Snake River Chinook salmon) and by Nickelson (2003; hatchery coho releases vs. coho productivity in coastal Oregon basins). However, recent analyses of CRB programs conducted in the context of hatchery reform (HSRG 2009) have treated the aggregate ecological effects of hatchery fish downstream of natal production areas as a relatively modest concern and have emphasized the important benefits of limiting natural spawning by the hatchery-origin adults that return to key tributary basins. To the unknown extent that the ecological effects of a multitude of large hatchery releases into the Columbia accumulate and are consequential for wild salmon in migratory corridors, the estuary or

ocean, reforms focused primarily on spawner control and limiting the proportion of hatchery-origin spawners in natal areas may fall short of achieving recovery objectives.

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Native Fish Society et al. Comments
Letter Dated July 9, 2012

The following responses reply to comments submitted by the Native Fish Society. Each response corresponds to margin numbers added to the comment letter.

1. State of Oregon will address comments specific to the HGMPs, and NMFS, in its consideration of comments to the draft EA, will include consideration of potential effects of any changes to the HGMPs made by the Oregon Department of Fish and Wildlife (ODFW) .
2. NMFS will respond to individual comments raised in the Executive Summary in the following responses.
3. ESA determinations are not made in a NEPA analysis, but rather are made in the ESA determination documents. The substance of the comment is noted, however, and will be addressed in the final ESA determination.
4. The substance of the comment is noted; however, determinations about proposed actions and ESA criteria are not made in NEPA analyses, but rather are made in the ESA determination documents.
5. Natural-origin coho salmon have increased abundances exceeding levels seen prior to listing. Impacts to spring Chinook salmon due to naturally spawning hatchery spring Chinook salmon have increased primarily due to the removal of Marmot Dam which severely reduced the ability to control the proportion of hatchery spring Chinook salmon spawning naturally. These impacts are expected to be reduced as hatchery fish are removed at the weirs and adults home back to the Bull Run acclimation ponds.
6. See responses to Comment Numbers 3 and 4.
7. See responses to Comment Numbers 3 and 4. Additionally, Comment “(A)” is addressed in sections 1.10.1 and 1.10.2 of the HGMPs. Regarding Comment “(E),” the HGMPs and the draft EA evaluated the actions that were proposed to minimize and account for hatchery effects. Regarding Comment “(H),” the HGMPs have been updated to better describe the monitoring and evaluation activities that are on-going, which will allow for the evaluation of actions designed to minimize impacts on the natural-origin salmon and steelhead. Regarding Comment “(I),” The HGMPs have been updated to include expanded adaptive management sections.
8. This comment pertains to the ESA process, and is not a relevant inquiry for the draft EA. NMFS does not initiate consultation until they review public comments received on the draft EA and the HGMPs (Section (k)(iv)). As to the substance of the comment, Section (k)(vi) requires NMFS, on a regular basis, to review the effectiveness of the HGMPs in protecting and achieving a level of salmonid productivity commensurate with the conservation of the listed salmonids, and does not apply until after the approval of the HGMPs.

9. This comment pertains to the final ESA determination and not to the NEPA review.
10. This comment pertains to the final ESA determination and not to the NEPA review.
11. The HGMPs have been updated to modify descriptions of the on-going monitoring and evaluation activities that are not directly related to the HGMPs but that will collect data that can be used to evaluate the hatchery programs. Spawning ground surveys in the Sandy River basin have been conducted since it was determined that Marmot Dam would be removed. To ensure consistency between historical escapement data collected at Marmot Dam and future spawning ground based abundance estimates, spawning ground surveys were initiated in 2002. The spawning ground surveys for coho salmon are part of the larger Status of Oregon Stocks of Coho Salmon Project (Lewis et al. 2009; 2010; 2011) that monitors all of the Lower Columbia River coho salmon populations. Similar monitoring is being done for winter steelhead in the Oregon tributaries to the Lower Columbia River. These and the Chinook salmon spawning ground surveys (which are part of the Willamette Basin Chinook salmon monitoring project) are monitoring projects that contribute to the Oregon Plan for Salmon and Watersheds monitoring program. The EA and associated analysis has been modified to reflect the updated HGMPs (Subsection 2.2, Alternative 2 (Proposed Action) Approve the HGMPs under Limit 5 of the 4(d) Rule). The commenter suggests that relying on monitoring already occurring under another program is too uncertain, but presents no information as to why this monitoring would be unlikely to happen, why data gathered under another program and supplied to the hatchery operator would be unreliable, or why suggested duplicative monitoring efforts undertaken directly as a requirement of the HGMPs would result in better information on adult returns than what is already being generated.
12. The requirement for guaranteed mitigation success is an ESA standard that will be addressed in the ESA determination documents. The purpose of an EA is to assess the significance of potential impacts, and not to apply the ESA standard in the analyses.
13. Acknowledging an unknown effect is acceptable practice within a NEPA review, which is a disclosure document. Likewise, disclosing an expected beneficial outcome based on an assumption is also acceptable practice, particularly if available data and trends suggest that the assumption is accurate. It is accurate to state that while it is unknown if the weirs will be successful, if they are successful, there will be a beneficial effect. The ability of the weirs to reduce the proportion of hatchery fish spawning naturally has been successfully used in other areas (WDFW 2012). Weir operations in 2012 will be the first year that the weirs will be operated as proposed in the HGMP and still remains uncertain if they will be able to trap enough hatchery spring Chinook salmon spawning to meet the recovery goal.
14. NEPA does not require the action agency to dismiss from its analysis any mitigation measures included in the Proposed Action because they rely on future funding. Under the circumstances it is reasonable to assume that funding will be secured, but if not, further NEPA review may be required at that time. Further, the Proposed Action analyses include the distribution by NMFS of Mitchell Act funds for the term of the HGMPs (Subsection 1.2, Description of the Proposed Action).

15. The HGMPs have been updated to include expanded adaptive management sections, furthermore, monitoring and evaluation will be included in the concurrence letter as part of the reporting requirements to meet ESA authorization under limit 5 of the 4(d) rule. If reporting shows that the monitoring and evaluation activities are not being implemented or not being effective, further NEPA review may be required, and NMFS can reinstate ESA consultation pursuant to 50 CFR 1402.16.
16. City of Portland will fund, over the life of its FERC license, the monitoring of habitat and fish populations in the Bull Run River as part of the Bull Run Habitat Conservation Plan (Sections 9.3.1 and 9.3.2; City of Portland 2008). Furthermore, the HGMPs have been updated to better describe the monitoring and evaluation activities that are on-going, which will allow for the evaluation of actions designed to minimize impacts on the natural-origin salmon and steelhead.
17. The hatchery fish are adipose fin-clipped to differentiate them from natural-origin adults and each year's release has a unique CWT code. In addition, all of the spring Chinook salmon are otolith marked so those fish not given a CWT can be identified to year of release. The HGMP has been updated to show that all spring Chinook salmon releases will be acclimated at the Bull Run acclimation pond beginning with the 2012 release.
18. The Upper Willamette Biological Opinion analysis looked at the impacts of the operation of the facilities that would include the rearing of fish from a number of different hatchery programs, including those under the Proposed Action (NMFS 2008). The biological opinion did not differentiate impacts due to one program but looked at the impacts on the ESA listed species and their habitat as whole, and found that the operation of the hatchery facilities did not jeopardize listed Upper Willamette spring Chinook salmon or Upper Willamette steelhead. The Willamette Biological Opinion did evaluate the hatchery facilities as they were currently operated and required them to pursue approval of associated programs through the HGMP process only if ODFW was to collect natural-origin adults for broodstock. ODFW decided not to pursue the use of natural origin fish for broodstock and thus, the conclusion that the hatcheries do not jeopardize listed salmon and steelhead remains valid.
19. An assumption is made in NEPA analyses that all legal requirements pertaining to the Proposed Action will be met prior to implementation. The purpose of an EA is to determine whether the Proposed Action would have significant impacts to the human environment. The ESA authorization for the weirs will be included in the ESA determination documents. The impacts of the weirs were evaluated in Subsection 4.1, Potential Hatchery Effects, Subsection 4.3.2.1, Sandy River Spring Chinook Salmon, and Subsection 4.5.2, Alternative 2 (Proposed Action) – Approve the HGMPs under limit 5 of the 4(d) Rule.
20. See responses to Comment Number 11 through Comment Number 19.
21. Comment noted.

22. Water quality is discussed in detail in Subsection 3.2, Water Quality and Water Quantity and Subsection 4.2, Effects on Water Quality and Water Quantity. Water quality components were described as part of the hatchery review process necessary for ODFW to receive a NPDES permit. The HGMPs and ODFW (2012) describe how samples are collected to monitor water quality components during both normal operations and during pond cleaning activities. The hatchery effluent may contain aquaculture drugs and chemicals (formalin), however these are strictly monitored and are prescribed by licensed veterinarians to be effective in the treatment of the fish pathogen while meeting drug label criteria for environmental exposure. The location of the settlement pond is out of the Sandy River flood plain and high enough that it has never been impacted by flooding in Cedar Creek (ODFW 2012). The EA has been modified to include this information.
23. NMFS reached the conclusion that the biological risk categories, as defined by Ford (2011), would not necessarily change under the No-action Alternative even though it may have a beneficial effect, because there are a number of other factors that are limiting the recovery of listed salmon and steelhead in the Sandy River, not just hatchery impacts (Subsection 3.3, Anadromous Fish Listed Under the ESA). A limited beneficial effect addressing one factor does not necessarily warrant changing the biological risk category when other risk factors are not addressed.
24. The HGMP identifies actions that are intended to improve the proportion of hatchery fish on the spawning grounds to levels that will achieve the diversity goal.
25. The “Max Feasible – ALL” scenario includes habitat, harvest, predation, and estuary actions that are not certain to occur and not before NMFS at this time. Also, the Max Feasible – ALL scenario would only increase escapement to 7,871, not 9,000 as indicated in the comment.
26. NMFS does not have a requirement to achieve a 5 percent stray rate. The 5 percent stray rate was developed, as described in Subsection 4.1, Potential Hatchery Effects, to describe a possible measure of genetic introgression and applies to strays (natural-origin and hatchery) from outside the local population. Recent analysis has shown that at the 10 percent hatchery stray rate the proportion of natural-origin by natural-origin crosses would be over 81 percent, and the proportion of natural-origin and hatchery crosses would be 18 percent (Snake River Biological Opinion 2012). NMFS has concerns regarding the Chilcote et al. (2011) reference, which has multiple data errors that raise questions as to the validity of the analysis and the conclusions reached by the authors.
27. NMFS does not agree that the draft EA underestimated the benefits (see Subsection 4.3.1.1, Sandy River Spring Chinook Salmon).
28. The goals of the hatchery programs are to support commercial and recreational harvest while not impeding the recovery of the listed populations. The purpose of the Mitchell Act (see <http://www.nwr.noaa.gov/Salmon-Harvest-Hatcheries/Hatcheries/MA-law.cfm>) is “To provide for the conservation of the fishery resources of the Columbia River, establishment, operation, and maintenance of one or more stations in Oregon, Washington, and Idaho, and for the conduct of necessary investigations, surveys, stream improvements, and stocking

operations for these purposes” . The “stream improvements” were “for the protection of migratory fish from irrigation projects, and for facilitating free migration of fish over obstructions”. Research and monitoring activities alone would not be expected to achieve the goal of supporting the commercial and recreational fisheries. See also response to Comment Number 25.

29. Comment noted.

30. The removal of Marmot Dam did not open new habitat. Other factors have continued to affect the recovery of the Sandy River populations, which are described in Subsection 3.3, Anadromous Fish Listed under the ESA.

31. Prior to 2002, Clackamas Hatchery spring Chinook salmon were released into the Sandy River basin. That Clackamas spring Chinook salmon program was converted to Sandy River Basin stock using natural-origin adults from the Sandy River for broodstock. The conversion was completed by the time Marmot Dam was removed. The pending removal of Marmot Dam and recovery concerns were the reasons that hatchery fish were acclimated and released at the Sandy Hatchery instead being released at and above Marmot Dam. The poor recovery and fluctuation in abundance are not limited to the Sandy River populations, but follow larger trends seen in other Lower Columbia River spring Chinook salmon populations.

32. The changes between the 1998 recovery goal and that included in the Oregon’s Recovery Plan (ODFW 2010) reflect the development of the VSP criteria and population viability analysis used in the development of the delisting goals for these and other listed populations.

33. See response to Comment Number 32.

34. The risk posed by hatchery programs mentioned in the status review applies to all of the spring Chinook populations in the ESU, not just the Sandy River population. Furthermore, the other spring Chinook salmon populations in the ESU are dependent on the hatchery programs because access to historic spawning habitat has been block by dams. The Proposed Action includes measures to reduce the proportion of hatchery spring Chinook salmon spawning naturally, which would address the risk.

35. See Subsection 2.3 Alternatives Considered but Not Analyzed in Detail, for a discussion of BMPs and Subsection 4.1, Potential Hatchery Effects, for BMP analysis information.

36. The coho escapement data have been updated, and the proportion of hatchery coho salmon in 2010 was 16.4 percent, not 24.3 percent (Lewis et al., in prep). This adjustment brings the average proportion of hatchery coho salmon on the spawning grounds for the period from 2007 to 2011 to 8.8 percent. See also response to Comment Number 26.

Steelhead spawning escapement was monitored in 2010 and included habitat below the former Marmot Dam site even though only 15 percent of the primary spawning habitat is downstream from the Marmot Dam site. Monitoring of steelhead spawning escapement will

be included in the reporting requirements as part of the authorization of the proposed hatchery programs.

See response to Comment Number 15.

37. As described above in the response to Comment Number 26, the 5 percent stray rate applies to fish from non-local populations, not from populations such as the hatchery spring Chinook salmon, coho salmon, or winter steelhead programs, which were either derived from natural-origin adults or have incorporated natural-origin adults in the broodstock. Also note that the incorporation of natural-origin adults into the spring Chinook salmon and winter steelhead broodstocks was discontinued in 2011.
38. NMFS considers weirs as BMP for the management of returning adult hatchery salmon and steelhead (NMFS 2011; HSRG 2004; Mobrand et al., 2005; ICF – Jones and Stokes 2009, and Subsection 4.1, Potential Hatchery Effects) The Williams reference noted in the comment should be cited as 1990 not 1989. The impacts considered in Williams (1990) were from the removal of natural-origin adults for broodstock and the release of hatchery adults above the weir. These actions are not part of the Proposed Action. The second reference refers to impacts from low-head dams, which were defined as “weirs” in the paper and thus, would not be comparable to the weirs included in the Proposed Action.
39. Changes in spawning distribution due to the weir were identified as a potential impact (Subsection 4.1, Potential Hatchery Effects, and Subsection 4.3.1.1, Sandy River Spring Chinook Salmon), and will be monitored under the Proposed Action.
40. No other impacts were observed, and the potential for increased pre-spawning mortality will be monitored as part of the spawning ground surveys.
41. The proportion of hatchery spring Chinook spawning naturally observed in 2011 was less than levels that were observed in 2010. The weirs were limited in their operation in 2011 and were not operated as proposed in the HGMP. In 2012, the operation of the weirs will be as proposed in the HGMPs and are expected to provide a better indication of their effectiveness in reducing the proportion of hatchery spring Chinook salmon spawning naturally. In 2011, ODFW collected and removed 420 hatchery adults, substantially reducing the number of hatchery spring Chinook salmon that could have potentially spawned naturally. Based on final estimates for 2011, Schroeder (2012) estimated that removing fin-clipped fish at the weirs reduced the percentage of hatchery spawners from 73 percent to 61 percent for the primary spawning areas upstream of the Marmot Dam site, with decreases of 73 percent to 62 percent in the Salmon River, and 71 percent to 53 percent in the Zigzag River and its tributaries.
42. Passage delay and changes in spawning distribution due to the weirs will be monitored and actions, such as modifying the weir, will be taken to minimize impacts. The EA has been modified for clarification.

43. The hatchery spring Chinook salmon are not expected to impact life history characteristics, as described in Subsection 3.3.1, Sandy River Spring Chinook Salmon. These life history characteristics include such things as ocean distribution, freshwater entry timing, and spawn timing. These would not be expected to change in the natural-origin population unless the hatchery substantially changed these characteristics in the hatchery produced spring Chinook salmon, and if the hatchery spring Chinook salmon continued to compose a majority of the spring Chinook salmon spawning naturally. Because this has been shown to occur, and due to the actions to reduce the proportion of hatchery spring Chinook salmon spawning naturally, the impacts on life history characteristics would not be expected to occur.
44. The discontinued use of incorporating natural-origin adults in the broodstock was due to concerns with impacts from removing natural-origin adults to support harvest programs when the natural-origin populations are below escapement goals. Subsection 2.2.1, Sandy River Spring Chinook Salmon Program, describes the history of the broodstock used for the Sandy spring Chinook salmon program, including the use of Clackamas Hatchery spring Chinook salmon.
45. The research completed by David Teel (as referenced in the comment) demonstrated that even though only natural-origin spring Chinook had been used for broodstock since 2002, there are still genetic markers in the population linking Sandy River spring Chinook salmon to Clackamas Hatchery spring Chinook salmon (Upper Willamette ESU). This does not mean that the program was unsuccessful in integrating with the natural-origin population. Rather, it indicates that the natural-origin spring Chinook salmon in the Sandy River include descendants of Clackamas Hatchery spring Chinook salmon from prior releases.
46. The purpose of the change in acclimation and the operation of the weirs is to reduce the level of hatchery spring Chinook salmon spawning naturally so they cannot interbreed with the natural-origin spring Chinook salmon.
47. In addition, the FERC license also requires the City of Portland to fund the production of hatchery fish to mitigate for impacts to commercial and recreational fisheries from production lost due to the presence of the Bull Run Water Supply.
48. The HGMPs propose to work with the City of Portland to install a weir that can be used to monitor escapement and recovery of spring Chinook salmon in the Bull Run River and can also be used to control the proportion of hatchery spring Chinook salmon using the newly accessible habitat in the Little Sandy River.
49. Comment noted.
50. Natural-origin spring Chinook salmon in the John Day River are not listed.
51. Comment noted.

52. There are problems with the report cited such as underestimating survival and the inclusion of capital costs. Without the inclusion of capital costs, the hatchery fish result in a net economic benefit.
53. The capacity to rear fish at the Sandy Hatchery is limited by flows in Cedar Creek during the summer months, thus limiting the hatchery usage as suggested.
54. The impacts would be the same as those analyzed under the Proposed Alternative. The comment regarding guaranteed funding is addressed under response to Comment Number 14.
55. See response to Comment Number 15.
56. This research has already been done, for example, on the Wind River in Washington and on the upper Clackamas River in Oregon.
57. Comment noted.
58. Comment noted.
59. Comment noted.
60. The removal of Marmot Dam did not free up over 50 miles of additional natural spawning habitat. Habitat above Marmot Dam has always been accessible due to the ladder at Marmot Dam. The only new additional spawning habitat for spring Chinook salmon, coho salmon, and steelhead is in the Little Sandy River.
61. Comment noted.
62. Comment noted.
63. Eight HGMPs for chum salmon programs in Puget Sound were approved March 4, 2002.
64. Comment noted.
65. In regards to where harm could occur, the weir locations are described in Subsection 2.2.1, Sandy River Spring Chinook Salmon Program. The release locations of the hatchery fish are included in the Proposed Action description (Subsection 2.2.1, Sandy River Spring Chinook Salmon Program). The baseline status information is provided in Subsection 3.3, Anadromous Fish Listed Under the ESA, and in more detail in Table 3.
66. The baseline status information is provided in Subsection 3.3, Anadromous Fish Listed Under the ESA and in more detail in Table 3.
67. Comment noted.

68. The presence of hatchery-origin fish on the spawning grounds is discussed in Subsection 3.3.1, Sandy River Spring Chinook Salmon, and Subsection 4.3.2.1, Sandy River Spring Chinook Salmon.
69. This information is summarized in Table 3. The coho data have been updated in the draft EA to include new information on the proportion of hatchery coho spawning naturally. See also response to Comment Number 15.
70. Comment noted.
71. Subsection 4.1, Potential Hatchery Effects, describes actions that can reduce impacts from hatchery operations, and many of these are proposed in the HGMPs. The success of these actions to reduce impacts is not guaranteed and thus, NMFS requires monitoring and evaluation activities to measure if the hatchery actions are reducing impacts. See also response to Comment Number 15.
72. See response to Comment Number 12. The HGMPs have been updated to include expanded descriptions of the monitoring and evaluation activities occurring in the Sandy River basin that are part of larger monitoring and evaluation programs. NMFS does not currently fund operations at the Sandy Hatchery as described in the HGMPs (Subsection 1.4, Action Area).
73. This information and the associated references are provided in Subsection 4.1, Potential Hatchery Effects.
74. Comment noted.
75. See Subsection 4.1, Potential Hatchery Effects (Fish Removal).
76. Comment noted.
77. Comment noted.
78. Additional mandatory conditions on the operation of the hatchery programs that are not already in the HGMPs would not be expected to fall outside the range of impacts already described for the No-action Alternative and the Proposed Action Alternative (see Subsection 2.3, Alternatives Considered but Not Analyzed in Detail).
79. See response to Comment Number 4.
80. See response to Comment Number 4.
81. Comment noted.
82. Comment noted.
83. Comment noted.

84. Factors impacting the listed populations in the Sandy River are described in Subsection 3.3, Anadromous Fish Listed Under the ESA.

85. Comment noted.

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SandyHatcheries nwr <sandyhatcheries.nwr@noaa.gov>

Please reject ODFW's Sandy River HGMPs

1 message

Rick Snyder <schroderfish@yahoo.com>

Mon, Jul 9, 2012 at 1:59 PM

To: SandyHatcheries.nwr@noaa.gov

- 1 I value healthy runs of wild salmon and steelhead and urge NMFS to reject the current Draft Hatchery and Genetic Management Plans (HGMPs) for the Sandy River and require ODFW manage the Sandy based on the best available science for the recovery of its native, wild fish. Over the past decade, dozens of organizations (including the City of Portland, PGE, Western Rivers Conservancy and The Freshwater Trust) have committed over \$100 million toward Sandy River dam removal and habitat restoration for the purpose of recovering wild fish. Continuing to plant over 1 million hatchery fish in the Sandy River constitutes the single greatest threat to the recovery of its wild native fish. The ESA listing of Sandy River salmon and steelhead more than a dozen years ago led to sorting of wild and hatchery fish at the former Marmot Dam site. With the dam gone, and 50 miles of spawning habitat again available to wild fish, it is no longer feasible or desirable to trap and sort fish. Since 2007, ODFW's continued hatchery plantings have jeopardized the tremendous public investment to recover wild fish in the Sandy Basin. The Lower Columbia River Salmon and Steelhead Recovery Plan, which includes the Sandy, sets recovery goals that rewrite abundance levels previously labeled as "likely to become endangered" to be "recovery." The new targets to achieve recovered status are spring Chinook: 1,230, Fall Chinook: 1,031, Late Fall Chinook: 3,561, Winter Steelhead: 1,519, Coho: 5685, Chum: 1,000. These new targets range from 29% (coho) to as low as 4.5% (spring Chinook) of the modeled historical abundance and three times lower than ODFW's targets in the Sandy River when Marmot Dam was removed in 2007. The signatories to the Marmot Dam agreement, including NFS, ODFW and NMFS, agreed to the dam removal on the promise of HATCHERY REFORM and recovery targets that now have been abandoned by the agencies. Wild fish in the Sandy River should not be victims of the death by a thousand cuts. Recovery goals should reflect that wild fish abundance is limited by the current condition of habitat and hatchery operations in the Sandy River Basin, not a new and indefensible claim of wild resilience in the face of conditions previously believed to produce extinction.
- 2 The spring Chinook draft HGMP allows for the continued release of 300,000 hatchery spring Chinook annually. Data collected by the Forest Service and ODFW in 2010 and 2011 very high stray rates, 78% and 61% respectively, greatly exceeding the 10% stray rate threshold set by ODFW in the Recovery Plan. Despite ODFW efforts to acclimate spring Chinook at the hatchery and in the Bull Run and the operation of weirs on the other tributaries, life history characteristics virtually guarantee that stray rates will remain high and wild fish will experience increased pre-spawn mortality due to handling and holding in
- 3 traps. Despite Sandy River spring Chinook being derived from wild broodstock, a recent study on the Hood River indicates that domestication of wild broodstock occurs within a single generation. Sustained high stray rates on spring Chinook, currently at a very high risk for extinction, in the Sandy River constitutes a significant and immediate threat to the recovery of ESA listed
- 4 spring Chinook. NMFS should not allow the continuation of this program under ODFW's wait and see management. The summer steelhead draft HGMP allows for 75,000 South Santiam stock (Skamania origin) to be released annually in the Sandy River. These fish are out-of-basin stock, and summer steelhead are not native to the Sandy River. With the removal of the artificial barrier at Marmot Dam, these fish stray into the upper spawning tributaries and reproduce naturally. The history of the Sandy, Clackamas, Molalla, and Hood Rivers make it clear that the presence of non-native hatchery summer steelhead in spawning areas harm wild winter steelhead populations. Evidence from extensive research by ODFW scientists on the Clackamas revealed that even if hatchery summer steelhead and wild winter steelhead do not spawn together, increased competition for juveniles can negatively affect the wild run. These risks are increased by the current recycling of summer steelhead, causing an additional threat that the non-native stock will stray and survive spawning. The science is clear that, if hatchery and wild steelhead cannot be separated by time and space, plantings of hatchery fish must cease to avoid impeding recovery of wild stocks. The winter steelhead draft HGMP allows for the continued annual release of 160,000 hatchery winter steelhead in the Sandy River. Despite the hatchery winter steelhead's wild origin, recent science indicates that these wild derived fish domesticate as soon as a single generation. Additionally, hatchery-bred fish do not have segregated run timing and thus are more likely to arrive on spawning grounds with wild fish, stray, and compete with wild steelhead for spawning gravel. Progeny of wild/hatchery salmon are less fit for survival, further degrading odds of recovery for the wild population. The current practice of recycling hatchery winter steelhead increases the threat of straying and subsequent harm to the wild winter steelhead population. Due to the high water events in the spring when winter steelhead are present spawning in the upper tributaries, the HGMPs do not explain how weirs or other artificial barriers could be used to prevent hatchery fish from harming wild fish.
- 5 The coho draft HGMP allows for the continued annual release of 500,000 hatchery coho salmon in the Sandy River. Hatchery

6 | coho are extremely voracious and will prey on other juvenile fish, including ESA listed wild steelhead and coho. The high stray
rates (24%) found in tributaries downstream of the Sandy hatchery demonstrate the continued risk of operating large hatchery
programs where hatchery fish stray into spawning tributaries and compete with wild fish. The draft HGMPs do not respond to
the cumulative impacts of the hatchery stocks presented in a scientifically robust fashion. While suggesting that the impacts to
wild fish are minor, the draft EA does not specifically quantify this risk nor does the current monitoring and evaluation program
exist to determine the entirety of risks posed to wild fish in the Sandy River. Most of the impacts of the proposed HGMPs and
the supposed benefits of the mitigation and monitoring programs are "uncertain" or "unknown." Hatchery programs pose the
7 | single greatest impediment to wild fish recovery in the Sandy Basin. In order for the Sandy to fully realize its potential for wild
recovery there must be higher escapement goals and a recovery program that allows existing wild stocks to reach their
productive potential within the available habitat without hatchery or harvest impediments. Because operation of the hatchery
under the HGMPs will continue to threaten the survival and recovery of wild fish in the Sandy River, we request that NMFS not
approve the four HGMPs. Thank you for the opportunity to participate in the public comment process.

Sincerely,
Rick Snyder
LaGrande, or
97850
541-663-6710

Native Fish Society Member Comments

Various Email Dates Received within the Comment Period

NMFS received a total of 194 email submittals with identical comments from members of the Native Fish Society. The following responds to all of those comments. Responses correspond to the margin numbers added to one representative email submittal.

1. Note that the removal of Marmot Dam did not make available 50 miles of spawning habitat because passage had always been provided at Marmot Dam. The new recovery abundance goals listed in the recovery plan (ODFW 2010) were developed based on VSP criteria and the output of population viability analysis modeling; these represent the best science.
2. The proportion of hatchery spring Chinook salmon that are spawning naturally has been reduced due to the removal of hatchery adults at the weirs. The operation of the weirs will be monitored along with spawning escapement and spawning distribution so that the impacts of the weirs on spring Chinook salmon can be evaluated.
3. Comment noted.
4. Hatchery winter steelhead home back well to the hatchery, which is reflected by the low proportion of hatchery winter steelhead spawning naturally (Table 3). Weirs are not proposed to manage the escapement of hatchery steelhead.
5. The EA has been modified to update coho salmon escapement data in Table 3. The proportion of hatchery coho salmon in 2010 was 12.4 percent, not 24.3 percent (Lewis et al., 2009; 2010; 2011). This adjustment brings the average proportion of hatchery coho salmon on the spawning grounds for the post-Marmot Dam period from 2006 to 2010 to 6.32 percent. The HGMPs have been modified to include expanded adaptive management sections; furthermore, monitoring and evaluation will be included in the concurrence letter as part of the reporting requirements to meet ESA authorization under limit 5 of the 4(d) rule. If reporting shows that the monitoring and evaluation activities are not being implemented, or are not being effective, NMFS can reinstate consultation pursuant to 50 CFR 402.16.
6. All of the impacts on listed salmon and steelhead from the operation of the hatchery programs are analyzed in Subsection 4.3.2, Alternative 2 (Proposed Action) – Approve the HGMPs under limit 5 of the 4(d) Rule. As described in Section 5, Cumulative Impacts, the cumulative impacts include those past, present and reasonably foreseeable effects of other actions. Past and present effects on the listed anadromous species from harvest, habitat impacts, and recent hatchery operations are part of the status and limiting factors discussions in Subsection 3.3, Anadromous Fish Listed Under the ESA. Future effects are discussed in the cumulative impacts section, but many of these actions and their effects are not reasonably foreseeable.
7. Comment noted.

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SandyHatcheries nwr <sandyhatcheries.nwr@noaa.gov>

Please manage Sandy River for wild fish

1 message

Nicholas P Vyleta <vyletan@gmail.com>

Tue, Jun 19, 2012 at 1:19 PM

To: SandyHatcheries.nwr@noaa.gov

1 I think that the Sandy River now presents a crucial opportunity to allow populations of wild fish to recover uninhibited by man-made detrimental factors. The dams are removed restoring safe fish passage, and critical spawning habitat is being restored in tributaries. In my opinion, the last major hindrance to wild fish in the Sandy River is the impact of hatchery introduced genetic weakness. As a scientist, I am familiar with the scientific documentation of genetic fitness decline as a result of hatchery fish mixing with wild fish. Especially with the removal of Marmot Dam and the elimination of screening of hatchery fish that happened there, it is essential that hatchery fish numbers be reduced. Otherwise, stray hatchery fish will most certainly attempt to spawn with wild fish, which will decrease the genetic strength of the native fish population.

I strongly urge NMFS and ODFW to manage the Sandy River for wild fish.

Thank you,

Nicholas Vyleta, PhD

Sincerely,
Nicholas P Vyleta
Portland, Oregon
97239

Nicholas P. Vyleta Comment
Email received June 19, 2012

1. Comment noted.



SandyHatcheries nwr <sandyhatcheries.nwr@noaa.gov>

ODFW's Sandy River HGMPs

1 message

Norm Ritchie <normritchie@q.com>
To: SandyHatcheries.nwr@noaa.gov
Cc: Norm Ritchie <normritchie@q.com>

Tue, Jun 26, 2012 at 9:55 AM

1 I support ODFW's HGMPs for the Sandy River. It is a balanced approach to recover listed salmon and steelhead while providing consumptive fisheries in Oregon's largest metropolitan area.

Both wild and hatchery fish are very important to me. I caught my first steelhead on the Sandy River, eventually turning me into a fanatic sport angler and staunch conservationist and conservation volunteer. Aside from catching many Sandy River hatchery fish, my accomplishments include: Appointed to the Salmon Trout Advisory Committee by Governors Kitzhaber and Kulongoski; Second to sign the Marmot Dam decommissioning agreement (after the Governor); Member of the Oregon Hatchery Research Center Advisory Committee; ODFW volunteer angling instructor; Received conservation awards from National Wildlife Federation, Association of Northwest Steelheaders, and Northwest Sportfishing Industry Association; and frequent habitat restoration volunteer.

It is important to note that the upper basin above the original Marmot Dam site represents almost all the quality spawning and rearing habitats. Lower basin tributaries are small, high gradient, and urbanized, making them poor producers. Discussions of stray rates into these areas only serves to confuse the issues. Stray rates into the upper basin of Coho is minimal. Steelhead is within guidelines.

Chinook straying into the upper basin has not yet been reduced to acceptable levels, primarily because ODFW was not able to implement off channel acclimation and other strategies until just last year. Per the HGMP's adaptive management approach, ODFW has aggressively addressed this issue by the use of weirs to extract hatchery fish that stray toward the upper basin wild fish sanctuary. Volunteer anglers (primarily from the Association of Northwest Steelheaders) have supported these actions by participating in manning the weirs and the off channel acclimation. We have only had two full generations of Chinook since the removal of Marmot Dam and ODFW has been adapting the management strategies continuously. It is too soon to suggest any trends.

ODFW 's management of our fish resources has been science based and transparent. Oregon and its citizens deserves the approval of the Sandy River HGMPs.

Thanks you for your consideration.

Norm Ritchie

email: normritchie@q.com

cell: 503-807-7729

2834 SE 166th Ave.

Portland, OR 97236

Norm Ritchie Comment
Email received June 26, 2012

1. Comment noted.

Rich Turner
NMFS Salmon Management Division
1201 NE Lloyd Boulevard, Suite 1100
Portland, OR 97232
By email: SandyHatcheries.nwr@noaa.gov

RE: Comments on the Sandy Hatchery Draft EA and HGMPs

Dear Mr. Turner:

Pacific Rivers Council (PRC) appreciates the opportunity to comment on the Draft Environmental Assessment (EA) prepared by the National Marine Fisheries Service (NMFS) regarding the Sandy Hatchery and the associated Oregon Department of Fish and Wildlife (ODFW) Hatchery and Genetic Management Plans (HGMPs) submitted pursuant to the Endangered Species Act (ESA). The HGMPs describe the proposed operations of four hatchery programs for rearing and releasing salmon and steelhead in the Sandy River subbasin for the purposes of providing recreational and commercial fishing opportunities.

PRC's mission is to protect and restore rivers, their watersheds and the native species that depend on them. Our comments on the EA and HGMPs focus on the implications of the proposed supplemental commercial and recreational hatchery programs on the recovery of ESA-listed wild salmon and steelhead. PRC strongly recommends against recreational and commercial fisheries management actions that interfere with or divert resources from the conservation and recovery of threatened and endangered species.

I. Introduction.

- A | PRC finds the EA inadequate in the accuracy and rigor of its description, analyses, and conclusions. To be frank, we are profoundly disappointed that NMFS would circulate this document, which reflects neither the agency's expertise and understanding of the potential effects of hatcheries on wild stocks, nor its investment in the recovery of listed wild salmon and steelhead. Should NMFS elect to approve these HGMPs in some form, a thorough Environmental Impact Statement that analyzes the significant effects on ESA-listed stocks of salmon and steelhead that result from operation of the Sandy Hatchery must precede such approval.
- B | While activities conducted under an approved HGMP are exempt from the take prohibitions of the 4(d) rule, it is unclear how the proposed activities comply with other requirements of the ESA. The HGMPs "propose" activities that have been

ongoing, and have caused take of listed wild salmon and steelhead for several years. The HGMPs and EA are silent on whether or how NMFS has provided take authorization for these ongoing activities. ODFW and NMFS should cease activities that result in the unauthorized take of listed species. The failure of the Sandy Hatchery programs to obtain take authorization implies an absence of a meaningful commitment to the recovery of listed wild salmon and steelhead, which underlies our principal concerns about approval of the HGMPs.

- C It is unclear how NMFS can ensure that its participation in the Sandy Hatchery programs complies with the ESA's requirement that federal actions not jeopardize the existence of listed species or result in adverse modification of critical habitat for listed species.¹ Operations proposed in the HGMPs will occur within and adversely modify critical habitat for Lower Columbia River Chinook and steelhead through the introduction of migration barriers and dewatering of Cedar Creek. (NMFS has not yet designated critical habitat for Lower Columbia River coho.) Operations proposed may affect the rearing and migration corridor elements of critical habitat for these Evolutionarily Significant Units (ESUs) as well as Upper Willamette River Chinook, Columbia River chum, Upper Columbia River spring-run Chinook, Upper Columbia River steelhead, Snake River steelhead, Middle Columbia River steelhead, and Upper Willamette River steelhead through the release of large numbers of hatchery fish, which no matter how deftly timed, will prey on listed wild salmon and steelhead and compete with them for food and habitat. The HGMPs should not be approved, nor should the Sandy Hatchery continue to be operated, absent conclusion of a Section 7 consultation that demonstrates the hatchery programs will not jeopardize the existence of listed species or adversely modify the critical habitat of listed species.
- D Among our principal concerns with the HGMPs are the effects on wild salmon and steelhead posed by hatchery produced fish that stray into natural spawning habitats. Strays present the combined impacts of habitat competition between wild fish and hatchery fish and reduction of genetic fitness of wild fish. To date, the hatchery has not effectively controlled straying of hatchery fish and the measures proposed in the HGMPs are insufficient to ensure that stray rates will be effectively controlled.

II. Endangered Species Act compliance.

A. The HGMPs threaten the survival and recovery of listed salmon and steelhead.

- 1 Operations proposed in the HGMPs would likely result in take² of listed native salmon and steelhead, including Lower Columbia River Chinook, Lower Columbia River coho, Columbia River chum, and Lower Columbia River steelhead. Take may occur during or as a result of capture, handling, and relocation of fish at collections weirs and the fish trap at Sandy Hatchery, the diversion of water from Cedar Creek, entrainment at the water diversion intake, broodstock collection of spring Chinook and winter steelhead, effluent discharge, outbreeding, introduction or amplification of pathogens, competition and predation by hatchery fish, monitoring, and other

¹ 16 U.S.C. § 1536.

² Under the ESA, take means to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." 16 U.S.C. § 1532(19).

actions proposed under the HGMPs. The 4(d) rule promulgated by NMFS relevant to listed salmon and steelhead prohibits take unless it complies with the provisions of the rule. ODFW intends for the HGMPs to comply with Limit 5 of the 4(d) rule, which exempts activities conducted pursuant to an approved HGMP from the take prohibition.

- 2 PRC urges NMFS not to approve the HGMPs as proposed. We believe that the hatchery programs described in the HGMPs interfere with, delay, and will likely prevent the recovery of listed wild salmon and steelhead in the Sandy River and in the Lower Columbia River. The HGMPs as written pose a number of serious threats to listed wild salmon and steelhead, including direct and indirect take, genetic and ecological effects, and degradation of habitat. The HGMPs expressly intend only to support commercial and recreational catch of artificially propagated fish. Viewed in the best possible light, the HGMPs purport only to minimize the significant risks they pose to listed wild salmon and steelhead. A closer reading reveals the HGMPs reflect a poor understanding of those risks and a weak commitment to resolving them.
- 3 The measures included in the HGMPs to mitigate risks are variously of highly questionable efficacy, non-committal, and difficult to verify. Overall, the HGMPs presume that the mitigation measures will be successful and allow current levels of hatchery production to continue. Both the ESA and fundamental precepts of adaptive management require a far more precautionary approach that does not place the risk that the mitigation will fail solely on the listed species. In short, we urge NMFS to reject the HGMPs because they merely propose to continue the current operations of the Sandy hatchery without demonstrating that the effects to wild salmon and steelhead can or will be mitigated.
- 4 In light of the current condition and prognosis for wild salmon and steelhead in the Lower Columbia River basin, we believe the principal goal of federal fisheries management should be to take positive actions to recover listed wild salmon and steelhead. The HGMPs merely attempt to lessen – but not eliminate – the substantial adverse effects of an unnecessary and counter-productive artificial propagation program. The agency’s emphasis should be on affirmative actions to ameliorate decline and foster recovery of listed stocks, not on finding ways to allow a hatchery program to continue with less damage. Viewed through this lens, the question the agency must ask in approving these HGMPs is whether they can effectively eliminate the risks, not whether they can just reduce them to anything below current levels.
- 5 To reiterate, the HGMPs present substantial risks of take and harm to listed wild salmon and steelhead, including the following:
 - Reduced fitness resulting from inter-breeding with adult hatchery-produced fish that spawn in natural habitat
 - Competition for food and habitat during out-migration
 - Predation of larger hatchery smolts on smaller wild fish
 - Migration barriers presented by collection facilities and de-watering of Cedar Creek
 - Direct injury and mortality from capture and handling during broodstock collection activities
 - Injury and mortality from stranding due to diversion from Cedar Creek
 - Injury and mortality resulting from impingement on non-compliant diversion intake screens

- 6 | The HGMPs' descriptions of their potential to take listed salmon and steelhead are inconsistent and incomplete. While the coho and steelhead HGMPs state that direct take may occur during trapping and handling of fish at traps and broodstock collection facilities, the spring Chinook HGMP – which contemplates similar use of fish traps and handling – erroneously states that no activities will result in direct take.
- 7 | The HGMPs also fail to fully identify the direct and indirect take of listed salmon and steelhead which may result from improperly screened intakes, de-watering of habitat from the hatchery intake, effluent discharge, introduction of pathogens, bycatch from sport and commercial harvest, competition and predation of hatchery fish on wild salmon and steelhead, and passage barriers posed by HGMP actions (such as installation of collection weirs and de-watering of habitat). The HGMP assessments of ecological interactions fail to consider effects that may be manifested in the migration corridor, the estuary, and the ocean.³ The assessments also fail to fully analyze the factors of within-basin freshwater interactions such as residence time, habitat segregation, carrying capacity, residualization rate, habitat complexity, number released, size of hatchery fish and size of wild fish, and piscivory rate.⁴ The HGMPs fail to analyze interspecific interactions. The HGMPs fail to identify the specific pathogens that could be introduced or accelerated by proposed operations and fail to reasonably assess the risk and magnitude of potential effects on the natural populations.
- 8 | The HGMPs fail to account for and minimize the effects on natural populations caused by straying of hatchery fish. The spring Chinook HGMP reports that the estimated proportion of hatchery spring Chinook in the natural spawning areas above the Marmot Dam site exceeded 10% in all years except 2007. In many years the stray rate exceeded 70% and it approached 80% in 2010. The coho HGMP reports stray rates of hatchery coho as high as 24.3%. As discussed below, the HGMPs' performance indicators associated with hatchery strays are incomplete, vague, of uncertain feasibility, and inadequate to demonstrate fulfillment of performance objectives.
- 9 | While the HGMPs variously describe the use of acclimation procedures, collection facilities, and release timing, location, and condition, to help mitigate the adverse impacts caused by high stray rates, the available data shows that the hatchery has been ineffective at preventing hatchery spring Chinook and coho salmon from spawning in natural spawning habitat above and below Sandy Hatchery. The EA's analyses of proposed alternatives demonstrate that ODFW has not yet obtained sufficient information to evaluate risk to natural populations and the HGMPs improperly subordinate concerns about adverse impacts to natural populations to their recreational and commercial goals.
- 10 | In the event of flooding or water system failure at the Sandy Hatchery, smolts would be released directly into Cedar Creek. Such a response would deprive the natural populations the purported protection afforded by the acclimatization of hatchery smolts. It is reasonable to expect that hatchery fish so released would be less likely to return to the hatchery and more likely to return

³ See Fig. 1, Pearsons and Busack, PCD Risk 1: A tool for assessing and reducing ecological risks of hatchery operations in freshwater. *Envtl. Biol. Fish.* 94:45, 65 (2012).

⁴ See Pearsons and Busack, *supra* note 1.

to spawn in natural spawning habitat. The HGMPs must include emergency measures that minimize adverse effects on the natural population.

B. The HGMPs fail to satisfy approval criteria.

- 11 As specified in the 4(d) rule for salmon and steelhead, NMFS may approve an HGMP only if it meets specific criteria.⁵ These HGMPs fail to fully satisfy these criteria because they lack performance indicators that meaningfully support program objectives, propose prohibited use of broodstock collected from listed species, fail to evaluate and minimize effects on natural populations, fail to include adequate monitoring and evaluation of risks posed to wild populations of listed salmon and steelhead, and fail to specify meaningful adaptive management measures.
- 12 An HGMP must have clearly stated goals, performance objectives, and performance indicators. The goals of the HGMPs are clearly directed only at harvest augmentation for sport and commercial fisheries. Other than purportedly minimizing the risk factors posed by Sandy Hatchery operations intended to support their augmentation goal, the HGMPs do not address – and are not intended to address – any factors contributing to the decline of or aid in the recovery of listed salmon and steelhead. In order to be approved, an HGMP must be “designed to provide as many benefits and as few biological risks *as possible* for the listed species.”⁶ The HGMPs identify no benefits to the listed species other than measures attempting to minimize the adverse effects posed by the HGMPs themselves. The measures identified to address the effects of adverse ecological and genetic effects on natural populations are insufficient.
- 13 The spring Chinook and winter steelhead HGMPs contain no objective to benefit listed wild salmon and steelhead. The coho and summer steelhead HGMPs identify “contribut[ion] toward the sustainability of naturally produced native fish populations through the responsible use of hatcheries and hatchery-produced fish” as a primary objective.⁷ This objective is disingenuous: the HGMPs include no activities to benefit wild salmon and steelhead other than to minimize adverse effects from Sandy Hatchery operations. In light of the current condition of listed wild salmon and steelhead in the Lower Columbia River Basin, no HGMP should be approved which does not aim to avoid any and all deleterious effects on listed species as its principal objective.

C. Performance indicators.

- 14 Many of the performance indicators identified in the HGMPs are not sufficiently clear to provide, as required, a basis to assess the HGMPs’ success or failure in meeting performance objectives. Rather, they are vague, lack binding commitments, do not identify assessment methods or standards, are of uncertain feasibility, or are inadequate to demonstrate fulfillment of performance objectives. The measures specified to address straying of hatchery fish illustrate these failures.

⁵ 50 C.F.R. § 223.203(b)(5)(i).

⁶ 50 C.F.R. § 223.203(b)(5)(i)(F) (emphasis added).

⁷ Final HGMP, Sandy River Coho Program, p. 5, Oregon Department of Fish and Wildlife; Final HGMP, Sandy River Summer Steelhead Program, p. 6, Oregon Department of Fish and Wildlife.

1. Spring Chinook HGMP.

- 15 | The spring Chinook HGMP identifies a performance indicator to reduce hatchery Chinook straying in the Upper Sandy River Basin through construction of off-station acclimation ponds, use of collection weirs/traps, acclimation procedures, and other stray reduction measures, but adopts no performance targets that those measures must meet (*e.g.*, percentage of adults in natural spawning grounds comprised of hatchery fish). No measures are proposed to address hatchery fish spawning in natural habitat below downstream of collection sites.
- 16 | Moreover, while the HGMP describes annual spawning surveys that have been and presently are conducted, there is no commitment to continue those monitoring efforts. There is no attempt to analyze how or whether any of the proposed stray reduction measures will actually achieve the de minimus stray rates necessary to comply with the ESA.

2. Winter steelhead HGMP.

- 17 | The winter steelhead HGMP identifies a performance indicator that the number of hatchery winter steelhead spawning in the natural spawning habitat of winter steelhead in the Sandy Basin shall remain below 10%. The HGMP states that spawning surveys will be conducted throughout the basin to “confirm [the] stray rate.”⁸ The HGMP discusses alternative reforms to implement if stray rates exceed 10%, but commits to none. The HGMP reports that spawning surveys in the Upper Sandy Basin were not performed in 2008 and 2009, and reports the percentage of hatchery steelhead at 2.6% in 2010.

3. Summer steelhead HGMP.

- 18 | The summer steelhead HGMP identifies a performance indicator to minimize the number of hatchery summer steelhead adults that stray throughout the basin. The HGMP states that annual ground surveys to assess the number of hatchery fish spawning above the Marmot Dam site will be conducted. Although summer steelhead are not considered indigenous to the Sandy River Basin and the stocks proposed for planting are from out-of-basin, the HGMP does not distinguish summer steelhead from winter steelhead in its consideration of stray rates: the HGMP reports the same data on hatchery escapement figures presented in the winter steelhead HGMP. Again, as in other HGMPs, this HGMP discusses alternative reforms to implement if stray rates “cannot be minimized” (although no escapement threshold is established), but makes no commitments. The HGMP also identifies as an indicator that prior to removal of Marmot Dam, all fish without fin clips were passed above the dam. It is unclear how events that occurred in the past can serve as effective indicators of future program performance.
- 19 | Each of the HGMPs’ performance indicators with respect to hatchery escapement to natural spawning habitat are deeply flawed and reflect an overall insufficient consideration of conservation and recovery of listed salmon and steelhead. At a minimum, performance indicators for hatchery escapement must account for all effects to listed salmon and steelhead (including interspecific interactions), set appropriate risk thresholds, commit to ongoing monitoring of

⁸ Final HGMP, p. 11, Sandy River Winter Steelhead Program, Oregon Department of Fish and Wildlife.

indicators as a program requirement, identify specific contingency actions to implement in the event that thresholds are exceeded, and monitor the implementation and effectiveness of those contingency actions.

4. Coho HGMP.

- 20 Another example of a poorly crafted performance indicator is #1 from the coho HGMP, which combines the issues of the location, timing, and fish condition at smolt release with the installation of fish screens at the hatchery intake. A blended performance indicator is not useful as a criterion of program success because it is unclear how partial compliance will be assessed.
- 21 These types of deficiencies of the performance indicators (lack of completeness, lack of specificity in methods and standards, absence of feasible contingency actions, tenuous connection to performance objectives, combining discrete issues) are not limited to those discussed here, but rather pervade the HGMPs. The HGMPs must include performance indicators that are sufficiently feasible, fully developed, evaluated by specified methods and standards, and specific methods and standards, and sufficiently specific to provide clear criteria for achievement of performance objectives. To satisfy the ESA, performance indicators must be more than conclusory statements of intent, but rather should demonstrate thorough implementation of specific and verifiable actions to ensure that defined and clear performance objectives will be achieved.

D. Conservation needs of listed species.

- 22 The spring Chinook, coho, and winter steelhead programs were developed after 2002 in part from broodstock collection from the Sandy River Basin listed populations. Under 50 C.F.R. § 223.203(b)(5)(i)(C), the primary purpose of broodstock programs must be conservation of the species. Use for recreation and commercial purposes may only be authorized “*after the species’ conservation needs are met and when the proposed use is consistent with survival and recovery of the ESU.*”⁹ There is simply no straight-faced argument that the conservation needs of the source ESUs are met.
- 23 NMFS’ 2011 status review¹⁰ reports no change in risk category for any of the Pacific salmonid ESUs: the Lower Columbia River Chinook salmon ESU remains “likely to become endangered,” the Lower Columbia River coho salmon ESU remains “in danger of extinction,” and the Lower Columbia River steelhead ESU remains “likely to become endangered.” While the status review concludes that the Sandy spring-run Chinook population is *relatively* at lower risk than other populations in the ESU, it concludes that this population remains at moderate risk. The 2011 status review recognizes improvements in risk from hatchery production, but it continues to apportion a significant share of the ongoing risk to the ESUs to hatchery production: “Although recovery plans call for multiple actions to reduce the impact of hatchery fish on the [LCR Chinook] ESU, provisions in the plans have yet to be implemented for all populations and hatchery fish still remain a significant risk factor in this ESU.” The status review describes

⁹ 50 C.F.R. § 223.203(b)(5)(i)(C) (emphasis added).

¹⁰ M.J. Ford (ed.). Status review update for Pacific salmon and steelhead listed under the Endangered Species Act: Pacific Northwest. U.S. Dep’t of Commerce., NOAA Tech. Memo. NMFS-NWFSC-113, 281 pp. (2011).

ongoing hatchery operations as posing genetic ecological risks and masking the performance of wild populations. With respect to Lower Columbia River steelhead, the status review similarly notes that while changes to hatchery practices have been noted in recovery plans, there have been no substantial changes since the last review. Under these circumstances, where hatchery production has been identified as a significant risk to these populations and the conservation needs of the species have not been met, the HGMPs' proposed use of broodstock derived from ESA-listed fish for recreational and commercial purposes is prohibited by 50 C.F.R. § 223.203(b)(5)(i)(C).

E. Monitoring.

- 24 While the HGMPs include or refer to important monitoring efforts, such as marking all hatchery-produced fish, tracking mortality and injury of wild fish during capture and handling at collection facilities, and spawning ground surveys, these measures are insufficient to evaluate all of the risk potentially impairing recovery of listed native salmon and steelhead because they fail to address the full scope of potential adverse risks to the wild populations such as spawning habitat competition downstream of the Sandy Hatchery and maintenance of instream flows and downstream of the hatchery diversion. As described above, the relationship between monitoring efforts, performance indicators, contingency actions, and program evaluation is not clear. Program actions undertaken to address adverse effects on listed salmon and steelhead should be accompanied by commitments to undertake specific implementation and effectiveness monitoring. As the monitoring efforts cited in the HGMPs are conducted by multiple entities, it is unclear if they can be relied on to continue in the future in a manner that is appropriate to evaluate hatchery program risks. Even if the HGMPs are modified to include measurable performance targets and indicators, the HGMPs cannot be approved absent adequate monitoring and evaluation to detect and evaluate risks that impair the recovery of listed salmon and steelhead.
- 25 HGMPs must also include adaptive management measures to be implemented in response to the results of monitoring data. The submitted HGMPs fail to include any such provisions that pertain to hatchery stray rates. Alternatives are discussed, but are explicitly described as being for discussion purposes only.

F. Consistency with proposed Lower Columbia River Recovery Plan.

NMFS recently released a proposed ESA Recovery Plan for Lower Columbia River coho, Chinook, chum, and steelhead.¹¹ The proposed Recovery Plan repeatedly emphasizes the importance of the Sandy River runs of wild salmon and steelhead.¹² In particular, the Sandy River's wild run of spring Chinook is targeted by the proposed Recovery Plan for protection and improvement, as it is "the only Lower Columbia River spring Chinook salmon population with

¹¹ 77 Fed. Reg. 28855 (May 16, 2012).

¹² See, e.g., Proposed ESA Recovery Plan for Lower Columbia River Coho Salmon, Lower Columbia River Chinook Salmon, Columbia River Chum Salmon, and Lower Columbia River Steelhead. National Marine Fisheries Service, Northwest Region (April 2012) [hereinafter Proposed Recovery Plan], Executive Summary, pp. ES-19, ES-21, and ES-23.

appreciable natural production.”¹³ The proposed Recovery Plan aims to protect and improve the Sandy’s wild spring Chinook run “by protecting high-quality, well-functioning spawning and rearing habitat” and “reducing the proportion of hatchery-origin spawners”¹⁴ The proposed Recovery Plan notes that for the Sandy River wild run of spring Chinook, “lessening the effects of hatchery-origin fish on naturally produced fish is expected to provide greater benefit than any other general category of action.”¹⁵

- 26 PRC fully supports protection and improvement of the Sandy’s wild run of spring Chinook and believes the Sandy River could indeed support a recovered run, but continued operation of the Sandy Hatchery, and the startlingly high stray rates of hatchery-origin spawners, stand in the way of this goal. Reduction of the proportion of hatchery-origin spawners is certainly needed to recover the wild run of spring Chinook on the Sandy, but the HGMPs as proposed will not reduce the proportion in a timely manner, and the proposed Recovery Plan appears not to establish a timeframe by which hatchery spring Chinook stray rates will be reduced to 10% in the Sandy. As proposed, the HGMPs are not consistent with NMFS’ proposed Recovery Plan that includes actual protection and improvement of the Sandy’s wild run of spring Chinook, as the purported means to reduce stray rates have no established efficacy. Definitive action is needed to genuinely lessen the effects of hatchery-origin fish on wild run spring Chinook in the Sandy to achieve recovery according to the proposed Plan.

III. National Environmental Policy Act compliance.

- 27 The purposes of the National Environmental Policy Act (NEPA) are to ensure that federal agencies thoroughly consider, or take a “hard look”¹⁶ at the environmental consequences of their actions and disclose those consequences to the public. NEPA requires federal agencies to prepare an environmental impact statement (EIS) when undertaking any “major federal actions significantly affecting the quality of the human environment.”¹⁷ The significance of an effect is determined by the context of the action and the intensity of the effect as determined in part by proximity to wild and scenic rivers and the degree to which the action may adversely affect species listed under the ESA or their critical habitat.¹⁸ “Human environment” includes the natural and physical environment.¹⁹ An agency may prepare an environmental assessment (EA) in order to determine whether preparation of an EIS is required.²⁰ An agency may forego preparing an EIS and issue a finding of no significant impact (FONSI) only when an EA provides sufficient evidence and analysis for determining that the proposed action will not have a significant effect on the environment.²¹ If there are substantial questions about whether there may be a significant adverse effect or if the agency fails to provide a statement of reasons for

¹³ Proposed Recovery Plan, Executive Summary, p. ES-23.

¹⁴ *Id.*, pp. ES-23 to ES-24.

¹⁵ Proposed Recovery Plan, Chapter 7, p. 7-42.

¹⁶ Oregon Natural Res. Council v. Lowe, 109 F.3d 521, 530 (9th Cir. 1997).

¹⁷ 42 U.S.C. § 4332(2)(C).

¹⁸ 40 C.F.R. § 1508.27.

¹⁹ 40 C.F.R. § 1508.14.

²⁰ 40 C.F.R. § 1501.3-1501.4.

²¹ 40 C.F.R. § 1508.13.

concluding there are no significant effects, a determination to forego preparation of an EIS is not reasonable.²²

- 28 | The EA fails to provide sufficient evidence and analysis supporting a reasonable conclusion the project will have no significant effects on the environment because the project description is unclear and incomplete, the scope of the EA is inadequate, and the EA fails to take a hard look at the identified potential significant adverse effects.

A. The EA fails to provide a clear project description or indicate the environmentally preferred alternative.

- 29 | The EA's project description is insufficient to support meaningful analysis of the actions because, on one hand, the EA's description of the project includes details of project activities that are not found in the underlying HGMPs and, on the other, the EA lacks any discussion of NMFS' intended actions in response to the HGMPs. For example, the EA states that the spring Chinook program will be operated with a maximum hatchery escapement target of 10%, but this condition or objective is not included in the spring Chinook HGMP. It is unclear whether or in what fashion this limit is understood by ODFW to be a requirement of the spring Chinook program. Hatchery escapement is a principal pathway of ecological and genetic effects on the listed wild salmon and steelhead populations and whether or not project limitations will be imposed, the extent to which they are binding on the project, and the form of the limitations is essential to evaluating their adequacy to assess the effectiveness of project measures to mitigate the effect.
- 30 | With respect to NMFS' intended action in response to the EA, the EA lacks any indication whether NMFS intends to simply "rubber stamp" the HGMPs, exercise its authority to conditionally approve the HGMPs, or exercise some other regulatory mechanism. When approving HGMPs, NMFS is required to specify implementation and reporting requirements.²³ While this may occur through an ESA § 7 consultation, no such consultation process is identified in the EA. An EA must include "appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources."²⁴ Indeed, agencies must identify the environmentally preferred alternative(s) and, if they are not adopted in the final record of decision, explain why they are or are not choosing to implement that alternative.²⁵ As the Council on Environmental Quality (CEQ) has explained, "[t]hrough the identification of the environmentally preferable alternative, the decision maker is clearly faced with a choice between that alternative and the others, and must consider whether the decision accords with the Congressionally declared policies of the Act."²⁶ Here, the EA neither clearly identifies the environmentally preferred alternative nor presents conclusions

²² *Save the Yaak Committee v. Block*, 840 F.2d 714, 717 (9th Cir. 1988).

²³ 50 C.F.R. § 223.203(b)(5)(i)(J).

²⁴ 42 U.S.C. § 4332(2)(E).

²⁵ *See* 40 C.F.R. §1505.2(b); *see also* 43 Fed. Reg. 55978 (Nov. 29, 1978) (preamble to regulations discussing identification environmentally preferred alternative explaining that "the purpose of NEPA is better environmental decisionmaking. . . The objective of this requirement is to ensure that Federal agencies consider which course of action available to them will most effectively promote the national environmental policies and goals.")

²⁶ *Forty Most Asked Questions Concerning CEQ's NEPA Regulations*, 48 Fed. Reg. 18,026 (Mar. 16, 1981), Question 6a.

regarding whether the proposed activities will result in significant effects to the environment. These deficiencies effectively frustrate the ability of the public to understand the nature of the actions being considered and to evaluate whether the actions will result in significant effects, as discussed above.

B. The scope of the Environmental Assessment is inadequate.

- 31 The scope of the EA is inadequate to fully consider and analyze the effects of the HGMPs because the action area is improperly limited, the effects are not fully considered, and the activities proposed are not fully considered. The spatial extent of the effects analysis undertaken by the EA is limited to “areas immediately adjoining the hatchery facility on Cedar Creek, the acclimation site on the lower Bull Run River, and potential weir locations on the Bull Run, Salmon, and Zigzag Rivers, and in Still Creek” on the grounds that “[i]mpacts of the programs on the human environment outside of this area are not expected.”²⁷
- 32 This approach is improper on several grounds. First, “human environment” must “be interpreted comprehensively to include the natural and physical environment and the relationship of people with that environment.”²⁸ As such, the effects of hatchery fish must be considered at the spatial scales where they manifest significant effects on the “natural and physical environment.” Second, the principal intent of the project is to modify commercial and recreational aspects of the human environment in the Sandy River, the Columbia River, and ocean fisheries by increasing fishery harvest through the release of large numbers of smolts. It is reasonable to expect that releases of numbers of fish sufficient to meaningfully augment fishing opportunities in the ocean may likewise produce ecological and genetic effects across a similar, if not more extensive, spatial extent. A recent publication²⁹ describes the spatial and functional mechanisms of ecological interactions between hatchery and wild fish that can contribute to wild salmon mortality as including competition, predation, indirect predation, disease and nutrients in migration corridors, the estuary, and the ocean. Further the straying of hatchery fish to upstream spawning grounds is obviously, albeit inadequately, documented in the HGMPs.
- 33 The EA improperly excludes consideration of “indiscernible” effects on fisheries outside of the Sandy River on the grounds that Sandy Hatchery production “accounts for only a small percentage of the total Chinook salmon available to the Ocean and mainstem fisheries.”³⁰ An adequate environmental analysis must include consideration of the action in light of connected, cumulative, and similar actions and the incremental impacts of the action when added to the past, present, and reasonably foreseeable future actions which may be individually minor but collectively significant.³¹ As the HGMPs propose to release hatchery fish in the tributaries of the Lower Columbia River basin, the incremental effects of those releases, even if “individually minor” as asserted without support by the HGMPs, must be analyzed in conjunction with the

²⁷ Sandy Hatchery Draft EA, p. 7.

²⁸ 40 C.F.R. § 1508.14.

²⁹ Pearsons and Busack, PCD Risk 1: A tool for assessing and reducing ecological risks of hatchery operations in freshwater. *Envtl. Biol. Fish.* 94:45 65 (2012).

³⁰ Sandy Hatchery Draft EA, p. 13.

³¹ 40 C.F.R. §§ 1508.7 and 1508.25; *Te Moak Tribe of W. Shoshone of Nev. v. U.S. Dep’t of Interior*, 608 F.3d 592, 602 (9th Cir. 2010).

effects of other hatchery releases with which they may combine to produce a cumulatively significant effect. The effects of the Sandy hatchery are either cumulative effects or connected actions, or both (see discussion of cumulative effects below). Regardless of how they are characterized, the effects of other past, present and future related or unrelated human activities must be included in NMFS' analysis.

- 34 The EA also improperly excludes consideration of effects at Cascade, Bonneville, Willamette, Marion Forks Hatcheries on the grounds that those facilities “would continue to be operated and funded in a similar manner without the addition of the production from the proposed program.”³² This misses the point. NMFS's analysis is not examining whether its approval of these HGMPs will cause direct modifications or changes in other hatcheries, or whether or how those other hatcheries will continue to operate. Rather, NMFS must analyze the effects of the proposed HGMP operations in conjunction with these other hatcheries, assuming that these other hatcheries will continue to operate. To support its conclusion that implementation of the Sandy Hatchery HGMPs, as well as operations at these other facilities, would have no significant effect on the environment, the EA cites findings from previously conducted jeopardy analyses. However, the purpose of an ESA jeopardy analysis is to determine whether an action will threaten the continued existence of a species, not to satisfy NEPA questions of whether or not there will be a significant effect on the environment. “No jeopardy” is not synonymous with “no significant effect”. As such, findings from prior no-jeopardy determinations are not adequate substitutes for analysis of significant environmental effects for the purposes of NEPA.

C. The EA fails to take a hard look at specific impacts.

- 35 An EA must include more than general statements about the risk of possible effects.³³ While this EA identifies and discusses some potential significant effects on the environment, for most such effects it fails to take a “hard look” and fails to state NMFS' conclusions as to the magnitude of the potential effects and whether or not project measures are sufficient to reduce the effects to a level of insignificance. Where such conclusions are presented, they are often conclusory statements without the support of quantitative or valid qualitative analysis.

1. Capture, handling, holding, and transport.

- 36 Under “Fish Removal,” the EA discusses the capture, handling, holding, and transport of spring Chinook, coho, and winter steelhead. The EA fails to provide estimates of resulting mortality for spring Chinook and simply restates ODFW's estimates for coho and winter steelhead mortality of two percent of returning spawners. Given the precarious state of the listed salmon and steelhead populations in the Sandy River Basin, the EA's treatment of the potential losses due to take at collection facilities cannot, in the absence of any independent assessment of ODFW's mortality estimates or an analysis of the effects of these losses on the recovery of the wild spawning populations, be considered a “hard look.”

³² Sandy Hatchery Draft EA, p. 16.

³³ *Neighbors of Cuddy Mtn. v. U.S. Forest Serv.*, 137 F.3d 1372, 1379-80 (9th Cir. 1998).

2. Genetic and ecological effects.

- 37 The EA's treatment of the genetic and ecological effects on wild salmon and steelhead populations is also insufficient. As described in the EA, the percentage of hatchery spring Chinook spawning in natural habitat above Sandy Hatchery has been well above the 10% management target adopted by the HGMP, reaching nearly 80% in 2007 and remaining high since. The spring Chinook HGMP identifies measures to address the stray rate, including installation of additional collection weirs and the use of an acclimation pond at the Bull Run powerhouse. However, these additional weirs were installed and operated in 2011 and failed to control the stray rate at the target level (resulting in an estimated stray rate of 61%). The EA provides no basis to conclude the acclimation program will be effective. The EA fails to provide meaningful analyses of the effects of extremely high stray rates on the wild population of spring Chinook or the efficacy of the proposed measures to address it. Rather, it recognizes the efficacy of the proposed measures is uncertain and provides the circular conclusion that if the proposed measures, or other unspecified ones that might be developed at a later time, are effective, the effects may be similar to the no-action alternative.³⁴
- 38 Similar deficiencies in analysis are found with respect to coho salmon. The EA discusses straying of hatchery coho into lower tributaries and reports hatchery stray rates as high as 24.3%, but again, no analysis of the effects of such rates on the wild population and no independent assessment of the efficacy of purported control measures are presented. Similarly, the EA's treatment of the effects of hatchery fish on listed salmon and steelhead through competition and predation simply enumerates the measures identified in the HGMPs and fails to provide either analysis of the potential effects on wild salmon and steelhead populations or any independent assessment of the efficacy of the proposed measures.

3. Competition and predation.

- 39 The EA fails to sufficiently analyze the competitive and predation effects of released hatchery fish on listed wild salmon and steelhead, but instead relies on coarse generalizations about run timing and habitat preferences to support a conclusion that such effects are expected to be low. The EA simply recites the HGMP measures to release smolts at a "size that is optimal" (unstated) for rapid emigration and fails to reflect available research and management findings regarding the effectiveness of releasing smolts at particular sizes as a means of controlling residualization.

³⁴ See Sandy Hatchery Draft EA, pp. 87-88: "Genetic impacts under the proposed Action would be expected to decrease over time if the above actions...are successful.... It would take a number of years to determine whether the acclimation of and release of hatchery spring Chinook salmon at the Bull Run acclimation pond would reduce the proportion of hatchery spring Chinook salmon reaching the primary spawning areas in the Upper Sandy Basin. It is also uncertain whether the installation operation of the weirs under the Proposed Action would be enough to reduce the number of hatchery spring Chinook salmon that could potentially spawn naturally to achieve the less than 10 percent hatchery spawner goal. It would be expected that, if the goal is not achieved under the Proposed Action, or if impacts from the handling of natural-origin spring Chinook salmon causes increased pre-spawning mortality, then additional actions would be needed.... These additional actions may be able to achieve genetic impacts similar to those under the no-action alternative."

- 40 | In a previously released biological opinion, NMFS recognized that acclimatization and volitional release have not been demonstrated to be effective at controlling residualization: “It is unclear at this time whether or not acclimating and volitionally releasing steelhead smolts can substantially reduce the proportion of residualized steelhead in all cases.”³⁵

4. Pathogens.

- 41 | The EA fails to properly address the potential effects of hatchery operations on listed wild salmon and steelhead through the introduction or amplification of diseases. The EA simply relies on the statements in the HGMPs that pathogens will be “intensively managed” without any independent assessment of whether such assurances have a basis. The EA fails to even identify the particular disease agents of management concern. It lacks any assessment of the sufficiency of proposed measures and includes no discussion of the potential adverse effects in context or intensity.

5. Water quality.

- 42 | The EA fails to assess the effects on water quality that may result from effluent discharge. It includes no discussion of potential effects, acceptable thresholds, or analysis of the sufficiency of the HGMP program measures (settling ponds). The effects of water quality components, including temperature, turbidity, and dissolved oxygen on salmonids are well-known, but the EA identifies none of these potential adverse effects. Hatchery effluent may include other materials not considered in the EA, such as aquaculture drugs and chemicals, toxic materials, and non-conventional materials that have adverse effects on water quality.
- 43 | The EA also does not consider water quality impacts that may occur as a result of releasing hatchery-produced fish. The efficacy of settling ponds for the capture of suspended materials from flowing water depends on a number of factors including pond outlet design, pond dimensions, and maintenance, none of which are described, much less analyzed, in the EA. Potential effluent discharges from the Bull Run acclimation ponds are not discussed. What analysis the EA does provide relies largely on reference to NPDES permits. For most pollutants, the EA fails to include critical information such as an enumeration of the discharged materials and water quality components, the water quality standards and conditions imposed by the permits, and the frequency of exceedances.

6. Water diversions.

- 44 | The proposed operations of the water supply intake at Sandy Hatchery will divert substantial volumes of water from Cedar Creek, resulting in the complete de-watering of the channel in fall when flows subside. The EA blithely concludes, without supporting information, that water diversion that occurs prior to September has no adverse effects on listed salmonids and steelhead. The EA barely acknowledges that diversions that de-water Cedar Creek present a passage barrier to spawning wild salmon and steelhead, and completely fails to analyze the local

³⁵ Endangered Species Act Section 7 Consultation Biological Opinion and Magnuson-Stevens Act Essential Fish Habitat Consultation, USFWS Artificial Propagation Programs in the Lower Columbia and Middle Columbia River. National Marine Fisheries Service (Nov. 27, 2007).

effects or effects on listed wild populations. Reductions in surface flow due to water diversion may have extensive effects on aquatic habitats and result in mortality or reduced productivity of wild salmon and steelhead, including passage barriers, stranding, reduced water quality, increased competition, increased predation, and reduce invertebrate production. The EA's analysis of measures to minimize impacts is limited to reference to compliance with water rights and fails to establish significance thresholds, determine whether the project will exceed those thresholds, or demonstrate the project will not adversely affect wild salmon and steelhead.

D. The EA fails to adequately consider cumulative impacts that have resulted and will continue to result from operation of the Sandy Hatchery.

45 The EA brushes off cumulative impacts that would result from continued operations of the Sandy Hatchery and other foreseeable actions as “minor, if at all measurable.”³⁶ NMFS contends that because “[o]ther Federal, tribal, and state actions are expected to occur within the action area” and “the migration corridor between the Sandy River and the Pacific Ocean that would affect the fish populations considered under the Proposed Action,” the agency has no duty to analyze the additional, cumulative effects that would result from the Sandy Hatchery. By failing to thoroughly assess the effects of the Sandy Hatchery’s operation on the environment wholly fails to satisfy NMFS’ duty under NEPA.³⁷ Merely because other actions will continue to occur does not mean operation of the Sandy Hatchery has only minor effects on the environment, particularly listed wild salmon and steelhead.

46 NMFS’ statement that “hatchery programs and fishing in the action area would be substantially diminished” only “[i]f the cumulative effects of salmon management efforts fail to provide for recovery of listed species” exemplifies PRC’s concerns about continued operation of the Sandy Hatchery and the inadequate cumulative effects analysis contained in the EA.³⁸ This statement indicates the agency’s awareness that cumulative effects may indeed prove to be significant and impede listed species’ recovery, but fails to take pre-emptive action to curb such impacts or even provide a thorough assessment of those cumulative impacts to determine their significance. Adaptive management must be much more thoroughly discussed if NMFS is to rely on such measures to counter cumulative effects that prove to be significant and impede recovery.

E. The EA fails to evaluate a reasonable range of alternatives and mitigation.

The evaluation of all reasonable alternatives is the “heart” of any NEPA analysis.³⁹ The discussion of alternatives is intended to provide a “clear basis for choice among options by the decisionmaker and the public.”⁴⁰

Consideration of a broad range of alternatives is necessary because it forces agencies to conduct an objective assessment of impacts by comparing the impacts of different alternatives.⁴¹ It also

³⁶ Sandy Hatchery Draft EA, p. 115.

³⁷ 40 C.F.R. § 1508.25(a)(2).

³⁸ Sandy Hatchery Draft EA, p. 116.

³⁹ 40 C.F.R. § 1502.14.

⁴⁰ *Id.*; Idaho Sporting Congress v. Alexander, 222 F.3d 562, 567 (9th Cir. 2000).

⁴¹ 40 C.F.R. § 1502.14.

forces federal agencies to consider options other than the preferred alternative, which may cause them to adapt or reject a previously preferred alternative if its environmental impacts are too severe.⁴²

An agency cannot reject an alternative because it is “not within the jurisdiction of the lead agency” or outside the bounds of congressional authorization.⁴³ The CEQ has explained that:

An alternative that is outside the legal jurisdiction of the lead agency must still be analyzed in the EIS if it is reasonable. A potential conflict with local or federal law does not necessarily render an alternative unreasonable, although such conflicts must be considered. Alternatives that are outside the scope of what Congress has approved or funded must still be evaluated in the EIS if they are reasonable, because the EIS may serve as the basis for modifying the Congressional approval or funding in light of NEPA’s goals and policies.⁴⁴

- 47 | The EA, however, considers only two alternatives: implementation of the HGMPs and the no action alternative. This fails to provide a meaningful analysis because it is unclear what the no-action alternative really is. The EA states that the no-action alternative is that the HGMPs are not approved and that NMFS does not provide a concurrence letter. The EA only assumes that this would result in the termination of the hatchery programs and the removal of the weir and intake facilities and speculates with respect to other possible outcomes. Because the nature and scope of potential impacts that would or could occur under the no-action alternative is not known, the alternative does not provide for a meaningful comparison with the proposed project and suggests that NMFS has formed the intent to approve the HGMPs prior to undertaking a meaningful evaluation.
- 48 | The EA also fails to consider additional meaningful alternatives to approving the HGMPs as proposed, such as imposing conditions on approval or approving only some of the proposed activities, which would provide a higher level of assurance that adverse effects will be avoided or minimized to a level of insignificance.
- 49 | The agency’s failure to consider alternatives hampers its ability to examine the additional mitigation measures required to ensure that operation of the Sandy Hatchery does not cause significant environmental effects. Pursuant to 40 C.F.R. § 1508.20, agencies must consider the following mitigation components as provided for by measures that are verifiable and certain to occur:
- (a) Avoiding the impact altogether by not taking a certain action or parts of an action.
 - (b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation.

⁴² 40 C.F.R. § 1502.14(a) (emphasis added); *see also* Forty Most Asked Questions Concerning CEQ’s NEPA Regulations, 48 Fed. Reg. 18,026 (Mar. 16, 1981)

⁴³ 40 C.F.R. § 1502.14(c).

⁴⁴ Forty Most Asked Questions Concerning CEQ’s NEPA Regulations, *supra* note 26, Question 2b.

- (c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
- (d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
- (e) Compensating for the impact by replacing or providing substitute resources or environments.

50 | Prior to approval of any of the HGMPs, NMFS should conduct a thorough analysis of additional alternative actions, including a defined no-project alternative, conditional approval, and partial approval. The no-action alternative should include a scenario wherein proposed hatchery operations are not conducted and ODFW undertakes effective measures to trap and remove returning hatchery adults while minimizing harm to wild salmon and steelhead, as well as a scenario where ODFW continues to operate the hatcheries absent approval. A conditional approval alternative should include additional measures to address project impacts, such as requirements to minimize or avoid straying adults, properly screen the diversion intake, maintain specific instream flows in Cedar Creek, sufficient monitoring and reporting requirements, and other measures necessary to ensure avoidance or mitigation of project effects. NMFS should also consider alternatives in which not all of the HGMPs are approved.

IV. Conclusion.

51 | Overall, the Sandy Hatchery Draft EA fails to demonstrate a reasonably thorough consideration of the many adverse effects posed by the HGMPs. That such a document was produced by NMFS, the federal agency charged with recovery of listed salmon and steelhead, is a disappointment. Under NEPA, NMFS's job is to rigorously take an independent hard look at the measures in the HGMPs and to evaluate alternatives to those proposals that would lessen the environmental impacts. This EA fails to do that. Because there continue to be substantial questions about the nature and magnitude of significant effects posed by the HGMPs, any approval of them must be preceded by a full environmental impact statement. Further, a formal Section 7 ESA consultation that fully and effectively evaluates the effects of the Sandy Hatchery operations on listed wild runs of salmon and steelhead and results in a biological opinion should be undertaken to inform a full environmental impact statement.

We appreciate the opportunity to comment on the Draft EA. Again, we urge NMFS to withhold approval of the HGMPs. If you have any questions about our comments, please contact Greg Haller, Conservation Director for Pacific Rivers Council, by telephone at (503) 228-3555, ext. 205, or by email at greg@pacificrivers.org. PRC looks forward to future opportunities to support the recovery of listed wild salmon and steelhead.

Sincerely,

A handwritten signature in black ink that reads "JOHN KOBER". The signature is written in a cursive style with a large, stylized "J" and "K".

John Kober
Executive Director
Pacific Rivers Council
317 SW Alder Street, Suite 900
Portland, OR 97204
(503) 228-3555, ext. 201
john@pacificrivers.org

Pacific Rivers Council Comments
Letter Not Dated – Received During Comment Period 2012

The following responses reply to comments submitted by the Pacific Rivers Council. Each response corresponds to margin numbers added to the comment letter.

- A. Comment noted.
- B. Comment noted.
- C. Comment noted.
- D. Comment noted.
- 1. Comment noted.
- 2. Comment noted.
- 3. Comment noted.
- 4. Comment noted.
- 5. Comment noted.
- 6. The spring Chinook salmon HGMP has been modified to make the language consistent.
- 7. The HGMPs did not describe specifically the direct and indirect take for all of the factors described in the comment, however, actions proposed in the HGMPs describe how impacts from these factors will be addressed to the point where the impacts from these factors would not substantially affect the natural-origin populations. For example, the timing of the release, the size of the fish at release, and the release of acclimated actively migrating hatchery juveniles are expected to reduce competition and predation on natural-origin juveniles.
- 8. The HGMPs do describe how they have and would reduce impacts from hatchery adults straying onto the spawning grounds. For example, the spring Chinook salmon HGMP describes how the weirs will be used to reduce the proportion of hatchery spring Chinook salmon on the spawning grounds. Data shows that the proportion of hatchery spring Chinook salmon on the spawning grounds has been highly variable, and includes three years when the proportion was less than 10 percent from 2002 to 2007 (Alsburry 2012). The coho escapement data has been updated and the proportion of hatchery coho salmon in 2010 was 16.4 percent not 24.3 percent (Lewis et al., in prep). This adjustment brings the average proportion of hatchery coho salmon on the spawning grounds from 2007 to 2011 to 8.8 percent.
- 9. Comment noted.

August 27, 2012

10. The HGMPs do identify procedures that would be implemented if there is an emergency (HGMPs Subsection 5.7, Describe operational difficulties or disasters that led to significant fish mortality). It should be noted that due to the location of the facility and the water sources for the Sandy Hatchery, emergency releases have not occurred.
11. The HGMPs do include performance indicators needed to evaluate program performance (HGMPs Subsection 1.10, List of “Performance Indicators”, designated by “benefits” and “risks”). The use of listed species for broodstock is not prohibited under limit 5 of the 4(d) rule as long as the program is for conservation purposes. The proposed hatchery programs do not propose to take natural-origin fish for broodstock, but the HGMPs do propose that natural-origin broodstock may be used in the future after the listed populations have met recovery abundance goals. If ODFW proposes to collect and use natural-origin adults for broodstock they will be required to consult with NMFS before they can proceed. Language has been added to the HGMPs that describes the on-going monitoring and evaluation activities that would measure program performance indicators, and includes adaptive management measures.
12. The quoted text in the comment is not cited, but relates to coordination of fisheries and hatchery management such that the “management must be designed to provide as many benefits and as few biological risks as possible for the listed species. For programs whose purpose is to sustain fisheries, HGMPs must not compromise the ability of FMEPs or other management plans to conserve listed species” (50 C.F.R. 223.203(b)(5)(F)). The benefits that are being referred to in the quote above are benefits to fisheries. Furthermore, the proposed hatchery programs are designed to be consistent with the FMEP and to not compromise the goals and actions in the Oregon’s Lower Columbia River Conservation and Recovery Plan (Recovery Plan)(ODFW 2010).
13. The programs as described in the HGMPs are not design to specifically provided benefits to listed species; they are designed to support fisheries while, at the same time, not compromise the recovery of the listed species.
14. Language has been added to the HGMPs that describes on-going monitoring and evaluation activities that would measure program performance indicators.
15. The HGMP does identify the goal of maintaining the basin upstream from the former Marmot Dam site as wild fish sanctuary, and Indicator 5(b) (HGMP Subsection 1.10, List of “Performance Indicators”, designated by “benefits” and “risks”) states that “the number of hatchery spring Chinook in the natural spawning population in primary production areas of the upper basin shall presumably remain below 10%.” Monitoring and evaluation will determine if the proposed operation of the weirs is successful in achieving the less than 10 percent goal for the entire population, not just that part that spawns above the weirs.

Adaptive management language in the HGMP has been modified to describe the actions that may be taken if the less than 10 percent goal cannot be achieved.

16. Monitoring and evaluation will be included in the concurrence letter as part of the reporting requirements to meet ESA authorization under limit 5 of the 4(d) rule. If reporting requirements are not achieved, NMFS can reinstate consultation pursuant to 50 CFR 402.16.
17. Comment noted.
18. Comment noted.
19. See response to Comment Number 16. The language regarding adaptive management in the HGMPs has been modified.
20. Comment noted.
21. Comment noted.
22. Natural coho salmon have not been used for broodstock. See response to Comment Number 11.
23. Hatcheries are a risk factor for many of the LCR Chinook salmon ESU populations because the populations are either dependent on the hatcheries to maintain the population (e.g., spring Chinook salmon populations in the Cowlitz and Lewis basins where historic habitat is inaccessible) or hatchery adults make up a large proportion of the naturally spawning population. Actions in the spring Chinook salmon HGMP are designed to address the hatchery risk to the Sandy River spring Chinook population derived from naturally spawning hatchery spring Chinook salmon. The status review makes the general statement that hatchery risks continue to affect the other LCR salmon ESUs and steelhead DPS; however, these risks vary by species and by population, and actions within the Sandy coho salmon and steelhead HGMPs are expected to reduce these risks. The proposed hatchery programs do not propose to take natural-origin fish for broodstock, but the HGMPs do propose that natural-origin broodstock may be used in the future after the listed populations have met recovery abundance goals. If ODFW proposes to collect and use natural-origin adults for broodstock it will be required to consult with NMFS before proceeding.
24. See response to Comment Number 16.
25. See response to Comment Number 16.
26. Comment noted.
27. Comment noted.
28. Comment noted.
29. The HGMP does identify a target of less than 10 percent hatchery spring Chinook salmon on the spawning grounds under Indicator 5(b) (HGMP Subsection 1.10, List of "Performance Indicators", designated by "benefits" and "risks"). Furthermore, the commenter

acknowledges that this is the management target adopted by the HGMP (see Comment Number 37). The HGMP also states that it would be consistent with Recovery Plan (ODFW 2010), which also includes the less than 10 percent hatchery fish on the spawning grounds goal.

30. Identification of an environmentally preferred alternative is not required for an EA review. The commenter references Question 6a of the 40 Most Asked Questions Concerning NEPA Regulations (48 Fed. Reg. 18,026, March 16, 1981) to support its contention that environmentally preferred alternative is required for this EA. Note that Question 6a of the 40 Most Asked Questions clarifies and specifies the following: “Section 1505.2(b) requires that, *in cases where an EIS has been prepared*, the Record of Decision (ROD) must identify all alternatives that were considered, specifying the alternative or alternatives which were considered to be environmentally preferable.”
31. Comment noted.
32. Comment noted.
33. The draft EA did consider the potential for impacts from the Proposed Action outside the action area (Subsection 1.4, Potential Hatchery Effects). NMFS considered whether the mainstem Columbia River, the estuary, and the ocean should be included in the action area, but the effects analysis was unable to detect or measure effects of the Proposed Action beyond the action area, based on best available scientific information. Available knowledge and research abilities are insufficient to discern the role and contribution of the Proposed Action to density dependent interactions affecting salmon and steelhead growth and survival in the mainstem Columbia River, the Columbia River estuary, and in the Pacific Ocean. From the scientific literature, the general conclusion is that the influence of density dependent interactions on growth and survival is likely small compared with the effects of large scale and regional environmental conditions and while there is evidence that hatchery production, on a scale many times larger than the proposed action, can impact salmon survival at sea, the degree of impact or level of influence is not yet understood or predictable.
34. The operation of the hatchery facilities where fish from the proposed programs are reared for a period of time would not change due to the implementation of the proposed programs. Impacts from the operation of these hatcheries would not change from the baseline and thus no effect on the environment from the proposed hatchery programs could be determined.
35. Comment noted.
36. The EA details sources of potential mortality of spring Chinook salmon from fish removal at the weirs and the level of estimated mortality (Subsection 2.2.1, Sandy River Spring Chinook Salmon Program). With regards to coho and winter steelhead, the assumed 2 percent mortality is a conservative estimate that only applies to those natural-origin adults that are handled at the hatchery and thus represent only a small fraction of the total natural-origin populations in the Sandy River Basin. See also response to Comment Number 16.

37. The weirs were limited in their operation in 2011 and were not operated as proposed in the HGMP. In 2012, the operation of the weirs will be as proposed in the HGMPs and is expected to provide a better indication of their effectiveness in reducing the proportion of hatchery spring Chinook salmon spawning naturally. The acclimation of hatchery fish prior to release has been proven to increase homing back to the release location. This is illustrated by the very low numbers of hatchery coho salmon observed at Marmot Dam prior to its removal. The proportion of hatchery spring Chinook salmon will be monitored as proposed in the HGMP to determine if the acclimation at release at the Bull Run acclimation pond will reduce the tendency for the hatchery spring Chinook salmon to stray into the upper basin.
38. Updated escapement data for Sandy River coho salmon shows that the proportion of hatchery coho salmon spawning naturally has been highly variable but has averaged below the 10 percent (see response to Comment Number 8). The EA discusses the potential impacts from the ecological interactions between hatchery and natural-origin fish (Subsection 4.1, Potential Hatchery Effects). Included in this discussion are descriptions and associated references for actions that have been shown to reduce these potential impacts.
39. See response to Comment Number 38.
40. The quote that is cited in this comment is part of a larger discussion of research on residualism in steelhead and the strategies that can be implemented to minimize the release of steelhead that will residualize. The biological opinion quoted goes on to say that the number of residualized steelhead can be reduced by acclimation, volitional release strategies, size at releases, and active pond management (NMFS 2007).
41. The ODFW maintains a Fish Health Management Policy with two primary objectives. The first is to produce healthy hatchery smolts that will contribute to the fishery and return sufficient numbers of adults to continue the program. The second is to prevent the introduction, and amplification or spread of fish pathogens that might negatively affect the health of both the hatchery and naturally reproducing stocks (ODFW 2012: ODFW 2012). Disease management plans and protocols are developed for each hatchery facility and are included in the annual operations plan for that facility. These annual operations plans describe how the hatchery facility will be operated to implement the programs described in the HGMPs. This can include the implementation of one or more hatchery programs at a single facility. ODFW (2012) describes in detail the actions taken at the Sandy Hatchery that are sufficient to control and prevent disease introduction and amplification of fish pathogens that would impede recovery of listed species. The EA (Subsection 3.2, Water Quality and Water Quantity) has been modified for clarification.
42. Water quality is discussed in detail in Subsection 3.2, Water Quality and Water Quantity, and Subsection 4.2., Effects on Water Quality and Water Quantity. Water quality components were described as part of the analysis for ODFW to receive a NPDES permit. The HGMP and ODFW (2012) describe how samples are collected to monitor water quality components during both normal operations and during pond cleaning activities. The hatchery effluent may contain aquaculture drugs and chemicals; however these are strictly monitored and are prescribed by licensed veterinarians to be effective in treatment of the fish pathogen while

meeting drug label criteria for environmental exposure (Subsection 3.2, Water Quality and Water Quantity). Toxic materials and other materials that would have an adverse effect on water quality would not be used in a hatchery because those same adverse effects would impact the health of the hatchery fish.

43. See response to Comment Number 42. The Bull Run acclimation facility does not rear more than 20,000 pounds of fish at any one time and thus, does not require a NPDES permit. Furthermore, flow in the Bull Run River during the time that spring Chinook salmon are acclimated at the facility are such that the impacts to water quality from the release of approximately 450 to 600 gallons per minute that passed through the acclimation pond would not be measureable. References cited in Subsection 3.2, Water Quality and Water Quantity, regarding the NPDES permits provide information on the management of pollutants.
44. The HGMPs and the EA describe how the hatchery intake would be operated from September through June and how water would not be removed from Cedar Creek during the low flow summer period (Subsection 4.2, Effects on Water Quality and Water Quantity). As described in the EA, the only time that flow within Cedar Creek would be impacted would be when the hatchery first starts operations in September. During the rest of the period of operation, water flow within Cedar Creek would be reduced over the 900-foot section between the intake and the adult outfall, but still would be adequate for passage and rearing. As described in Subsection 4.2.2, Alternative 2 (Proposed Action) – Approve the HGMPs under Limit 5 of the 4(d) Rule, the period during which the flow would be impacted in the 900-foot section, migration of adult steelhead and coho salmon would not occur in this section of Cedar Creek because all adult salmon and steelhead would be collected at the hatchery. The impact to aquatic habitat in the 900-foot section of Cedar Creek would be expected to be minimal and for a short period of time. The impact on the small section of habitat in Cedar Creek when compared to the range of coho and steelhead habitat within the Sandy River basin would not be. Note that ODFW has modified the Coho salmon HGMP, and under the proposed operation of the new intake and fish passage facilities, a minimum flow will be maintained with the section of Cedar Creek from the intake to the hatchery outfall to support juvenile and resident fish migration.
45. As described in Section 5, Cumulative Impacts, the cumulative impacts include those past, present and reasonably foreseeable effects of other actions. Past and present effects on the listed anadromous species from harvest, habitat impacts, and recent hatchery operations are part of the status and limiting factors discussions in Subsection 3.3, Anadromous Fish Listed under the ESA. Future effects are discussed in the cumulative impacts section, but many of these actions and their effects are not reasonably foreseeable.
46. NMFS acknowledges that the cumulative effects of salmon management efforts including those that occur outside the action area may fail to allow sufficient escapement of returning adult salmon and steelhead to the action area to meet recovery goals while providing for the operation of the proposed hatchery programs. If this occurs, then adjustment to fisheries and to the hatchery production would be proposed (Subsection 5.2, Conservation Management under the ESA). The draft EA states (Subsection 5.2, Conservation Management under the ESA) that the cumulative impacts of the Proposed Action on recovery actions are expected to

be minor because of reporting and monitoring requirements that would ensure compatibility with recovery plans.

Management of the hatchery programs and of fishing opportunity is only one element of a large suite of regulations and environmental factors that may influence the overall health of listed salmon and steelhead populations and their habitat. The proposed hatchery programs are coordinated with monitoring so that hatchery managers can respond to changes in the status of affected listed species. Monitoring and adaptive management would help ensure that the affected ESU and DPS are adequately protected and would help counter-balance any potential adverse cumulative impacts.

Monitoring and Evaluation activities and adaptive management language has been added to the EA and reflects additions to the HGMPs (for example see Subsection 2.2.1, Sandy River Spring Chinook Salmon Program).

47. The draft EA addresses alternatives considered but not analyzed in detail in Subsection 2.3, Alternatives Considered but Not Analyzed in Detail. Further, the description of the No-action Alternative acknowledges that there are other regulatory outcomes as a result of this alternative, but that hatchery closure was considered a prudent scenario to frame a robust comparative analysis against the Proposed Action (Subsection 2.3, Alternatives Considered but Not Analyzed in Detail). All best available information was used to assess effects on the human environment as a result of the No-action Alternative.
48. The draft EA addresses alternatives considered but not analyzed in detail in Subsection .3, Alternatives Considered but Not Analyzed in Detail. No other potential alternatives were identified during the internal scoping process that would meet the purpose and need for the Proposed Action.
49. Comment noted.
50. Comment noted.
51. Comment noted.

References

- Alsbury, T. 2012. Email to Richard Turner (NMFS) with 5 attachments. K. Schroeder data from spawning ground surveys. January 19, 2012. Oregon Department of Fish and Wildlife, Clackamas, Oregon.
- Lewis, M., B. Sounhein, M. Weeber, and E. Brown. (in prep) Status of Oregon stocks of coho salmon, 2011. Monitoring Program Report Number OPSW-ODFW- 2012- X, Oregon Department of Fish and Wildlife, Salem, Oregon.

- ODFW. 2012. Sandy Hatchery Operations Plan 2012. Available at <http://www.dfw.state.or.us/fish/HOP/Sandy%20HOP.pdf> (accessed 8-27-2012).
- NMFS. 2007. Endangered Species Act Section 7 Consultation Biological Opinion and Magnuson-Stevens Act Essential Fish Habitat Consultation. USFWS Artificial Propagation Programs in the Lower Columbia and Middle Columbia River. November 27, 2007. Available at <http://www.nwr.noaa.gov/Salmon-Harvest-Hatcheries/Hatcheries/Sec-7-USFWS-Columbia.cfm> (accessed December 17, 2010).



SandyHatcheries nwr <sandyhatcheries.nwr@noaa.gov>

ODFW HGMP Sandy River

1 message

Robert Kiningham <nwrob@live.com>

Mon, Jul 9, 2012 at 6:42 PM

To: SandyHatcheries.nwr@noaa.gov, Norm Ritchie <normritchie@q.com>

1 I urge you to support the ODFW HGMP for the Sandy River. I consider the Sandy my home river. I have taught my children to fish for Salmon and Steelhead on the Sandy. Fishing the Sandy has been an important part of my family history and tradition. I plan on teaching my grandchildren to fish the Sandy as well.

As a member of the Sandy Chapter of Northwest Steelheaders, I regularly work to improve the habitat and fishery on the Sandy River, I urge you to consider the following points.

The HGMP is adaptive and ODFW management of the basin is adapting to findings.

- There is almost no straying of hatchery coho into the upper basin spawning sanctuary.
- The stray rate of steelhead is well under NMFS guidelines, and with the introduction of off channel acclimation and reducing main channel smolt releases (as outlined in the HGMP), this stray rate will improve.
- Chinook stray rate is being aggressively addressed by ODFW. Off channel acclimation has been part of the plan since negotiations of the removal of Marmot Dam. Stiff opposition to new acclimation sites from the very people who filed suit against ODFW's Sandy River hatchery fish practices stalled the startup of the acclimation site until last year. Three different weirs are being used to filter out hatchery chinook from reaching the main chinook spawning tributaries in the upper basin.
- PGE, ODFW, the Association of Northwest Steelheaders, and many other fishing and conservation groups worked together during Marmot dam removal negotiations to take the opportunity to recover wild fish runs while providing hatchery fish for sport and commercial harvest.
- Key to this effort is maintaining the bulk of the spawning habitat as a wild fish spawning sanctuary. Per the ODFW HGMP, efforts are made to keep hatchery fish from reaching this prime habitat. To date, this is mostly successful with coho, winter steelhead straying into the sanctuary is also well within acceptable levels, and the HGMPs call for numerous improvements to reduce straying of hatchery spring chinook.
- Chinook strategies are still being implemented. Off channel acclimation in the Bull Run only started last year and will take a couple more years before we see results. Other tributaries in the lower basin are small, typically of high gradient, and suffering urbanization thus not a significant producer of wild fish.

I support hatchery fish on the Sandy River and the ODFW HGMP.

Robert Kiningham

503-630-3166
41707 SE Porter Rd
Estacada, OR 97023

Robert Kiningham Comment
Email received July 9, 2012

1. Comment noted.



Association of Northwest Steelheaders

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Established 1960

July 5, 2012

To: NMFS Salmon Management Division,
1201 NE Lloyd Blvd., Suite 1100
Portland, OR 97232
Fr: Russell Bassett, executive director
Re: Sandy River HGMPs

Dear NMFS Salmon Management Division,

Thank you for the opportunity to provide comments on the Sandy River Hatchery and Genetic Management Plans. The Northwest Steelheaders has 1,300 members, with 12 chapters in Oregon and one in Washington. The Steelheaders' Sandy River Chapter is one of our largest and most active chapters, with more than 150 members. Chapter members are involved in numerous restoration activities on the river including river cleanups and habitat improvement projects. The Sandy is an important river not only to the chapter, but also to our hundreds of Portland-area members who enjoy the close-by fishery. Many of the Steelheaders' business supporters rely on this fishery for their income.

- 1 The HGMPs call for numerous changes to management to reduce stray rates and help recover wild fish, while at the same time striving to provide a fishery to the thousands of anglers who recreate on the river. Steelheaders value strong runs of wild salmon and steelhead, but we also understand the importance of hatcheries to maintain a viable fishery.

The Steelheaders have the following brief comments, and we urge to NMFS to approve the HGMPs:

- The HGMPs call for numerous changes to management to reduce stray rates and help recover wild fish.
- The HGMPs are adaptive and ODFW management of the basin is adapting to findings.
- There is almost no straying of hatchery coho into the upper basin spawning sanctuary.
- The stray rate of steelhead is well under federal and state guidelines, and with the introduction of off channel acclimation and reducing main channel smolt releases (as outlined in the HGMPs), this stray rate will improve.
- The chinook stray rate is high, but it is being aggressively addressed by ODFW. Off channel acclimation has been part of the plan since negotiations of the removal of Marmot Dam. Stiff opposition to new acclimation sites from the very people who filed suit against ODFW and NMFS regarding Sandy River hatchery fish practices stalled the startup of new acclimation sites until last year. As called for in the HGMPs, three different weirs are being used to filter out hatchery Chinook from reaching the main Chinook spawning tributaries in the upper basin.
- PGE, ODFW, the Association of Northwest Steelheaders, and many other fishing and conservation groups worked together during Marmot Dam removal negotiations to take the opportunity to recover wild fish runs while providing hatchery fish for sport and

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Association of Northwest Steelheaders

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commercial harvest. Key to this effort is maintaining the bulk of the spawning habitat as a wild fish spawning sanctuary. Per the HGMPs, efforts are made to keep hatchery fish from reaching this prime habitat.

- Chinook strategies are still being implemented. Off-channel acclimation in the Bull Run only started last year and will take a couple more years before we see results. Other tributaries in the lower basin are small, typically of high gradient, and suffering urbanization so are thus not a significant producer of wild fish.
- ODFW has shutdown the winter steelhead wild bloodstock program on years where the wild run was not large enough to support it.
- Marmot Dam allowed the sorting out of hatchery fish, but now that the dam has been removed, that is no longer possible. The HGMPs aggressively address this problem, while at the same time providing a very popular fishery. Without the continued stocking of hatchery fish, the coho and chinook fisheries would pretty much cease to exist, and the steelhead fisheries would only be enjoyed by a few catch-and-release anglers.
- It is important to give the management changes as outlined in the HGMPs a chance to see if they will help recover wild fish. Five years from now, if wild runs do not improve, then new HGMPs will be needed to more aggressively address the problem. It's unrealistic to completely shut down the hatchery programs before the management changes have had to time to bear fruit.

Thank you for the consideration of our comments,

Respectfully,

Russell Bassett
Executive Director

Russel Bassett, Association of Northwest Steelheaders Comment
Email with attachment received July 9, 2012

1. Comment noted.



SandyHatcheries nwr <sandyhatcheries.nwr@noaa.gov>

HGMP

1 message

Ryan Hook <hook.ryan@gmail.com>

Mon, Jul 9, 2012 at 3:03 PM

To: SandyHatcheries.nwr@noaa.gov

To whom it may concern-

1 I am writing regarding the hatchery program on the Sandy River. I want to add my voice to the many others that feel that this is a unique opportunity to reduce the genetically weak hatchery fish populations and give native fish runs a chance to come back to their historic levels. Wild fish possess the instincts to survive and thrive in our nations rivers whereas hatchery fish have been artificially selected to do things that lower their overall fitness. The science supports this conclusion. Please focus on habitat restoration as a way to improve wild fish population rather than creating detrimental competition for the wild runs of fish. Thank you for your time and consideration.

Ryan Hook

Ryan Hook Comment
Email received July 9, 2012

1. Comment noted.

Sandy River Basin Watershed Council

Working together to restore the Sandy River



P.O. Box 868 Sandy, OR. 97055

Rich Turner
NMFS Salmon Management Division
1201 NE Lloyd Boulevard, Suite 1100
Portland, OR 97232
By email: SandyHatcheries.nwr@noaa.gov

July 9, 2012

Dear Mr. Turner:

On behalf of the Sandy River Basin Watershed Council, I am submitting the following comments on the Draft Environmental Assessment (EA) prepared by the National Marine Fisheries Service (NMFS) regarding the Sandy Hatchery and the associated Oregon Department of Fish and Wildlife (ODFW) Hatchery and Genetic Management Plans (HGMPs).

The Sandy River Basin Watershed Council is an independent 501(c)3 non-profit whose mission is to protect and restore the natural, cultural and historic resources of the Sandy River and its tributaries. We work together with landowners, community volunteers and agencies to restore habitat toward recovery of the Sandy's wild salmon and steelhead, and their tremendous value as a regional resource.

- 1 As we have in past reviews of fishery and hatchery management plans by ODFW, the Council strongly supports actions that recognize wild fish recovery as a key and over-arching goal for management in the basin. Wild fish recovery in the Sandy is not only a regional priority and a somewhat unique opportunity, considering that the Sandy's self-sustaining wild fish stocks are among the only remaining wild fish populations in the Lower Columbia, but a legal responsibility under the Endangered Species Act. With this in mind, the Council is concerned that the recommended action in this EA does not sufficiently contribute to wild fish recovery and a sustainable future in the basin.
- 2 The analysis does document that the hatchery operation as proposed has been identified as a limiting factor in wild fish recovery. It states repeatedly that the hatchery operation has already and would in future result in "take" under the ESA definition, and that reducing or eliminating hatchery releases (the
- 3 "No Action" alternative) would instead remove that limiting factor, eliminate negative impacts of hatchery releases, and eliminate the take. In this context, it is difficult to understand the recommended action as preferred, or as meeting the ESA legal requirement, or the concerted agency and public goal that the Sandy should lead toward wild salmon recovery in the Lower Columbia.

- Particularly in the issue of reducing the impact of hatchery strays on spawning fish populations, the current analysis and recommendation relies too heavily on a big "if", repeatedly assuring that proposed hatchery releases, fish acclimation on the Bull Run, and interception of strays at sorting weirs will have
- 4 limited negative effect "if" the strategy works. The plan lacks consideration of alternatives, and means of adjusting to those alternatives, if the plan does not work, nor does it provide any opportunity to review effectiveness or alter hatchery and associated practices prior to 9 years in the future when the actual effects of the proposed action would help shape the next steps.

Studies clearly show that hatchery strays reduce the productivity of the next generations of fish, so the recommended strategy risks continuing to influence the Sandy's wild fish recovery trend in the wrong

direction. Indeed, the analysis documents that the Sandy basin populations of Spring Chinook, which are at greatest risk from hatchery stray interactions, are facing numbers of strays far beyond target rates of 5-10 percent of spawners. It also presents evidence that under recent operations with substantial hatchery releases, Sandy wild fish populations have failed to meet return targets in all but a handful of years.

- 5 The analysis addresses a limited area, concentrating on those spawning segments where weirs will be placed and dismissing or neglecting to examine effects elsewhere in the basin. And its economic analysis is incomplete, considering only the loss of income and economic activity associated with the status quo hatchery, failing to consider potential upside economic benefit from a sport fishery operated in a future in which wild fish have in fact recovered.
- 6 The Council does not recommend accepting the proposed action. We strongly recommend that ODFW and NMFS develop a strategy that removes the negative impact of hatchery operations, addresses impacts in a more comprehensive way, and provides opportunities to review results and adjust operations sooner than at the end of nearly 3 generations of spawning fish that would reproduce in the Sandy in the period covered by the plan.

In addition to these general concerns, the Council noted the following issues related to the recommended action and analysis of its impacts:

- 7
 - The history of wild Spring Chinook adult returns does not indicate that the population is trending toward recovery under current or proposed practices. Data for wild Spring Chinook adults indicate that in 12 out of 19 years the number of wild adults was less than ODFW's Recovery Goal of 1230 natural origin adults annually (p. 34; Table 3 - p. 35). In an additional two years the number of wild adults was approximately equal to the recovery goal. In only five years did the number of wild adults exceed the recovery goal with only two years well above the goal. It should also be noted that the unmet recovery goal was lowered in ODFW's most recent plan revisions from previous targets.
- 8
 - The given the ESA threatened status of salmon and steelhead in the basin, the goal of ODFW's fish management in the Sandy River Basin must be the recovery of ESA-listed salmon populations, and all of the department's actions must support that goal. The recommended action continues a hatchery program with a primary focus on the continuation of sport and commercial fishing. While we recognize that ODFW's mission supports sportfishing, and that such a goal is reasonable in some areas, is not clear how that goal is compatible, or supportive, of ODFW's ESA responsibility in the Sandy basin.
- 9
 - On-going take of listed species is not acceptable. The EA states that "NMFS has determined that, within the action area, ESA-listed species would be affected by, and take would occur as a result of, the Proposed Action Alternative" (p. 84). ODFW's and NMFS' responsibility is to restrict take until recovery is achieved. The recommended action does not demonstrate how it will support this goal.
- 10
 - The EA claims that reducing impacts from hatcheries under the proposed action would "be expected to have impacts similar to those for the No Action Alternative" (p. 83). To say that

continuing negative impact including take and continuation of identified limiting factors such as stray interaction is the same as eliminating those impacts and thus justifiable strains credulity, particularly with the broad and critical uncertainties associated with the proposed action. The analysis concedes that “these impacts would not be expected to occur under the No-action alternative” but does not indicate why continued impacts is a better strategy than eliminating impacts.

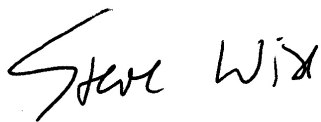
- 11 • The analysis claims that genetic impacts from hatchery spring Chinook stray spawning “would be expected to be decrease over time if” proposed actions are successful, yet hedges in saying “It would take a number of years” to determine the effectiveness of acclimation of smolts in Bull Run, and that “it is uncertain” whether the installation and operation of weirs...would be enough...to achieve the less than 10 percent recovery goal.” (p. 88) If not successful, “additional actions would be needed” yet such actions are not specified, nor given any timetable for potential implementation.
- 12 • The analysis fails to compare the timescale and related genetic and other impacts of proposed and no-action alternatives. It notes that hatchery adults currently in the marine environment would return in 2-5 years (p. 74), which means curtailing or eliminating hatchery releases could be effective at eliminating negative impacts on listed fish in 5 years. Yet the plan asks for 9 years to evaluate the uncertain effectiveness of the proposed action. At least, the agencies need to consider the relative benefit of reducing the continued hatchery interaction period by half to determine the comparison to the no-action alternative.
- 13 • The analysis contains limited consideration of the impact of continued hatchery operations on other parts of the Sandy basin beyond those areas treated by weirs. The Little Sandy River, where migrating fish regained access with removal of Little Sandy dam, shows high concentrations of straying hatchery origin fish already in early returns. The installation of weirs only on tributaries in the upper Sandy basin fails to protect a significant amount of spawning habitat including the Little Sandy and lower Bull Run rivers. The proportion of hatchery Spring Chinook in these two rivers is likely to increase as a result of using an acclimation site on the Bull Run River.
- 14 • The EA fails to address the effect of a weirs potentially diverting fish to spawn in less suitable habitat downstream of the weir. Observation by some biologists in the first year of operating weirs in 2011 noted the apparent year-to-year increase in spawners downstream of weirs, in habitat less likely to support successful spawning This can be an additional source of reduced production by natural-origin adults. It is not clear that the analysis sufficiently evaluates this effect, or other weir-related impacts such as direct and delayed mortality from handling fish.
- 15 • While suggesting “relatively substantial effects on socioeconomics”, the analysis includes no accounting of the upside of shifting to a wild fish-only recreational fishery in the future, or when either alternative would reach recovered wild fish population levels that could support easing restrictions on wild fish angling. The assumption that lack of production “would be expected to

preclude” recreational fishing and thus reduce visitors suggests that wild fish recovery and fishing are incompatible rather than complementary long term goals. The Council recognizes and supports the essential economic and cultural place of recreational fishing in the Sandy, but we would encourage consideration of economic benefits associated with wild fish recovery as part of any analysis.

- 16 The EA suggests that “the number of anglers may possibly increase under the Proposed Action if hatchery returns increase. Yet the analysis clearly indicates that increased hatchery returns negatively impact wild fish population, and thus their potential for recovery. In a less optimistic scenario, the proposed action could further reduce wild fish populations and further restrict all
- 17 fishing to avoid impacts on remaining wild fish. The assumption that ODFW expenditures would disappear from the basin also neglects the possibility that labor associated with restoration and recovery operations would not allow for reinvestment of those funds in recovery actions other
- 18 than the hatchery. Even in the most dire scenario of a fishery closure of indeterminate length (p. 113) the analysis concedes that the reduction in the overall economy associated with tourism and non-fishing activity “would not be substantial” because the other activities would continue. It is equally possible that other activities would increase, and that the potential status of the Sandy as a recovered wild fish population would actually draw additional visitors.

We appreciate your efforts to review the hatchery practices in the Sandy River basin, and your consideration of the Council’s comments in this matter. Wild fish recovery in the Sandy is an essential element of long-term progress in the Lower Columbia Basin, and we have the opportunity to deliver that progress with improved practices in the Sandy.

Sincerely,



Steve Wise
Executive Director
Sandy River Basin Watershed Council

Sandy River Basin Watershed Council Comments

Letter Dated July 9, 2012

The following responses reply to comments submitted by the Sandy River Watershed Council. Each response corresponds to margin numbers added to the comment letter.

1. Comment noted.
2. Comment noted.
3. Comment noted. The proposed hatchery programs have two goals, the first is to provide hatchery fish to support fishing opportunities, and the second is to do this while minimizing potential risks to natural-origin salmon and steelhead in the Sandy River consistent with the Oregon's Lower Columbia River Conservation and Recovery Plan (Recovery Plan)(ODFW 2010)(Subsection 1.3, Purpose and Need). The hatchery actions proposed in the HGMPs are designed to address risks associated with the hatchery programs and to reduce those risks such that the hatchery programs do not impede the recovery of natural-origin salmon and steelhead in the Sandy River. The effects of the hatchery programs on the survival and recovery of the ESA-listed species will be addressed more substantively in the biological opinion and final ESA determination.
4. Modifications have been made to the HGMPs that describe adaptive management that will be considered if the proposed actions are not adequate to meet recovery goals for the listed species. Note that in Oregon's Recovery Plan (ODFW 2010), the 9-year time frame was identified as the length of time that would be used in the development a moving average for monitoring escapement and the proportion of hatchery-origin fish on the spawning grounds. This 9-year time frame is expected to provide a better measure of the actual impacts to the natural-origin populations and would reduce the effects of high abundance years and low abundance years. The 9-year average would be calculated annually using escapement data for the past 9 years and would not require 9 new years of data before the average could be calculated. If monitoring and evaluation activities show that impacts are increasing or not being reduced then changes to the programs can be taken to address this concerns. ODFW has included adaptive management language in its HGMPs describing what changes would be considered if impacts are not minimized.
5. The description of the action area (Subsection 1.4, Action Area) has been updated. The draft EA analyses addressed impacts to the entire Sandy River basin.
6. See response to Comment Number 4.
7. NMFS agrees that the listed populations are not making escapement goals. Note that the primary purpose of the hatchery programs is to mitigate for development in the Sandy River and Columbia River basins by producing hatchery fish to support fishing opportunities while not impeding actions necessary to recovery the listed populations in the Sandy River.

8. ODFW management goals for the hatchery programs in the Sandy River basin, as described in the HGMPs, are to provide hatchery salmon and steelhead to support fishing opportunities while minimizing potential risks to natural-origin salmon and steelhead in the Sandy River consistent with Oregon's Recovery Plan (ODFW 2010). If ODFW cannot comply with the Recovery Plan goals, it has included adaptive management actions in the HGMPs describing actions it would consider to address hatchery related factors that are limiting the recovery of the listed species. Additionally, Subsection 5.2, Conservation Management under the ESA, addresses the interface between fishing and recovery plans.
9. Take (such as handling of fish at a weir) does not necessarily result in jeopardy to the continued existence of the listed species or destruction or adverse modification of designated critical habitat. The Proposed Action is designed to minimize take of listed species that results from the operation of the hatchery programs. Determinations about the effects of the proposed actions on species survival and recovery are not made in NEPA analyses, but rather are made in the ESA determination documents.
10. The Proposed Action includes many changes from past operations and does not constitute a continuation of past impacts, as suggested by the comment. The overall effects on the listed species under the Proposed Action are expected to be reduced from levels observed currently to a point where they would not be substantially different from the No-action Alternative (Subsection 4.3.2, Alternative 2 (Proposed Action) – Approve the HGMPs under limit 5 of the 4(d) Rule).
11. As described in Subsection 2.2.1, Sandy River Spring Chinook Salmon Program, Spring Chinook salmon smolts were first acclimated and released from the Bull Run Acclimation pond in 2011. It will take up to 2 years to begin to see if this will increase the number of fish harvested and reduce the number of fish straying to the upper basin (Subsection 4.3.2.1, Sandy River Spring Chinook Salmon). In 2012, ODFW began to release all spring Chinook salmon from the Bull Run Acclimation pond because it had determined that the attraction flows in Cedar Creek during the summer were not adequate to keep hatchery spring Chinook salmon from straying into the upper basin. The weirs have not been operated as described under the Proposed Action so it is unknown if they can achieve the goal of fewer than 10 percent hatchery-origin spawners, but any action to remove hatchery spring Chinook salmon is anticipated to reduce impacts. ODFW has added adaptive management language to the HGMPs to further clarify its proposal.
12. See response to Comment Number 4. ODFW has added adaptive management language to the HGMPs.
13. The high concentrations of hatchery fish in the Little Sandy River are to be expected because hatchery fish tend to be the only fish present in the lower basin compared to natural-origin fish, and because natural production has only recently begun in the Little Sandy River. The weir in the lower Bull Run River that is described under the Proposed Action (Subsection 2.2.1, Sandy River Spring Chinook Salmon Program) is expected to reduce the number of hatchery strays reaching spawning areas in the Little Sandy River and the Bull Run River.

14. The commenter does not give the source of the observation that spawning increased downstream of the weirs in 2011. Nevertheless, the potential change in spawning distributions due to the presence of the weirs was identified as a concern that it is being addressed as part of the monitoring and evaluation activities for spring Chinook salmon required as part of the 4(d) rule concurrence letter (Subsection 2.2.1, Sandy River Spring Chinook Salmon Program).
15. Comment noted.
16. NMFS was unable to find the quote in the draft EA that was referenced in the comment, but the increase in the number of anglers would be expected as more spring Chinook salmon home back to the Bull Run Acclimation ponds because the flows from the Bull Run River are expected to provide enough volume and cooler temperatures such that the hatchery spring Chinook salmon would hold longer in this part of the river (Subsection 4.3.2.1 Sandy River Spring Chinook Salmon).
17. Comment noted.
18. Comment noted. Subsection 4.8.1, Alternative 1 (No-action), was modified to reflect this comment.

References

- ODFW. 2010. Lower Columbia River Conservation & Recovery Plan for Oregon Populations of Salmon and Steelhead. 2010. Available at http://www.dfw.state.or.us/fish/CRP/lower_columbia_plan.asp (accessed July 19, 2011).