Cover Sheet
April 2011 Final

Title of Environmental Review:	Environmental Assessment to Analyze Impacts of a NOAA's National Marine Fisheries Service Determination that the Snake Basin Fishery Management and Evaluation Plan Submitted by the Washington Department of Fish and Wildlife Satisfies the Section 4(d) Rule and Does Not Appreciably Reduce the Likelihood of Survival and Recovery of Snake River Steelhead Distinct Population Segment or Snake River Fall and spring/summer Chinook Salmon Evolutionarily Significant Units
Evolutionarily Significant Units:	Snake River Steelhead, Snake River Fall Chinook salmon, and Snake River spring/summer Chinook salmon
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Legal Mandate:	Endangered Species Act (ESA) of 1973, as amended and implemented – 50 CFR Part 223
Location of Proposed Activities:	Washington, Snake River Basin, Grande Ronde and Tucannon Rivers
Activity Considered:	ESA determination regarding a Washington Department of Fish and Wildlife Fishery Management and Evaluation Plan through part of the range of the ESA-listed Distinct Population Segment and Evolutionarily Significant Units pursuant to the ESA 4(d) Rule

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1.0 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 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 take prohibition under section 9. NMFS issued a final Endangered Species Act (ESA) rule pursuant to section 4(d) (4(d) Rule), adopting regulations necessary and advisable to conserve threatened species (50 CFR 223.203). This 4(d) Rule applies the take prohibitions in section 9(a)(1) of the ESA, and also sets forth specific circumstances when the prohibitions will not apply, known as 4(d) limits. With regard to fisheries and Fisheries Management and Evaluation Plans NMFS declared, in the 4(d) rule, that section 9 take prohibitions would not apply to activities carried out under those resource plans deemed by the Secretary of Commerce to not appreciably reduce the likelihood of survival and recovery of a listed species.

On December 16, 2009, NMFS received a Fisheries Management and Evaluation Plan (FMEP) from the Washington Department of Fish and Wildlife (WDFW), addressing activities affecting Snake River steelhead, Snake River spring and summer Chinook salmon, and Snake River fall Chinook salmon in the Snake River in 2010 and beyond (WDFW 2009). In the review of a FMEP, NMFS must consider whether it satisfactorily addresses the criteria contained in the ESA 4(d) Rule. If NMFS determines that the FMEP "...is not likely to appreciably reduce the likelihood of survival and recovery..." and otherwise satisfies the 4(d) Rule, then NMFS will publish that determination. NMFS' determination 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, 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 WDFW submitted an FMEP for management of steelhead fisheries and other miscellaneous fisheries with incidental take of listed salmonids in Washington's portion of the Snake River and the Grande Ronde and Tucannon Rivers for review under the 4(d) Rule (WDFW 2009). The Proposed Action is the implementation of fisheries as described in the FMEP (although it should be recognized that the FMEP represents ongoing fisheries). The Federal action evaluated here is the proposed determination by the Secretary (through the Northwest Regional Administrator for NMFS) that the Washington's FMEP would not appreciably reduce the likelihood of survival and recovery of the ESA-listed Snake River steelhead Distinct Population Segment (DPS), Snake River fall Chinook salmon, and Snake River spring/summer Chinook salmon Evolutionarily Significant Units (ESUs).

Three alternatives are considered in this EA: (1) NMFS determines that the FMEP does not satisfy criteria of the 4(d) Rule (i.e., no-action), (2) NMFS determines that activities implemented as described in the FMEP would satisfy criteria of the 4(d) Rule, and (3) NMFS determines that only miscellaneous fisheries targeting resident species in the FMEP satisfies the criteria of the 4(d) Rule. No other alternatives that would meet the purpose and need were identified, which were not appreciably different from the three alternatives analyzed below (Section 2.0, Alternatives Including the Proposed Action).

1.3 Purpose of and Need for the Action

The purpose of the Proposed Action is to implement recreational fisheries targeting adipose-clipped hatchery-origin steelhead and miscellaneous fisheries as described in the FMEP in 2010 and beyond, and to comply with the requirements of the ESA; specifically with the 4(d) Rule. Washington's FMEP includes adaptive management measures to limit ESA impacts and proposes conservative incidental harvest regimes on the affected natural-origin populations of the affected listed species. The FMEP describes monitoring programs that would be in place to ensure that the proposed incidental take limit would not reduce the chances of survival and recovery of the Snake River steelhead DPS, the Snake River fall Chinook salmon, and the Snake River spring/summer Chinook salmon ESUs listed under the ESA.

The need for the Proposed Action is to provide fishing opportunity to the citizens of Washington State while protecting and enhancing natural-origin populations of the affected species.

1.4 Action Area

Washington's FMEP discusses and evaluates all recreational fisheries (including steelhead, trout, bass, walleye, catfish, and other warmwater fish, carp, sturgeon and other fisheries) in areas of the Snake River mainstem supporting anadromous fish (from the mouth upstream to the Washington-Oregon border, including the boundary waters with Idaho upstream to the Oregon State line) and its tributaries, including the Tucannon River, Asotin Creek, and the Grande Ronde River (and their tributaries), within the state of Washington (Figure 1).

1.5 Scope

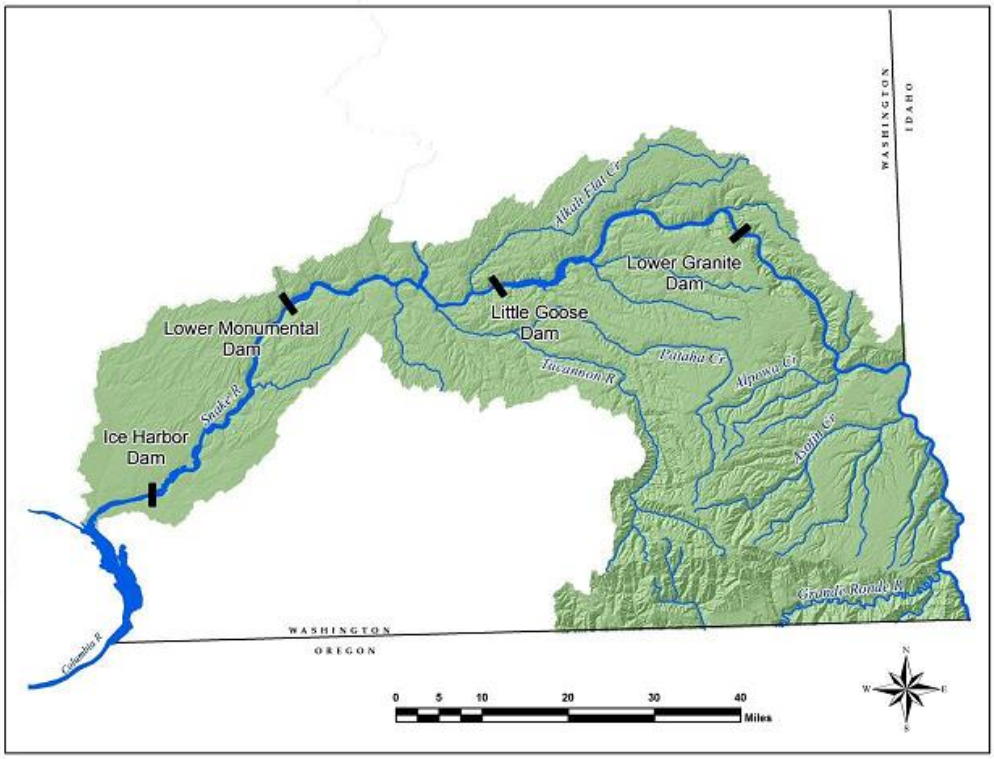
The scope of the action considered here includes fisheries for steelhead, trout, bass, walleye, catfish, and other warmwater fish, carp, sturgeon and other miscellaneous resident species. The FMEP would be in effect after the associated biological opinion is signed in 2010 until it is replaced by a comprehensive FMEP in the near future.

1.6 Relationship to Other Plans and Policies

This Environmental Assessment (EA) was prepared pursuant to regulations implementing the 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. Recovery plans are in place or being developed for most parts of the Columbia River system in which anadromous fish occur

(for example, see NMFS 2005a; NMFS 2009; Snake River Salmon Recovery Board 2006; a recovery plan for the Snake River Basin is currently under development by NMFS' Northwest Regional Office). Typically, development and on-going implementation of these plans includes participation by multiple Federal, tribal, state, and local agencies and stakeholder groups. These recovery plans contain (1) measurable goals for delisting, (2) a comprehensive list of the actions necessary to achieve delisting goals, and (3) an estimate of the cost and time required to carry out those actions.

Figure 1. The Proposed Action Area[1].



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

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

[1] Note: some small tributaries open for trout or other gamefish fisheries are not shown.

A recovery plan for the Snake River Region is currently being developed by NMFS and the Snake River Salmon Recovery Board, a cooperative group comprised of officials representing Walla Walla, Garfield, Asotin, Columbia, and Whitman Counties. In addition, the board also includes the Confederated Tribes of the Umatilla Indian Reservation and various state and Federal agencies. All factors that have been identified as leading to the decline of ESA-listed species are being addressed in this recovery plan. For ESA-listed Snake River steelhead, sockeye, and spring/summer and fall Chinook salmon, these factors include hydroelectric operations, harvest, habitat use, and artificial propagation (NMFS 2005a; NMFS 2006).

As discussed below (Section 3), the FMEP describes the salmon and steelhead that would be affected by the proposed fisheries, consistent with the population descriptions given by the Interior Columbia Basin Technical Recovery Team (ICTRT 2003) and updated in ICTRT (2007a). It also incorporates Viable Population Thresholds provided by the ICTRT (2007b).

In 2008, NMFS concluded multiple ESA consultations for several Federal actions that occur simultaneously affecting the same listed species of Columbia River Salmon and Steelhead (NMFS 2008a, 2008b, 2008c). The Federal Columbia River Power System (FCRPS) Action Agencies and Reclamation for its Upper Snake projects based their two biological assessments for their actions on a common comprehensive analysis entitled *Comprehensive Analysis of the Federal Columbia River Power System and Mainstem Effects of Upper Snake and Other Tributary Actions* (Corps et al. 2007a). NMFS later prepared its own Supplemental Comprehensive Analysis (NMFS 2008a) to capture the best available data and analysis contemporaneous with its issuance of these biological opinions in 2008. NMFS' Supplemental Comprehensive Analysis (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 2008a).

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

Alternatives considered in this EA are: (1) to issue a determination that the fisheries implemented under the terms of the FMEP appreciably reduce the likelihood of survival and recovery of the listed fish (the No Action alternative); or (2) to issue a determination that the fisheries implemented under the terms of the FMEP do not appreciably reduce the likelihood of survival and recovery of the listed fish (the Proposed alternative); or (3) to issue a determination that that only miscellaneous fisheries targeting resident species in the FMEP do not appreciably reduce the likelihood of survival and recovery of the listed fish (the No-Steelhead Fisheries alternative). The following describes the alternatives.

2.1 Alternative 1 (No-action) – Issue a Determination that Washington's FMEP does not Satisfy the 4(d) Rule

Under this alternative, the Secretary would determine that Washington's FMEP does not meet the criteria of the 4(d) Rule, in which case none of the activities conducted under this FMEP would adequately limit impacts on listed salmonids and therefore the limitations on application of ESA section 9 take prohibitions would not apply to fisheries implemented pursuant to the

Washington FMEP. Although the fisheries have been ongoing, for the purpose of this analysis, NMFS treats the No-action alternative as resulting in no fishing in the Action Area in 2010 and into the future. There are a number of other potential outcomes that might result from this determination – Washington could pursue other regulatory mechanisms for allowing the continuation of the fisheries without ESA coverage – but because the closure of state-managed fisheries 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) – Issue a Determination that Washington's FMEP Satisfies the 4(d) Rule

Under this alternative, the Secretary would determine that Washington's FMEP does adequately limit impacts on listed salmonids and therefore the activities conducted under this FMEP would qualify for the limitations on application of ESA section 9 take prohibitions. For the purpose of this analysis, NMFS treats the Proposed Action alternative as resulting in fishing as described in the FMEP in 2010 and into the future, for as long as the FMEP remains in place. Alternative 2 would result in ESA coverage for ongoing fisheries regulated by WDFW in the Action Area. A harvest report would be submitted annually to NMFS post-season each year under this FMEP (WDFW 2009).

2.2.1 Fisheries Included in Washington's FMEP

Washington's FMEP discusses and evaluates all recreational fisheries (including steelhead, trout, bass, walleye, catfish, and other warmwater fish, carp, sturgeon and other fisheries) that may result in the incidental take of Snake River steelhead and Snake River fall and spring/summer Chinook salmon in anadromous portions of the Snake River mainstem (from the mouth upstream to the Washington-Oregon border, including the boundary waters with Idaho upstream to the Oregon State line) and its tributaries, including, but not limited to the Tucannon River, Asotin Creek, and the Grande Ronde River (and their tributaries), within the state of Washington (Table 1). These fisheries are bundled in a single FMEP for ESA compliance purposes.

Steelhead Fisheries

Table 1 lists proposed fisheries included in this FMEP. WDFW would implement mark-selective steelhead fisheries directed at adipose-clipped hatchery-origin fish in river systems containing hatchery steelhead as long as wild steelhead stock abundances maintain a rolling 3-year average at or higher than critical threshold levels[2], and hatchery broodstock goals are achieved (WDFW 2009, Table 3). These mark-selective fisheries would require the release of unmarked fish. Additionally, steelhead harvest or retention would be prohibited in the Asotin Creek Basin, and lower Joseph Creek, due to WDFW management of these areas as wild steelhead refuges.

[2] WDFW proposes using an interim critical abundance threshold for fisheries management purposes of 250 wild spawners per year for all populations. Critical population levels will be developed by TRTs and will be incorporated into the FMEP.

WDFW is also proposing the retention of marked and unmarked jacks and adipose-clipped fall Chinook salmon adults caught during the proposed steelhead fisheries. The retention of adipose-clipped fall Chinook salmon adults would not be allowed if the expected Lower Granite Dam escapement for natural-origin fall Chinook salmon were not likely to achieve at least 1,000 fish in any given year.

Table 1. General description of location and timing of proposed fisheries included in this FMEP (see Appendix A of WDFW's FMEP for details for fishing regulations by stream section).

Fishery	Location	Earliest Begin date	Latest End Date	Comments
Steelhead	Snake River Mainstem. From mouth of Snake River to Oregon State line	September 1	March 31	Selective Fishery targeting adipose-clipped steelhead with incidental take to natural origin Snake River Steelhead and natural-origin Snake River fall Chinook salmon
	Tucannon River From Mouth to Tucannon H. Bridge	September 1*	March 31	Extends beyond October. Most tributaries, and the upper reach of the North Fork are closed to fishing
	Grande Ronde River Mouth to Oregon State Line (RM 39)	September 1*	April 15	Extends beyond October. Tributaries close on Oct 31.
	Other Snake River Tributaries (e.g. Alpowa, Almota, Tenmile)	June 1**	October 31	
	Asotin Creek	June 1 (closed to all steelhead harvest)	October 31	Most tributaries, and the upper reach of the North Fork are closed to fishing
Trout	Snake River Mainstem	June 16	March 31	No retention of steelhead prior to September 1
	Other open areas of SE WA	June 1	October 31	Hatchery steelhead may be retained, unless specifically prohibited in some areas
Other Gamefish	Snake R Mainstem	Year-round		
	Tucannon River	June 1	October 31	Most tributaries, and the upper reaches are closed to fishing
	Grande Ronde (lower 2.5 miles)	Year-round		
	Grande Ronde and tributaries	June 1	Oct 31	
	Wenaha River tributaries	June 1	August 31	
White Sturgeon	Snake River Mainstem	Year-round		
Carp	Snake River Mainstem	Year-round		No license required & no limits

* As part of trout fishing during June 1 to October 31, but directed steelhead angling usually begins about September 1.
** No directed steelhead fishing, only incidental to trout fishing.

Miscellaneous Fisheries

WDFW has established statewide rules for resident trout fisheries designed to provide recreational angling while at the same time protecting natural-origin steelhead and salmon populations. Trout fisheries would generally be scheduled from June through October in rivers, streams, and beaver ponds, and year-round in lakes, ponds, and reservoirs (Table 1). Trout fisheries would be closed in the Action Area in April and May to protect steelhead spawners and smolts, except for a proposed year-round trout fishery in the lower Grande Ronde River from the confluence with the Snake River upstream 2.5 miles. This fishery would be managed with selective gear rules and a 10-inch minimum size restriction. These fisheries would not be expected to encounter or retain many wild steelhead, Chinook salmon, or sockeye salmon in any locations.

Fisheries for other resident fish species could occur year-round in the Snake River mainstem and the lowest 2.5 miles of the Grande Ronde River (Table 1). In the tributaries to the Snake River, such as the Tucannon River, Asotin Creek, and the lower Grande Ronde River (upstream of about river mile (RM) 2.5), these fisheries would occur from June through October concurrent with trout fisheries. Whitefish fisheries would be scheduled from November through mid-April in the Tucannon and Grande Ronde Rivers when whitefish congregate in deep pools and would be more accessible to anglers. The release of wild steelhead would be required during the winter and early spring steelhead and whitefish fisheries. These fisheries would be expected to have little or no encounter with or retention of wild steelhead, Chinook salmon, or sockeye salmon in any locations. Miscellaneous fisheries the Action Area would be managed in a manner consistent with the maintenance of self-sustaining populations. Additionally, some of the miscellaneous fisheries in the FMEP are designed to purposely reduce the number of fish for some non-native (introduced) species. Walleye, for example, are extremely voracious and are most abundant in dam tailraces where the potential for impacts on juvenile salmon is high.

2.3 Alternative 3 (No Steelhead Fisheries) - Issue a Determination that only Miscellaneous Fisheries Targeting Resident Species in the FMEP Satisfy the 4(d) Rule

Under this alternative, the Secretary would determine that, of the fisheries described in the FMEP, only those fisheries targeting resident species meet the criteria of the 4(d) Rule, in which case only miscellaneous fisheries targeting resident species conducted under this FMEP would qualify for the limitations on application of section 9 take prohibitions. Alternative 3 would result in ESA coverage for only a subset of the ongoing fisheries regulated by WDFW in the Action Area. Because only some of the fisheries would be approved, for the purpose of this analysis, NMFS assumes only those fisheries would continue to take place (steelhead fisheries would not be implemented), and so this alternative would result in reduced fishing in 2010 and beyond, compared to what is proposed in the FMEP. It should be noted that while NMFS has no discretion to modify the FMEP, this alternative is being analyzed to assist in considering a full range of alternatives. While it is not possible under the appropriate regulations to approve only a portion of the FMEP, it would be possible for the State of Washington to implement only those fisheries considered in this alternative.

2.4 Alternatives Considered but Not Analyzed in Detail

Alternatives that would consider increases or decreases for harvest of hatchery-origin steelhead, increases or decreases for incidental take of ESA-listed fish, or increases or decreases for harvest of non-listed fish were considered, but determined to be less likely to provide the intended benefit of providing fishing opportunities while conserving and enhancing the natural-origin populations. The management framework proposed in the FMEP (WDFW 2009) carefully balances a number of objectives and concerns, to the extent that alternatives outside the bounds of the FMEP are likely to have inappropriate and adverse effects on the natural resources. No other alternatives were identified that would achieve the purpose and need for this Proposed Action.

3.0 AFFECTED ENVIRONMENT

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

3.1 Water Quality

Habitat conditions important to the various ESA-listed and resident fish vary widely; however, factors such as water quality and flow conditions are important to most fish species in the Action Area. Washington's Water Quality Assessment lists the status of water quality for a particular location in one of five categories recommended by Environmental Protection Agency (EPA). This Assessment represents the Integrated Report for Sections 303(d) and 305(b) of the Clean Water Act. The 303(d) list reports on Category 5 waters, which are the impaired waters of the state. Waters placed on Category 5 require the preparation of a plan to improve water quality by limiting pollutant loads.

Washington State Department of Ecology (Ecology) has included most water bodies in the Action Area on its 303(d) list. Many of the streams and rivers in the Action Area do not comply with water quality standards. For temperature, the 3(d) listing result primarily due to lower summer flows. In some water bodies, pH has been adversely affected. Some bodies of water have raised levels of fecal coliform and PCBs as well as other constituents. Past and current agricultural practices, manufacturing, erosion, among other activities, have resulted in impaired water quality. Some of these activities have also introduced pesticides such as DDT, 4,4'-DDE, chlordane, dieldrin, heptachlor epoxide, and hexachlorobenzene into the water. Water quality information for specific bodies of water is available using the query tool at Ecology's Water Quality Assessment for Washington (WQA) website (WQA 2010). According to the WQA website, all of the bodies of water that would be affected by fisheries proposed in this FMEP (Walla Walla, Tucannon, Asotin, and Lower Snake subbasin) are in Ecology's 3(d) list for several parameters.

Mortality as a result of fisheries can reduce the transport of 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. He attributed the loss to habitat changes due to beaver trapping, logging, irrigation, grazing, pollution, dams, urban and industrial development, and commercial and sport 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, but mechanisms were not postulated. 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. In studies with juvenile coho salmon, Quinn and Peterson (1996) correlated increased body size with higher rates of overwinter survival, although this study was not designed to determine whether the effect was related to carcass density. In summary, there is an increasing body of work suggesting that the biomass of carcasses affects the productivity of salmonid rearing habitat, but functional and quantitative relationships are poorly understood and difficult to generalize from the specific conditions studied. Limiting factors, and thus the ecological importance of marine-derived nutrients, differ among streams.

Stream flow, or discharge, is the volume of water flowing in a stream channel expressed as unit per time (cfs = cubic feet per second). Stream flow is an important determinant of water quality and aquatic habitat conditions. High water temperature, low levels of dissolved oxygen, and deleterious levels of toxins can all be exacerbated by low stream flow. Moreover, the quantity, quality and connectivity (e.g., fish migration) of aquatic habitats are also influenced by flow. Agricultural and domestic water diversions are common sources of impact to aquatic resources. Diversions and associated diking, damming, and dredging are a large contributing factor to the loss of salmon and steelhead habitat in some river basins (Beechie et al. 1994; McBain and Trush 1997). Stream flow is also a powerful determinant of aquatic habitat conditions through the effects of peak or flood events. It is during these flood flows that banks are either built or eroded, pools are deepened or filled, and large wood is contributed and redistributed. It is also during these flood flows that very high rates of mortality occur for salmonids in the egg or alevin life stage (McHenry et al. 1994). Changes in vegetation, such as extensive clear cutting, can increase the frequency and intensity of flood flows due to accelerated runoff. Zeimer (1998) found a 35 percent increase in mean peak flows after logging of the North Fork of Caspar Creek. While this effect disappears with forest stand recovery, urbanization has a more profound effect on peak flows because impervious surfaces increase (May et al. 1996). Both removal of vegetation and urbanization decrease the lowest flows by reducing the water storage capacity of watershed soils.

Human Activity such as beaver trapping, logging, irrigation, grazing, pollution, dams, urban and industrial development have all contributed to a decline in water quality parameters in the Action Area. Other human activities that are unrelated to the proposed fisheries in the FMEP and that could affect water quality in the Action Area, such as boating, agricultural practices, logging, irrigation, pollution, dams, urban and industrial development would continue for the duration of the proposed FMEP.

3.2 ESA-listed Fish

3.2.1 Snake River Basin Steelhead

The Snake River steelhead Distinct Population Segment (DPS) was listed under the ESA as threatened in 1997, reaffirmed in 2006 (NMFS 2006a). According to the ICTRT (ICTRT 2007a), this DPS includes all anadromous populations that spawn and rear in the mainstem Snake River and its tributaries between Ice Harbor and the Hells Canyon hydro complex. There are five major population groups with 24 populations. Inland steelhead in the Columbia River Basin are commonly referred to as either A-run or B-run, based on migration timing and differences in age and size at return. A-run steelhead are believed to occur throughout the steelhead streams in the Snake River Basin, and B-run are thought to produce only in the Clearwater and Salmon Rivers (ICTRT 2007a).

Population-specific adult population abundance is generally not available for Snake River steelhead due to difficulties conducting surveys in much of their range. To supplement the few population-specific estimates, the ICTRT used Lower Granite Dam counts of A-run and B-run[3] steelhead and apportioned those to A- and B-run populations proportional to intrinsic potential habitat (Appendix A of ICTRT 2007c). The ICTRT generated 10-year geometric mean abundance estimates for two populations in the Grande Ronde Major Population Group (MPG) and reported average A-run and average B-run abundance as an indicator for the other populations. For the two Grande Ronde MPG populations, a recent average abundance exceeds the ICTRT abundance threshold and the second is below the threshold (Table 8.5.2-1 cited in NMFS 2008a). Both the A- and B-run averages are below the average abundance thresholds that the ICTRT identifies as a minimum for low risk (ICTRT 2007c). Abundance for Grande Ronde populations, and the average A- and B-run populations, declined to low levels in the mid-1990s, increased to levels at or above the recovery ICTRT abundance thresholds in a few years in the early 2000s, and are now at levels similar to those of the mid-1990s and early 2000s (Figure 2). Abundance trends in Figure 2 account for fishery-related mortality at levels comparable to those proposed in the FMEP under consideration in this EA since 1980.

[3] Inland steelhead in the Columbia River Basin are commonly referred to as either A-run or B-run, based on migration timing and differences in age and size at return. A-run steelhead are believed to occur throughout the steelhead streams in the Snake River Basin, and B-run are thought to produce only in the Clearwater and Salmon Rivers.

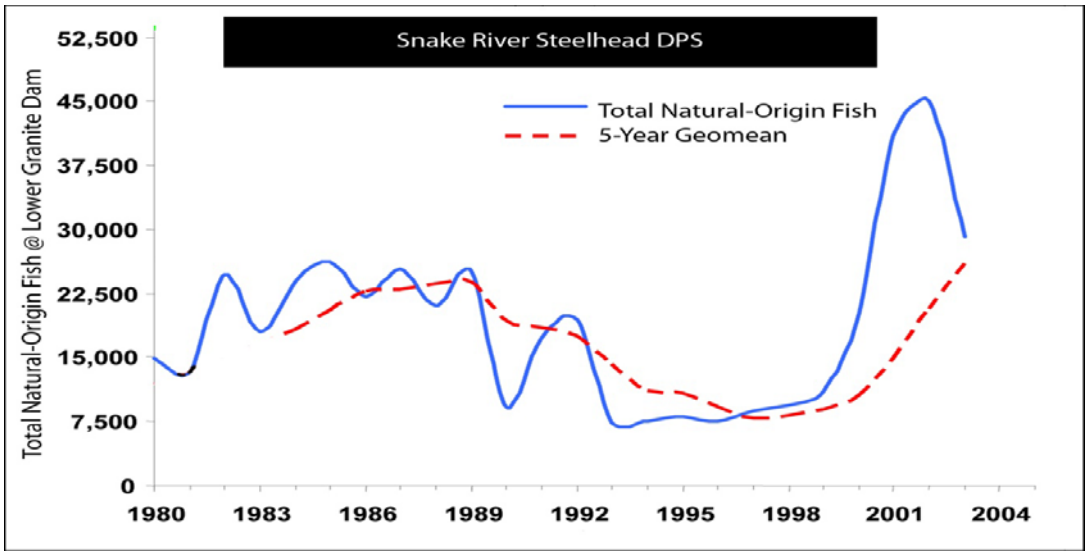


Figure 2. Snake River Steelhead DPS Abundance and 5-Year Geometric Mean (adopted from Fisher and Hinrichsen 2006).

The 5-year geometric mean abundance, for the total aggregate of all natural-origin populations above Lower Granite Dam, increased from 1980, peaking in 1989 and decreasing throughout the 1990s (Figure 2). Aggregate abundance of natural-origin fish peaked in 2002 and the 5-year geometric mean has been increasing since 2000.

NMFS concluded multiple ESA consultations in 2008 for several Federal actions that occur simultaneously affecting the same listed species of Columbia River Salmon and Steelhead (NMFS 2008b, 2008c, 2008d). The biological opinions associated with The FCRPS and Upper Snake Bureau of Reclamation projects call for mitigation activities or actions to be progressively taken between 2008 and 2017 (Prospective Actions) that are expected to accumulate beneficial effects on all affected ESA-listed species over the current baseline (NMFS 2008a). The baseline for these analyses included the proposed take of Snake River Basin steelhead because the proposed fisheries in the FMEP under consideration have been ongoing since 1980. The future status of Snake River steelhead is expected to improve compared to their current status through the implementation of these Prospective Actions with beneficial effects, as described in the Supplemental Comprehensive Analysis described in Subsection 1.6, Relationship to Other Plans and Policies (Subsections 8.5.5, 8.5.6, and 8.5.7.2 in NMFS 2008a). These Prospective Actions include reduction of avian and fish predation, estuary habitat improvements, kelt reconditioning of B-run steelhead, and tributary habitat improvements for most populations. Therefore, the status of the DPS as a whole is expected to improve compared to its current condition and to move closer to a recovered condition.

3.2.2 Snake River Fall Chinook Salmon

Snake River fall Chinook salmon were listed under the ESA as threatened in 1992 and reaffirmed in 2005 (NMFS 2005a). The Snake River fall Chinook salmon ESU is a single population in one MPG that spawns and rears in the mainstem Snake River and its tributaries below Hells Canyon Dam. The decline of this ESU was due to heavy fishing pressure beginning in the 1890s and loss of habitat with the construction of Swan Falls Dam in 1901 and the Hells

Canyon Complex from 1958 to 1967, which extirpated two of the historical populations. Only 10 to 15 percent of the historical range of this ESU remains. Hatcheries have played a major role in the production of Snake River fall Chinook salmon since the 1980s (ICTRT 2007b).

Average abundance (1,273) of Snake River fall Chinook salmon over the most recent 10-year period is below the 3,000 natural spawner average abundance thresholds that the ICTRT identifies as a minimum for low risk (Table 8.2.2-1 cited in NMFS 2008a). The ICTRT recommends that no fewer than 2,500 of the 3,000 natural-origin fish be mainstem Snake River spawners. Total returns of fall Chinook salmon over Lower Granite Dam increased steadily from the mid-1990s to the present. Natural returns increased at roughly the same rate as hatchery-origin returns (through run year 2000); since then, hatchery returns have increased disproportionately to natural-origin returns (Figure 3). The median proportion of natural-origin returns has been approximately 32 percent over the past two brood cycles (Cooney and Ford 2007). Abundance trends in Figure 3 account for fishery-related mortality at levels comparable to those proposed in the FMEP under consideration in this EA since 1980.

The driving factors for the recent increase depicted in Figure 3 may include reduced harvest rates, improved in-river rearing and migration conditions, the development of life history adaptations to current conditions, improved ocean conditions benefiting the relatively northern migration patter, and the supplementation program or other factors. At this time, however, there is insufficient information to estimate the relative contributions of these factors to the recent observed increase in abundance (Cooney and Ford 2007).

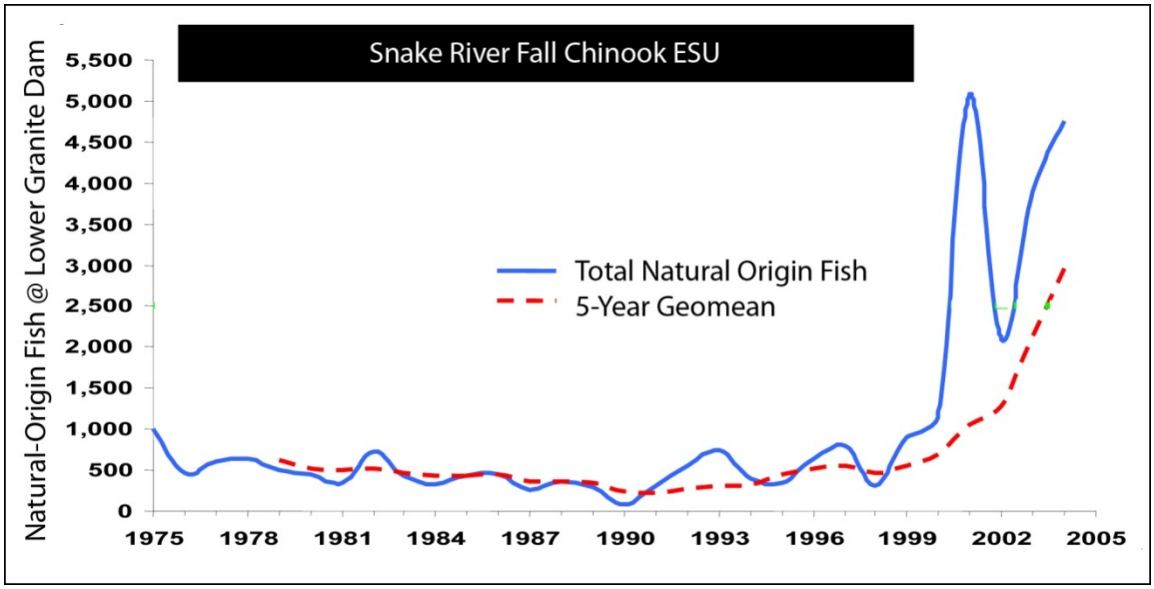


Figure 3. Snake River Fall Chinook Salmon Abundance Trends (adopted from Fisher and Hinrichsen 2006).

The future status of the single extant population and single MPG of Snake River fall Chinook salmon will be improved compared to its current status through the reduction of current adverse Federal Columbia River Power System (FCRPS) and Upper Snake project effects and the implementation of Prospective Actions with beneficial effects over the current baseline, as

described in the Supplemental Comprehensive Analysis (NMFS 2008a, Sections 8.2.5, 8.2.6, and 8.2.7.2). The baseline for these analyses included the proposed take of Snake River Fall Chinook salmon because the proposed fisheries in the FMEP under consideration have been ongoing since 1980. Therefore, the status of the ESU as a whole is expected to improve compared to its current condition and to move closer to a recovered condition.

3.2.3 Snake River Spring/Summer Chinook Salmon

Snake River spring/summer Chinook salmon were listed under the ESA as threatened in 1992 and reaffirmed in 2005 (NMFS 2005a). The Snake River spring/summer Chinook salmon consists of five major population groups that spawn and rear in the tributaries of the Snake River between the confluence of the Snake and Columbia rivers and the Hells Canyon Dam. The factors that contributed to their decline include intensive harvest and habitat degradation in the early and mid 1900s, high harvest in the 1960s and early 1970s, and Federal and private hydropower development, as well as poor ocean productivity in the late 1970s through the late 1990s (ICTRT 2007a).

For all populations, average abundance over the most recent 10-year period is below the average abundance thresholds that the Interior Columbia Technical Recovery Team (ICTRT) identifies as a minimum for low risk (Table 8.3.2-1 cited in NMFS 2008a). Figure 4 shows abundance for most populations declined to extremely low levels in the mid-1990s, increased to levels near the recovery abundance thresholds in a few years in the early 2000s, and are now at levels similar to those of the mid-1990s and early 2000s.

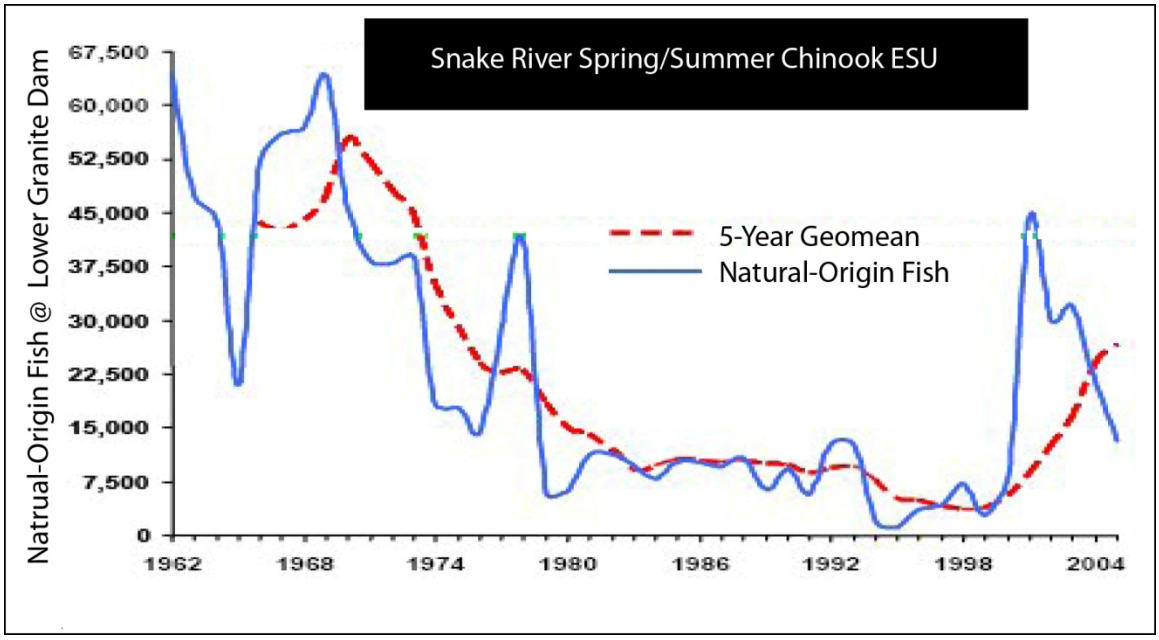


Figure 4. Snake River Spring Summer Chinook salmon Abundance Trends (adopted from Fisher and Hinrichsen 2006).

Although recovery criteria rely on the abundance of individual spawning populations, evaluated at the MPG and ESU level, the quality of information varies among populations. The aggregate abundance

of all populations of natural-origin Snake River spring/summer Chinook salmon has been measured since 1962 by counts at the four dams on the lower Snake River. Since 1975, counts have been made at Lower Granite Dam, which encompass most populations within the ESU. Abundance of most populations in the ESU, based on a rolling 5-year geometric mean, peaked in the late 1960s and continued to decrease until the late 1990s (Figure 4). Geometric mean abundance since the late 1990s has increased substantially for the Lower Granite Dam aggregate count. Geometric mean abundance of natural-origin fish for the 2001 to 2005 period was 25,957, compared to 4,840 for abundance of natural-origin fish for the 1996 to 2000 period, a 436 percent improvement (Fisher and Hinrichsen 2006). As a point of reference, the sum of the ICTRT's minimum abundance thresholds for all populations in this ESU is 26,500 (ICTRT 2007c). Abundance trends in Figure 4 account for fishery-related mortality at levels comparable to those proposed in the FMEP under consideration in this EA since 1980.

The future status of all populations and MPGs of Snake River spring/summer Chinook salmon will be improved from their current status through the reduction of current adverse effects and the implementation of Prospective Actions with beneficial effects over the current baseline, as described in the Supplemental Comprehensive Analysis (NMFS 2008a, Sections 8.3.5, 8.3.6, and 8.3.7.2). The baseline for these analyses included the proposed take of Snake River spring/summer Chinook salmon because the proposed fisheries in the FMEP under consideration have been ongoing since 1980. Therefore, the status of the ESU as a whole is expected to improve compared to its current condition and to move closer to a recovered condition.

3.2.4 Snake River Sockeye Salmon

The Snake River sockeye salmon ESU includes all anadromous and residual sockeye from the Snake River basin, Idaho, as well as artificially propagated sockeye salmon from the Redfish Lake Captive Broodstock Program (Table 8.4.2.1-1 cited in NMFS 2008a). Sockeye salmon were historically numerous in many areas of the Snake River basin prior to the European westward expansion. However, intense commercial harvest of sockeye along with other salmon species beginning in the mid-1880s; the existence of Sunbeam Dam as a migration barrier between 1910 and the early 1930s; the eradication of sockeye from Sawtooth Valley lakes in the 1950s and 1960s; the development of mainstem hydropower projects on the lower Snake and Columbia Rivers in the 1970s and 1980s; and poor ocean conditions in 1977 through the late 1990s probably combined to reduce the stock to a very small remnant population. Snake River sockeye salmon are now found predominantly in a captive broodstock program associated with Redfish Lake and the other Sawtooth Valley lakes (NMFS 1991). At the time of listing, one, one, and zero fish had returned to Redfish Lake in the three preceding years, respectively.

Historically, adult Snake River sockeye salmon entered the Columbia River in June and July, migrated upstream through the Snake and Salmon Rivers, and arrived at the Sawtooth Valley lakes in August and September (Bjornn et al. 1968). Spawning in lakeshore gravels peaked in October. Fry emerged in late April and May and moved immediately to the open waters of the lake where they fed on plankton for 1 to 3 years before migrating to the ocean. Juvenile sockeye generally left the Sawtooth Valley lakes from late April through May and migrated nearly 900 miles to the Pacific Ocean. While pre-dam reports indicate that sockeye salmon smolts migrated

through the lower Snake River in May and June, smolts from Redfish Lake recently passed Lower Granite Dam during mid-May to mid-July. Snake River sockeye spend 2 to 3 years in the ocean before returning to their natal lake to spawn.

This species has a very high risk of extinction. Between 1991 and 1998, all 16 of the natural origin adult sockeye salmon that returned to the weir at Redfish Lake were incorporated into the captive broodstock program (NMFS 2005b). The program has used multiple rearing sites to minimize chances of catastrophic loss of broodstock and has produced several hundred thousand eggs and juveniles, as well as several hundred adults, for release into the wild. Between 1999 and 2007, more that 355 adults returned from the ocean from captive broodstock releases—almost 20 times the number of wild fish that returned in the 1990s (NMFS 2008a). The program has been successful in its goals of preserving important lineages of Redfish Lake sockeye salmon for genetic variability and in preventing extinction in the near-term. The Stanley Basin Sockeye Technical Oversight Committee has determined that the next step toward meeting the goal of amplifying the wild population is to increase the number of smolts released. Fisheries proposed in the FMEP under consideration in this EA are not expected to encounter any listed sockeye salmon.

3.2.5 Bull Trout

The U.S. Fish and Wildlife Service issued a final rule listing the Columbia River population of bull trout as a threatened species on June 10, 1998 (63 FR 31647). The Action Area of the FMEP considered in this EA is part of the Snake River Washington Recovery Unit. The Snake River Washington Recovery Unit forms part of the range of the Columbia River Distinct Population Segment.

According to U.S. Fish and Wildlife Service (2002), in portions of the Snake River Washington Recovery Unit, bull trout have been extirpated from their former habitat. Other local populations may be fragmented and isolated in headwater locations because of natural or manmade barriers. Although current data and records that describe the historic distribution of bull trout throughout the Snake River Washington Recovery Unit are limited, observations indicate that mainstem reaches and many tributaries within the Tucannon River and Asotin Creek watershed were, or still are, occupied or utilized by bull trout at various life stages. Also, other information strongly suggests that bull trout from tributaries in the Tucannon River and Asotin Creek watersheds migrated into the mainstem Snake River, presumably to forage and overwinter. Because of credible anecdotal accounts, the Snake River Washington Recovery Unit Team believes that before habitat was substantially modified, fluvial bull trout used Asotin Creek just as they use the Tucannon River. In recent years, bull trout have not been found in some of the tributaries where they were earlier documented, and local populations of these fluvial forms have perhaps been lost.

The Snake River Washington Recovery Unit Team has identified the Tucannon River and Asotin Creek basins as separate core areas within the Snake River Washington Recovery Unit. Current knowledge indicates that local populations within the recovery unit consist of migratory and resident life history forms. Migratory forms include fluvial bull trout that overwinter in the mainstem Tucannon River and fish that may overwinter in and then migrate from locations in the mainstem Snake River at least as far downstream as the Lower Monumental Dam pool. Fisheries

proposed in the FMEP under consideration in this EA are not expected to encounter any listed bull trout (WDFW 2009). The U.S. Fish and Wildlife Services (USFWS) has determined that ESA take prohibitions do not need to be applied to fisheries conducted under state fish and wildlife regulations (63 FR 31647, June 10, 1998).

3.2.6 Washington State's Species of Concern

Table 2 lists species of concern in the Action Area. State sensitive species or species of concern are defined as: Any wildlife species native to the state of Washington that is vulnerable or declining and is likely to become endangered or threatened throughout a substantial portion of its range within the state without cooperative management or removal of threats (WDFW 2010).

Fisheries proposed in the FMEP under consideration in this EA are not expected to encounter any species of concern.

Table 2. Species of concern in the Action Area (WDFW 2009).

River lamprey	Species of Concern	Present in Action Area, but limited numbers observed
Pacific lamprey	Species of Concern	Present in Action Area, but limited numbers observed
Margined sculpin	Species of Concern	Present in Action Area, but limited numbers observed

3.3 Non-listed Fish

The Action Area supports a variety of salmonid and non-salmonid fish. All anadromous salmonid species in the Action Area are ESA-listed and are discussed in the previous section. Resident salmonid species include rainbow trout, mountain whitefish, and the non-native brown trout. Fish species present within the Action Area are summarized in Table 3.

Resident fish in the Snake River Basin include both native and introduced species. The basin contains a mix of cold-water and warm-water species. Warm-water species include smallmouth bass, largemouth bass, yellow perch, black crappie, bluegill, brown bullhead, and pumpkinseed. Cold-water species include rainbow trout, brown trout, and mountain whitefish. According to WDFW (2009), fish species of both native and exotic origin often compete with, and prey upon, salmonid species. Within the Action Area, northern pikeminnow, smallmouth bass, and walleye are the primary predators upon other fish. Of these three species, only the northern pikeminnow is native. Other predatory resident species include channel catfish, Pacific and river lamprey, yellow perch, brown trout, largemouth bass, and bull trout. Pacific lamprey and bull trout are native species. Smallmouth bass are the dominant predators in the reservoirs of the lower Snake River. Northern pikeminnow and perches, as well as smallmouth bass, are primary predators in certain reaches of the Snake River system. Walleye are extremely voracious and are most abundant in dam tailraces where the potential for impacts on juvenile salmon is high (WDFW 2009).

3.4 Instream Fish Habitat

Natural channels are complex and contain a mixture of habitats differing in depth, velocity, and cover (Bisson et al. 1987). They are often formed during storm events with associated flows that mobilize sediment in the channel bed (Murphy 1995). The hydrologic regime of a watershed, combined with its geology, hillslope characteristics, and riparian vegetation determines the nature of stream channel morphology (e.g., number and spacing of pools and width-to-depth ratio) (Sullivan et al. 1987).

Instream habitat conditions in the Action Area are affected by a wide range of factors, including land-use practices (e.g., timber harvest, grazing, urban development, road construction and operation, and gravel mining), existing geological conditions (e.g., erodible soils), and extremes of flow (e.g., flooding and low flow).

Table 3. Fish Species Present in the Snake River Salmon Recovery Region (SRSRB 2006).

Species	Origin[1]	Location[2]	Abundance[3]
Mountain whitefish (*Prosopium williamsoni*)	N	R, T	R
Brown trout (*Salmo trutta*)	E	R, T	R
Lamprey (*Lampetra* spp.)	N	R, T	U
Longnose dace (*Rhinichthys cataractae*)	N	R, T	R/I
Speckled dace (*R. osculus*)	N	R, T	A
Umatilla dace (*R. umatilla*)	N	R, T	I
Leopard dace (*R. falcatus*)	N	R, T	I
Chiselmouth (*Acrocheilus alutaceus*)	N	R, T	C
Peamouth chub (*Mylocheilus caurinus*)	N	R, T	I
Redside shiner (*Richardsonius balteatus*)	N	R, T	C
Northern pikeminnow (*Ptychocheilus oregonensis*)	N	R, T	C
Walleye (*Stizostedion vitreum)*	E	R	U
Mountain sucker (*Catostomus platyrhynchus*)	N	R, T	C
Common carp (*Cyprinus carpio*)	E	R, T	R/I
Brown bullhead (*Ameiurus nebulosus*)	E	R, T	R/I
Tadpole madtom (*Notorus gyrinus*)	E	R, T	R/I
Channel catfish (*Ictalurus punctatus*)	E	R, T	C/I
Smallmouth bass (*Micropterus dolomieu*)	E	R, T	C/I
Largemouth bass (*M. salmoides*)	E	R, T	R/I
Pumpkinseed (*Lepomis gibbosus*)	E	R, T	I
Bluegill (*L. macrochirus*)	E	R, T	R/I
White crappie (*Pomoxis annularis*)	E	R, T	C/I
Black crappie (*P. nigromaculatus*)	E	R, T	C/I

Species	Origin[1]	Location[2]	Abundance[3]
Warmouth (*L. gulosus*)	E	R, T	I
Yellow perch (*Perca flavescens*)	E	R, T	I
Paiute sculpin (*Cottus beldingi*)	N	R, T	C
Margined sculpin (*C. marginatus*)	N	R, T	C
Torrent sculpin (*C. rhotheus*)	N	R, T	R
threespine stickleback (*Gasterosteus aculeatus*)	E	R, T	R/I
Sandroller (*Percopsis transmontana*)	N	R, T	I

[1]Origin: N = native stock, E = exotic, H = hatchery reintroduction.

[2]Location: R = mainstem rivers and Mill Creek, t = tributaries, P = ponds.

[3]Fish species abundance based on average number of fish per 100m2: A = abundant, C = common, R = rare, U = uncommon, I = insufficient data.

WDFW entered into a cooperative effort with the Asotin, Pomeroy, Palouse, and Whitman Conservation Districts to conduct brief assessments of several tributaries in the Action Area to begin development of baseline information about fish and their habitat conditions (Mendel et al. 2004). The streams in this assessment suffer from very limited (less than 1.5 cfs) surface water during summer and fall, moderate to high levels of fine sediments, and most have higher water temperatures than preferred by salmonids. Some stream reaches have water temperatures that are lethal for salmonids during summer and early fall, or the channel is dry in some places. Passage problems exist in several of these streams (Mendel et al. 2004).

3.5 Wildlife

According to the Interactive Biodiversity Information System (IBIS) web site, more than 250 species of reptiles, amphibians, birds, and mammals occur within the Action Area (IBIS 2010). Big game species present in the Action Area include elk, black bear, and deer. Upland game birds include ring-necked pheasant, chukar, and wild turkey, among others.

Within the Action Area, fish are an important part of the diets of a variety of wildlife species including giant salamander, common loon, grebes, American white pelican, double-crested cormorant, herons, turkey vulture, harlequin duck, common and Barrow's goldeneye, common and red-breasted merganser, osprey, bald eagle, golden eagle, gulls, terns, belted kingfisher, Steller's jay, black-billed magpie, American crow, common raven, and American dipper. Mammals that consume salmon include Virginia opossum, water shrew, coyote, black bear, raccoon, mink, northern river otter, and bobcat. During salmonid freshwater rearing, these wildlife species may consume salmonid eggs, juveniles, adults, and/or carcasses.

Double-crested cormorants (*Phalacrocorax auritis*) and gulls (*Larus* spp.) are the principal avian predators in the basin. The breeding season for these birds coincides with the juvenile salmon outmigration, which provides an important source of prey for the birds (SRSRB 2006). Piscivorous (fish-eating) birds often congregate near hydroelectric dams in the Columbia River Basin and eat large quantities of migrating juvenile salmonids. Diet analyses indicate that juvenile salmonids constitute a major food source for avian predators and that, throughout the Columbia River Basin, losses to birds account for a substantial proportion of fish mortality each

year (SRSRB 2006). Populations of gulls, in particular, have increased throughout the Columbia River Basin as a result of creation of nesting and feeding habitats through human activities (SRSRB 2006). Dredge spoil deposited in rivers and wetlands, reservoir impoundments, and tailrace outfalls at dams are examples of habitats favored by gulls and other fish-eating birds (SRSRB 2006).

Wildlife habitats within the Snake River Basin consist primarily of riparian/floodplain, shrub steppe, and agricultural lands. Other important habitats include forest lands and transitional steppe areas near the mountains and foothills (SRSRB 2006). The riparian/floodplain habitat lies along the Snake River and its tributaries. The shrub steppe and agricultural habitats encompass the uplands and comprise agricultural croplands, rangeland, and undeveloped areas. Areas of healthy riparian vegetation in the lower elevations are important to wildlife because they provide refuge and habitat (SRSRB 2006). The majority of wildlife is found in riparian, forest, and transitional steppe habitats where food and refuge are plentiful. Deer and elk are often found in agricultural fields.

Riparian zones are important habitats for a variety of wildlife species (SRSRB 2006). Some species are dependent upon riparian zones and some use the areas only for specific life stages. For example, black-crowned night herons and great blue herons use riparian areas for nesting. Furbearers, such as mink, muskrat, and beaver, are found along rivers and streams in riparian zones. Deer often use riparian zones to have their fawns. Neo-tropical birds use riparian zones as they migrate back and forth from Central and South America. And scavengers eat salmon carcasses for in the riparian zone.

Other human activities that are unrelated to the proposed fisheries in the FMEP and that could affect wildlife in the Action Area, such as camping, hunting, or boating would continue for the duration of the proposed FMEP.

3.6 Listed Plants

Listed plants in the Action Area include Spalding's catchfly (*Silene spaldingii)* and Ute lady's tresses (*Spiranthes diluvialis).* Both are terrestrial perennials.

Spalding's catchfly is an herbaceous perennial plant in the pink family (Caryophyllaceae) (USFWS 2007). It is a regional endemic found predominantly in bunchgrass grasslands and sagebrush-steppe, and occasionally in open pine communities, in eastern Washington, northeastern Oregon, west-central Idaho, western Montana, and barely extending into British Columbia, Canada (USFWS 2007). There are currently 99 known populations of *S. spaldingii*, with two-thirds of these (66 populations) composed of fewer than 100 individuals each. There are an additional 23 populations with at least 100 or more individuals apiece, and the 10 largest populations are each made up of more than 500 plants (USFWS 2007). Occupied habitat includes five physiographic (physical geographic) regions: the Palouse Grasslands in west-central Idaho and southeastern Washington; the Channeled Scablands in eastern Washington; the Blue Mountain Basins in northeastern Oregon; the Canyon Grasslands of the Snake River and its tributaries in Idaho, Oregon, and Washington; and the Intermontane Valleys of northwestern Montana. Spalding's catchfly was listed as a threatened species under the Endangered Species Act on October 10, 2001 (USFWS 2001). No critical habitat has been designated for this species

(USFWS 2010). A recovery plan was finalized by the U.S. Fish and Wildlife Service in September 2007 (USFWS 2007).

The Ute lady'-tresses is an orchid that occurs in relatively low elevation riparian, spring, and lakeside wetland meadows in three general areas of the interior western United States: near the base of the eastern slope of the Rocky Mountains in southeastern and central Wyoming and north-central and central Colorado, and Montana; in the upper Colorado River basin, particularly in the Uinta Basin; and along the Wasatch Front and westward in the eastern Great Basin, in north-central and western Utah and extreme eastern Nevada (USFWS 1995). There are four know populations of Ute lady's tresses in Washington State, three of which occur near one another in the Columbia River (WDNR 2010). The total population is approximately 20,500 individuals. The riparian and wetland habitats required by this species have been heavily impacted by urban development, stream channelization, water diversions, and other watershed and stream alterations that reduce the natural dynamics of stream systems, recreation, and invasion of habitat by exotic plant species. These activities are expected to continue threatening remaining Ute 1ady'-tresses populations and habitats (USFWS 1995). No critical habitat has been designated or recovery plan developed for this species (USFWS 2010).

3.7 Socioeconomics

Prior to contact with European settlers, the native peoples harvested fish from the Snake and Columbia Rivers and hunted elk, deer, bear, and waterfowl. The lower Snake, Asotin, Walla Walla, and Tucannon Rivers are still of particular historic and cultural importance to the native people that continue to harvest within the Action Area.

Today, the economy of the region including the areas in which the proposed fisheries would take place is primarily dependent upon agriculture (Asotin 1997; Dayton, Washington 2004; Pasco, Washington 2003; Walla Walla County 2004; Walla Walla Valley Chamber of Commerce 2002; Whitman County 2003).

Other economic factors include industry (primarily related to agriculture), education, recreation and tourism, and government. Whitman College and Walla Walla Community College are located in Walla Walla (Walla Walla County 2004), and Washington State University is located in Pullman (Pullman, Washington 2003). In many communities, the largest employers are the school districts and various government entities (State of Washington 2004).

According to the Comprehensive Economic Development Strategy for the Southeast Washington counties of Asotin, Columbia, Garfield, and Whitman (Palouse Economic Development Council 2008), the largest employment industry in the area is the government (42 percent of employment). Agriculture, forestry, and fishing, combined, account for 3 percent of all employment (PEDC 2008).

3.7.1 Tourism and Recreation

Tourism is centered on the region’s natural and historical attributes. Sites of historic interest are found throughout the region in which the proposed fisheries would take place. For example, the Whitman Mission National Historical Site and Fort Walla Walla are located near Walla Walla

(Walla Walla Valley Chamber of Commerce 2002). Dayton supports 117 buildings listed on the National Historic Register (Dayton, Washington 2004). The Lewis and Clark expedition is commemorated throughout the region; a number of parks and memorials are found along their original route (Dayton, Washington 2004; Pasco, Washington 2003).

Hunting and sportfishing also bring visitors to the area. Deer, elk, and upland game birds are important species to hunters. The Snake River reservoirs are the most popular fishing areas and support a major year-round fishery. Hatchery-reared steelhead and salmon are released into the Snake River (WDFW 2003). Warmwater species, including smallmouth bass, channel catfish, and some sturgeon, are caught in the sloughs and backwaters of the Snake River. The Grande Ronde River in Asotin County provides hatchery steelhead as well as smallmouth bass and channel catfish. Fishing for stocked rainbow trout takes place at various ponds throughout the recovery region.

Mendel (2010) provided economic estimates for steelhead fisheries for Southeast Washington, which for practical purposes is considered equivalent to the Action Area in this analysis. Chapter 3 of WDFW's Steelhead Management Plan (WDFW 2008) provides an estimate of $999 spent per steelhead harvested, plus an economic multiplier of 1.9, for a total economic benefit per steelhead kept of $1,898 in 2001 dollars. Also, Table 4-1 in WDFW (2008) shows the economic output or total economic value of Columbia River Basin summer steelhead fisheries is $119.8 million in 2001 dollars.

Using an estimate of $999 spent per steelhead harvested as the baseline and increasing the value at 2 percent per year for inflation to bring it up to 2007 dollars, that would bring the per fish value to $1,125 direct expenditures and $2,138 per fish for total economic value or output (Table 3-1 in PEDC 2008). For example, the number of steelhead harvested in the 2006-2007 steelhead fishing season in the southeast Washington portion of the Snake River was 14,326 (Figure 1). Therefore, the total economic benefit for all steelhead harvested in the 2006-2007steelhead fishing season was $30,621,825 (Mendel 2010).

3.8 Environmental Justice

Impacts on environmental justice occur when an action disproportionally impacts low income or minority populations. All four counties within the Palouse Economic Development District (Asotin, Columbia, Garfield, and Whitman) saw an increase in diversity based on census year numbers (Table 4). The 2006 estimate shows an increase in most categories of diversity; however, the total minority population has decreased in each county, as total population increased. According to the Washington State Office of Financial Management, data for 2007 are not available (Palouse Economic Development Council 2008).

Table 4. Racial Composition by County 1990-2006 (Palouse Economic Development Council 2008).

County, WA	Asotin			Columbia			Garfield			Whitman		
	1990	2000	2006	1990	2000	2006	1990	2000	2006	1990	2000	2006
White	17,136	19,650	20,286	3,874	3,809	3,965	2,222	2,312	2,337	35,653	35,880	37,776
Black	38	39	55	1	9	10	0	0	0	490	623	742
American Indian, Eskimo & Aleut	260	260	283	27	39	42	12	9	10	248	298	330
Asian & Pacific Islanders	107	110	137	16	19	23	7	17	22	2,112	2,369	2,976
*Hispanic	278	401	471	463	258	298	22	47	59	683	1219	1410
2 or More	64	492	339	106	188	61	7	59	31	272	1570	976
Population Total	17,605	20,551	21,100	4,024	4,064	4,100	2,248	2,397	2,400	38,775	40,740	42,800
Total % Minority	2.66	4.38	3.88	3.73	6.27	3.32	1.16	3.55	2.63	8.05	11.93	11.73

4.0 ENVIRONMENTAL CONSEQUENCES

This section of the assessment evaluates the potential effects of the alternatives (including the proposed action) on the biological, physical, and human environments described in Chapter 3, Affected Environment. No other resources of the environment were identified that could potentially be impacted or benefited from any of the alternatives.

4.1 Effects on Water Quality

4.1.1 Alternative 1 (No-action) – Issue a determination that Washington's FMEP does not satisfy the 4(d) Rule

Fisheries proposed in the FMEP would not be implemented under the No-action Alternative. The absence of steelhead and miscellaneous fisheries under the No-action Alternative would not affect water temperature, flows, and pollutant levels because there is no relationship between fishing activity and fluctuation of these water quality parameters. The only possible benefit of the No-action Alternative would result from the elimination of the possibility of accidental spilling of gasoline by anglers with motorized vessels in the water, however, this benefit would be minor because boating associated with fisheries is only a small proportion of all boating activity in the Action Area (WDFW 2009).

The absence of hatchery-origin adult steelhead and miscellaneous fisheries under the No-action Alternative would be beneficial to water quality with respect to the amount of marine-derived nutrients delivered to the ecosystem by steelhead and Chinook salmon that would die near the spawning grounds, before or after spawning, instead of being caught in the proposed fisheries. A

small increase in marine-derived nutrients delivered to the ecosystem would be the only logical positive effect of the No-action Alternative. However, it is not certain if this small gain would yield measurable beneficial effects given habitat changes that have already occurred due to beaver trapping, logging, irrigation, grazing, pollution, dams, urban and industrial development in the Action Area (Subsection 3.1, Water Quality). It is likely that the amount of marine-derived nutrients under the No-action Alternative would not be substantially different from the other alternatives to result in differences in the growth of riparian forests as described by Helfield and Naiman (2001). The functional and quantitative relationships between carcass density and productivity of salmonid rearing habitat are poorly understood and difficult to generalize (Quinn and Peterson 1996), therefore, it is difficult to estimate these relationships under the No-Action alternative.

There would be no other measurable effects to water quality from the No-action Alternative. The No-Action Alternative is not expected to result in any changes to the 303(d) listings or to groundwater conditions in the Action Area because the expected effects on these resources would be either nonexistent or too small to be measurable.

4.1.2 Alternative 2 (Proposed Action) – Issue a determination that the FMEP satisfies the 4(d) Rule

Alternative 2 would result in the implementation of fisheries as described in the FMEP (WDFW 2009). The fisheries included in the FMEP would not affect water temperature, flows, and pollutant levels because there is no relationship between fishing activity and these water quality parameters. Contrary to the No-action Alternative, the only possible introduction of pollutants from the implementation of Alternative 2 would result from accidental spilling of gasoline by anglers with motorized vessels in the water. However, this effect to water quality would be minor because less than half of the anglers participating in the proposed fisheries would use boats, and because boating associated with fisheries is only a small proportion of all boating activity in the Action Area (WDFW 2009).

The implementation of fisheries under Alternative 2 would result in the removal of a small percentage of steelhead and Chinook salmon that would otherwise die in the stream after spawning as under the No-action Alternative (Table 5). Furthermore, all hatchery-origin fish that would reach the hatchery weirs under any alternative would be removed and would not contribute nutrients to the system regardless of alternative. Therefore Alternative 2 would have only a small adverse effect on water quality compared to the No-action Alternative, and only with respect a small loss in the amount of marine-derived nutrients delivered to the ecosystem by natural-origin fish that would die as a result of fisheries instead of dying after spawning.

Table 5. Estimated annual incidental mortality rates for adult steelhead and Chinook salmon listed under the ESA as a result of the implementation of fisheries included in the FMEP[4].

ESA-listed Species or Population	Expected (and Maximum) Incidental Mortality Rate (Percent)
Snake River steelhead DPS - Mainstem steelhead fisheries	1 (1.5)
Grande Ronde steelhead population – Grande Ronde terminal steelhead fishery	2.5 (5)
Tucannon River steelhead population – Tucannon terminal steelhead fishery	2.5 (5)
Snake River spring/summer Chinook salmon ESU – Mainstem steelhead fisheries	0 (0.1)
Grande Ronde spring Chinook salmon population – Grande Ronde terminal steelhead fishery	0 (0.1)
Tucannon spring Chinook salmon population – Tucannon terminal steelhead fishery	0.1 (0.2)
Fall Chinook salmon ESU – Mainstem steelhead fisheries	1 (1.5)
Snake River Sockeye ESU – Mainstem steelhead fisheries	0 (0.1)

As illustrated in Table 5, the decrease in the amount of marine-derived nutrients under Alternative 2 compared to the ongoing fishery would be very small (0.1-5 percent, depending on the population, ESU or DPS). It is probable that the potential small reduction in marine-derived nutrients would not be substantially different from the No-action Alternative to result in differences in the growth of riparian forests due to 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 as described by Helfield and Naiman (2001). The functional and quantitative relationships between carcass density and productivity of salmonid rearing habitat are poorly understood and difficult to generalize (Quinn and Peterson 1996), therefore, as under No-action conditions, the impacts on these relationships are difficult to estimate under the Proposed Action.

There would be no other measurable effects to water quality from Alternative 2. As under the No-action Alternative, Alternative 2 is not expected to result in any changes to the 303(d) listings or to groundwater conditions in the Action Area because the expected effects of the fisheries in the FMEP on these resources would be either nonexistent or too small to be measurable.

4.1.3 Alternative 3 (No Steelhead Fisheries) - Issue a determination that only miscellaneous fisheries targeting resident species in the FMEP satisfy the 4(d) Rule

Alternative 3 would result in the implementation of only a subset of fisheries described in the FMEP (WDFW 2009). The implementation of this subset of fisheries would not affect water temperature, flows, and most pollutants because there is no relationship between fishing activity

[4] The proposed harvest rates under Alternative 2 are the same as those observed in the same fisheries as those included in the FMEP under consideration since 1980.

considered under Alternative 3 and these water quality parameters. The only possible introduction of pollutants from the implementation of Alternative 3, compared to the No-action Alternative, would result from accidental spilling of gasoline by anglers with motorized vessels in the water. According to WDFW, fisheries targeting non-anadromous species rarely use boats in the Action Area. And that would make the number of anglers with motorized vessels under Alternative 3 smaller that under Alternative 2 (Mendel 2010).

Similar to the No-action Alternative, fisheries targeting hatchery-origin adult steelhead would not take place under Alternative 3. Marine-derived nutrients are only delivered to the ecosystem by steelhead and salmon returning from the ocean to spawn in freshwater. And because Alternative 3 does not consider steelhead fisheries, it is for all practical purposes exactly the same as the No-action Alternative with respect to its likely effect on water quality parameters influenced by marine-derived nutrients. As discussed in Subsection 4.1.1, Alternative 1 – No-action, it is not certain if this small gain would yield measurable beneficial effects given habitat changes that have already occurred due to beaver trapping, logging, irrigation, grazing, pollution, dams, urban and industrial development in the Action Area (Subsection 3.1, Water Quality). It is likely that the amount of marine-derived nutrients under Alternative 3 would not be substantially different from the other alternatives regarding differences in the growth of riparian forests as described by Helfield and Naiman (2001). The functional and quantitative relationships between carcasses density and productivity of salmonid rearing habitat are poorly understood and difficult to generalize (Quinn and Peterson 1996), and, as under the No-action Alternative and Alternative 2, are difficult to estimate under Alternative 3.
As under the No-action Alternative, there would be no other measurable effects to water quality from Alternative 3. Alternative 3 is not expected to result in any changes to the 303(d) listings or to groundwater conditions in the Action Area because the expected effects on these resources from the subset of fisheries considered under Alternative 3 would be either nonexistent or too small to be measurable.

4.2 Effects on ESA-listed Fish

4.2.1 Alternative 1 (No-action) – Issue a determination that Washington's FMEP does not satisfy the 4(d) Rule

Fisheries proposed in the FMEP would not be implemented under the No-action Alternative. The absence of fisheries in the Action Area under the No-action Alternative would result in an increase in the abundance of ESA-listed fish on any given year compared to those described in Subsection 3.2, ESA-listed Fish, proportionally to the expected take under Alternative 2 (Table 5). The annual abundance of ESA-listed steelhead and Chinook salmon a result of the No-action Alternative could increase by 0.1-5 percent of the run, depending on the fishery, species, and population (Table 5).

Abundance trends described in Subsection 3.2, ESA-listed Fish, for all affected ESA-listed species account for fishery-related incidental mortality at levels comparable to those proposed in the FMEP (which has been the same level since 1980; WDFW 2009). In Subsections 3.2.1, 3.2.2, and 3.2.3 it is stated that the future status of all populations and MPGs of Snake River steelhead, Snake River fall Chinook salmon, and Snake River spring/summer Chinook salmon would improve compared to their current status through the implementation of Prospective Actions

described in the FCRPS and Bureau of Reclamation biological opinions (NMFS 2008b, NMFS 2008c). The absence of hatchery-origin adult steelhead and miscellaneous fisheries under the No-action Alternative could result in a slight increase in abundance for those populations, MPGs, ESUs, and DPSs proportional to the expected take under Alternative 2 (Table 5). However, given that the expected take under Alternative 2 is low (1-1.5 percent for Snake River fall Chinook salmon, 0-0.2 percent for Snake River spring/summer Chinook salmon, and 1-5 percent for Snake River steelhead), the No-action Alternative would only result in a small increase in abundance.

Under the No-action Alternative, there would also not be any harvest of hatchery-origin fall Chinook salmon. Section 3.2.2, Snake River Fall Chinook Salmon, indicates that the median proportion of natural-origin returns has been approximately 32 percent over the past two brood cycles. The proportion of natural-origin returns is affected by both the number of hatchery-origin fish and the number of natural-origin fish. Even with a potential increase in abundance of 1-1.5 percent for natural-origin fall Chinook salmon under the No-action Alternative, the number of hatchery-origin fall Chinook salmon that would escape to spawn in the wild (not removed at hatchery weirs – weirs are not 100 percent efficient) would also increase in any given year because of the lack of removal of hatchery-origin fall Chinook salmon under the ongoing fisheries.

The expected increase or decrease in the abundance trends under the No-action Alternative for sockeye salmon and bull trout would not be measureable. Although the Snake River Washington Recovery Unit Team indicates that local populations of bull trout within the recovery unit (including mainstem reaches and many tributaries within the Tucannon River and Asotin Creek watershed) consist of migratory and resident life history forms, bull trout are not normally encountered in ongoing fisheries in the Action Area (WDFW 2009). If there is no fishery under the No-Action Alternative, there is little or no chance that bull trout or the recovery unit would be negatively affected by this alternative, and only a slight opportunity for recovery unit improvements since this species is rarely encountered in the Action Area. There is only a slight chance to encounter an ESA-listed sockeye under current conditions (WDFW 2009). Similarly, the No-action Alternative would not have a measurable negative or beneficial effect on Snake River sockeye salmon since there would be no fishery under this alternative and since sockeye salmon are rarely encountered.

Miscellaneous fisheries (fisheries targeting trout, bass, walleye, catfish, crappie, yellow perch, sunfish, whitefish, northern pikeminnow, sturgeon, catfish, bullhead, and carp) can result in harvest of a small number of ESA-listed juvenile steelhead (WDFW 2009). The number of adult natural-origin salmon and steelhead caught and released in miscellaneous fisheries under current conditions is low, but no specific data exist for the Action Area (WDFW 2009). Data that are available through creel surveys and verbal reports from WDFW enforcement suggest that miscellaneous fisheries generally have a negligible impact on listed salmon and steelhead (WDFW 2009). Schuck and Mendel (1987) found that naturally produced rainbow trout or juvenile steelhead comprised only 0.6 percent of the total resident rainbow trout harvest. The additional number of adult spawners returning in future years that would result from a lack of miscellaneous fisheries in the Action Area under the No-action Alternative compared to current conditions would equal the number of ESA-listed juvenile steelhead that would be killed on any

given year multiplied by the smolt-to-adult spawner survival rate (SAR), which is estimated to be 1.72 percent (WDFW 2009). With an expected catch for ESA-listed steelhead of less than 0.6 percent of total trout harvest under current conditions, combined with an SAR of 1.72 percent, the potential increase in adult steelhead returns as a result of implementing the No-action Alternative would be negligible.

Because some of the miscellaneous fisheries in the FMEP are designed to purposely reduce the number of fish for some non-native species that prey on anadromous salmonids, the No-action Alternative would preclude fisheries that could benefit ESA-listed species because it would not allow for the removal of potential predators from specific areas from taking place.

The potential effects on state species of concern listed in Subsection 3.2.6, Washington State's Species of Concern, would not be measurable under any alternative because these species are not expected to be present in measurable numbers in the Action Area during any fishery season (WDFW 2009).

4.2.2 Alternative 2 (Proposed Action) – Issue a determination that the FMEP satisfies the 4(d) Rule

Fisheries proposed in the FMEP would be implemented under Alternative 2. Unlike the No-action Alternative, incidental mortality of ESA-listed fish would occur under Alternative 2 if these are caught and released during fisheries targeting hatchery-origin steelhead, and to a minor extent during miscellaneous fisheries targeting other species. Alternative 2 would not result in a decrease in the abundance of ESA-listed fish on any given year compared to those described in Subsection 3.2, ESA-listed Fish, because abundance trends described for the current Affected Environment for all affected ESA-listed species account for fishery-related incidental mortality at levels comparable to those proposed in the FMEP (which has been the same level since 1980; WDFW 2009). Therefore the abundance trends for ESA-listed species presented in Subsections 3.2.1, 3.2.2, and 3.2.3 would not be affected by fisheries under Alternative 2, but would be slightly lower than those expected under the No-action Alternative with the absence of fisheries. The year-specific number of ESA-listed steelhead and Chinook salmon that would not spawn in the wild as a result of the Alternative 2 is outlined in Table 5.

In Subsections 3.2.1, 3.2.2, and 3.2.3 it is stated that the future status of all populations and MPGs of Snake River steelhead, Snake River fall Chinook salmon, and Snake River spring/summer Chinook salmon would improve compared to their current status through the implementation of Prospective Actions described in the FCRPS and Bureau of Reclamation biological opinions (NMFS 2008b, NMFS 2008c). The implementation of hatchery-origin adult steelhead and miscellaneous fisheries under the Alternative 2 would not result in a slight increase in abundance for those populations, MPGs, ESUs, and DPSs proportional to the expected take of ESA-listed fish (Table 5). However, given that the expected take under Alternative 2 would be low (1-1.5 percent for Snake River fall Chinook salmon, 0-0.2 percent for Snake River spring/summer Chinook salmon, and 1-5 percent for Snake River steelhead), Alternative 2 would preclude only a small increase in abundance compared to those described as the current Affected Environment (Section 3.2, ESA-listed Fish).

Unlike conditions under the No-Action Alternative, WDFW anticipates that no more than 10 percent of the adult, naturally produced ESA-listed Snake River fall Chinook salmon counted passing Lower Granite Dam could be caught and released on any given year for the duration of the FMEP, with a 10 percent hook and release mortality for unmarked Chinook (1 percent total mortality for naturally produced fall Chinook adults over Lower Granite Dam). WDFW's proposed retention of hatchery-origin fall Chinook salmon incidental to the steelhead fisheries would provide a benefit to the natural population by reducing the ratio of hatchery-origin to natural-origin Chinook salmon on the spawning grounds. This benefit would not be realized under the No-action Alternative. The retention of marked hatchery-origin Snake River fall Chinook adults would not be allowed if the naturally produced portion of the population at Lower Granite Dam is not likely to achieve at least 1,000 fish on any given year.

The expected increase or decrease in the abundance trends under Alternative 2 for sockeye salmon and bull trout would not be measureable as compared to the No-action Alternative. Although the Snake River Washington Recovery Unit Team indicates that local populations of bull trout within the recovery unit (including mainstem reaches and many tributaries within the Tucannon River and Asotin Creek watershed) consist of migratory and resident life history forms, bull trout would not be normally encountered in proposed fisheries under Alternative 2 in the Action Area (WDFW 2009). Under Alternative 2 there is little or no chance that bull trout in the Action Area or the recovery unit would be negatively affected by this alternative, and only a slight opportunity for recovery unit improvements since this species would be rarely encountered. There would only be a slight chance to encounter an ESA-listed sockeye under Alternative 2 (WDFW 2009). Similar to the No-action Alternative, Alternative 2 would not have a measurable negative or beneficial effect on Snake River sockeye salmon because sockeye salmon would rarely be encountered in the proposed fisheries.

Miscellaneous fisheries (fisheries targeting trout, bass, walleye, catfish, crappie, yellow perch, sunfish, whitefish, northern pikeminnow, sturgeon, catfish, bullhead, and carp) can result in harvest of a small number of ESA-listed juvenile steelhead (WDFW 2009). As under the No-action Alternative, the number of adult natural-origin salmon and steelhead that would be caught and released in miscellaneous fisheries under Alternative 2 would be low, but no specific data exist for the Action Area (WDFW 2009). Data that are available through creel surveys and verbal reports from WDFW enforcement suggest that miscellaneous fisheries generally have a negligible impact on listed salmon and steelhead (WDFW 2009). Schuck and Mendel (1987) found that naturally produced rainbow trout or juvenile steelhead comprised only 0.6 percent of the total resident rainbow trout harvest. The reduction in the number of adult spawners that would return in future years from the implementation of miscellaneous fisheries in the Action Area under Alternative 2 would equal the number of ESA-listed juvenile steelhead that would be killed on any given year multiplied by the smolt-to-adult spawner survival rate (SAR), which is estimated to be 1.72 percent (WDFW 2009). With an expected catch for ESA-listed steelhead of less than 0.6 percent of total trout harvest, combined with an SAR of 1.72 percent, the potential decrease in adult steelhead returns under Alternative 2 would be negligible compared to the No-action Alternative.

Some of the miscellaneous fisheries in the FMEP are designed to purposely reduce the number of fish for some non-native species. Alternative 2 would allow fisheries that could benefit ESA-listed species by removing potential predators from specific areas to take place. This would be a

species benefit compared to the No-action Alternative where this predator removal would not occur.

As under the No-action Alternative, the potential effects on state species of concern listed in Subsection 3.2.6, Washington State's Species of Concern, would not be measurable under any alternative because these species are not expected to be present in measurable numbers in the Action Area during any fishery season (WDFW 2009).

4.2.3 Alternative 3 (No Steelhead Fisheries) - Issue a determination that only miscellaneous fisheries targeting resident species in the FMEP satisfy the 4(d) Rule

Fisheries targeting hatchery-origin steelhead would not occur under Alternative 3. Similar to the No-action Alternative, the absence of fisheries targeting hatchery-origin steelhead in the Action Area under Alternative 3 would result in an increase in the abundance of ESA-listed fish on any given year compared to those described in Subsection 3.2, ESA-listed Fish, proportionally to the expected take under Alternative 2 (Table 5). The annual abundance of ESA-listed steelhead and Chinook salmon a result of Alternative 3 could increase by 0.1-5 percent of the run, depending on the fishery, species, and population (Table 5).

Abundance trends described in Subsection 3.2, ESA-listed Fish, for all affected ESA-listed species account for fishery-related incidental mortality at levels comparable to those proposed in the FMEP (which has been the same level since 1980; WDFW 2009). In Subsections 3.2.1, 3.2.2, and 3.2.3 it is stated that the future status of all populations and MPGs of Snake River steelhead, Snake River fall Chinook salmon, and Snake River spring/summer Chinook salmon would improve compared to their current status through the implementation of Prospective Actions described in the FCRPS and Bureau of Reclamation biological opinions (NMFS 2008b, NMFS 2008c). The absence of hatchery-origin adult steelhead fisheries under Alternative 3 could result in a slight increase in abundance for those populations, MPGs, ESUs, and DPSs proportional to current conditions (Table 5). However, as under the No-action Alternative, given that the take under current conditions is low (1-1.5 percent for Snake River fall Chinook salmon, 0-0.2 percent for Snake River spring/summer Chinook salmon, and 1-5 percent for Snake River steelhead), Alternative 3 would only result in a small increase in abundance.

Similar to the No-Acton Alternative, there would also not be any harvest of hatchery-origin fall Chinook salmon Under Alternative 3. Section 3.2.2, Snake River Fall Chinook Salmon, indicates that the median proportion of natural-origin returns has been approximately 32 percent over the past two brood cycles. The proportion of natural-origin returns is affected by both the number of hatchery-origin fish and the number of natural-origin fish. Even with a potential increase in abundance of 1-1.5 percent for natural-origin fall Chinook salmon under the No-action Alternative, the number of hatchery-origin fall Chinook salmon that would escape to spawn in the wild (not removed at hatchery weirs – weirs are not 100 percent efficient) would also increase in any given year because of the lack of removal of hatchery-origin fall Chinook salmon under the ongoing fisheries.

The expected increase or decrease in the abundance trends under Alternative 3 for sockeye salmon and bull trout would not be measureable. Although the Snake River Washington Recovery Unit Team indicates that local populations of bull trout within the recovery unit

(including mainstem reaches and many tributaries within the Tucannon River and Asotin Creek watershed) consist of migratory and resident life history forms, bull trout are not normally encountered in ongoing fisheries in the Action Area. With a reduced fishery regime under Alternative 3, there is little chance that bull trout or the recovery unit would be negatively affected by this alternative, and only a slight opportunity for recovery unit improvements since this species is rarely encountered in miscellaneous fisheries in the Action Area. There is almost no chance to encounter an ESA-listed sockeye under Alternative 3 (WDFW 2009). As under the No-action Alternative, Alternative 3 would not have a measurable negative or beneficial effect on Snake River sockeye salmon since sockeye salmon would not be likely encountered at all in the miscellaneous fisheries.

Miscellaneous fisheries (fisheries targeting trout, bass, walleye, catfish, crappie, yellow perch, sunfish, whitefish, northern pikeminnow, sturgeon, catfish, bullhead, and carp) can result in harvest of a small number of ESA-listed juvenile steelhead (WDFW 2009). As under all the alternatives, the number of adult natural-origin salmon and steelhead that would be caught and released in miscellaneous fisheries under Alternative 3 would be low, but no specific data exist for the Action Area (WDFW 2009). Data that are available through creel surveys and verbal reports from WDFW enforcement suggest that miscellaneous fisheries generally have a negligible impact on listed salmon and steelhead (WDFW 2009). Schuck and Mendel (1987) found that naturally produced rainbow trout or juvenile steelhead comprised only 0.6 percent of the total resident rainbow trout harvest. The reduction in the number of adult spawners that would return in future years from the implementation of miscellaneous fisheries in the Action Area under the Alternative 3 would equal the number of ESA-listed juvenile steelhead that would be killed on any given year multiplied by the smolt-to-adult spawner survival rate (SAR), which is estimated to be 1.72 percent (WDFW 2009). With an expected catch for ESA-listed steelhead of less than 0.6 percent of total trout harvest, combined with an SAR of 1.72 percent, the potential decrease in adult steelhead returns under Alternative 3 would be negligible compared to the No-action Alternative.

Some of the miscellaneous fisheries in the FMEP are designed to purposely reduce the number of fish for some non-native species. Although a modification of the FMEP fisheries under Alternative 2, Alternative 3 would allow fisheries that could benefit ESA-listed species by removing potential predators from specific areas to take place. This would be a species benefit compared to the No-action Alternative where this predator removal would not occur.

As under the No-action Alternative, the potential effects on state species of concern listed in Subsection 3.2.6, Washington State's Species of Concern, would not be measurable under any alternative because these species are not expected to be present in measurable numbers in the Action Area during any fishery season (WDFW 2009).

4.3 Effects on Non-listed Fish

4.3.1 Alternative 1 (No-action) – Issue a determination that Washington's FMEP does not satisfy the 4(d) Rule

Fisheries proposed in the FMEP would not be implemented under the No-action Alternative. The absence of fisheries in the Action Area under the No-action Alternative, including predator

control fisheries, may result in an increase or a decrease in the abundance of non-listed fish, native and introduced, compared to current conditions. Because miscellaneous fisheries the Action Area are currently managed in a manner consistent with the maintenance of self-sustaining populations, for the purpose of this analysis it is assumed that the No-action Alternative would have a neutral effect on non-listed species.

4.3.2 Alternative 2 (Proposed Action) – Issue a determination that the FMEP satisfies the 4(d) Rule

Alternative 2 would result in the implementation of fisheries as described in the FMEP. Fisheries targeting hatchery-origin steelhead under Alternative 2 would not result in additional effects to non-listed fish species, native and introduced, compared to the No-action Alternative because the methods and gears in these fisheries would not likely result in the catch of non-listed fish (WDFW 2009). Fisheries targeting non-listed fish in the Action Area under Alternative 2, including predator control fisheries, would be managed in a manner consistent with the maintenance of self-sustaining populations. Therefore, fisheries in the Action Area under Alternative 2 would not likely result in any measureable biological or ecological effect on non-listed fish species compared to the no-Action Alternative. . However, because some of the proposed miscellaneous fisheries in the FMEP target non-native predators, Alternative 2 could result in potential benefits for native species from the removal of predatory non-native species in the Action Area. However, the effects, adverse or beneficial, of proposed fishing activity on non-listed fish under Alternative 2 are not estimated and could be considered neutral or negligible.

4.3.3 Alternative 3 (No Steelhead Fisheries) – Issue a determination that only miscellaneous fisheries targeting resident species in the FMEP satisfy the 4(d) Rule

Only miscellaneous fisheries would occur in the Action Area under Alternative 3. Any potential increase or a decrease in the abundance of non-listed fish, native and introduced, under Alternative 3 compared to the No-action Alternative cannot be easily measured. Since miscellaneous fisheries the Action Area under Alternative 3, including predator control fisheries, would continue to be managed in a manner consistent with the maintenance of self-sustaining populations, for the purpose of this analysis it is assumed that Alternative 3 would have a neutral effect on non-listed species compared to the No-Action Alternative. The absence of fisheries targeting hatchery-origin steelhead under Alternative 3 would not result in any measurable differences compared to Alternative 2 because the additional methods and gears that would be used in Alternative 2 for hatchery-origin steelhead fisheries compared to Alternative 3 would not result in the catch of non-listed fish (WDFW 2009).

4.4 Effects on Instream Fish Habitat

4.4.1 Alternative 1 (No-action) – Issue a determination that Washington's FMEP does not satisfy the 4(d) Rule

The absence of fisheries under the No-action Alternative would eliminate any potential interaction between anglers and channel morphology, geological conditions, or flows. Therefore, effects on this resource under the No-action Alternative would be negligible. All other existing

effects on instream fish habitat, such as land-use practices, erodible soils, and extremes of flow (Subsection 3.4, Instream Fish Habitat) would continue under the No-action Alternative.

4.4.2 Alternative 2 (Proposed Action) – Issue a determination that the FMEP satisfies the 4(d) Rule

Potential effects on instream fish habitat under the Alternative 2 would be related to fishing activity and deployment of gear. However, methods and gear that would be used under Alternative 2 would not alter channel morphology, geological conditions, or flows. Furthermore, any potential effect of Alternative 2 on fish habitat compared to the No-action Alternative, however negligible, would be limited in duration and geographical scope as described in the FMEP. All other existing effects on instream fish habitat, such as land-use practices, erodible soils, and extremes of flow (Subsection 3.4, Instream Fish Habitat) would continue under Alternative 2.

4.4.3 Alternative 3 (No Steelhead Fisheries) – Issue a determination that only miscellaneous fisheries targeting resident species in the FMEP satisfy the 4(d) Rule

Fisheries targeting hatchery-origin steelhead would not occur under Alternative 3. However, miscellaneous fisheries would occur under Alternative 3. Effects on instream fish habitat would, therefore, be related to fishing activity and deployment of gear. However, methods and gear that would be used under Alternative 3 would not alter channel morphology, geological conditions, or flows. Furthermore, any potential effect of Alternative 3 on fish habitat compared to the No-action Alternative, however negligible, would be limited in duration and geographical scope as described in the FMEP. All other existing effects on instream fish habitat, such as land-use practices, erodible soils, and extremes of flow (Subsection 3.4, Instream Fish Habitat) would continue under Alternative 3.

4.5 Effects on Wildlife

4.5.1 Alternative 1 (No-action) – Issue a determination that Washington's FMEP does not satisfy the 4(d) Rule

Because fisheries proposed in the FMEP would not be implemented under the No-action Alternative, there would be no fishery-related effects on the more than 250 species of reptiles, amphibians, birds, and mammals that could be present in the Action Area. Likewise, the lack of fish harvest (fish removal from the system) under the No-action Alternative would presumably not affect the diet of any affected wildlife species that consumes fish in the Action Area as part of their diet, including double-crested cormorants. Double-crested cormorants' breeding season coincides with juvenile salmon outmigration, and the No-Action Alternative is not expected to alter the number of anadromous fish spawning and thus would not affect the number of smolts outmigrating on any given year.

The absence of fisheries would not remove a small number of potential preys for predators (i.e., adult salmon for large predators and resident fish for smaller predators beyond the location of the proposed fisheries). The absence of fisheries under the No-action Alternative would also result in

a small increase in the number of potential carcasses for scavengers in the riparian zone comparable to current conditions (Table 5).

Since no fishery would occur, there would be no associated human activities in wildlife habitat within the Action Area. There would be no new construction of fishery access points, roads, permanent camping sites, or any long lasting habitat alterations of any kind under this alternative. Therefore, the No-action Alternative would not result in any fishery-related alterations of wildlife habitat such as forest, shrub steppe, agricultural lands, floodplains, wetlands, uplands, or transitional steppes where food is abundant for many species in the Action Area (Subsection 3.5, Wildlife). Furthermore, there would be no effect on dredge spoil deposited in rivers and wetlands, reservoir impoundments, tailrace outfalls, riparian/floodplain, shrub steppe, and agricultural lands, which is a component of wildlife habitat in the Action Area, under any alternative because fishing or the lack of fishing would not alter or contribute to dredge spoil depositions.

Under the No-action Alternative, there would be no effect on nesting and feeding habitats for gulls in the Action Area because there would be no fishing activity affecting these habitats. The potential reduction in disturbance of wildlife and wildlife habitat in the Action Area by the absence of fishery activities would be mostly counteracted by the continued presence of humans engaged in other practices, such as camping, hunting, or boating.

Although the No-action Alternative would reduce the fishery-related interactions with wildlife in the Action Area compared to current conditions , the potential benefits of the lack of fishery-related interactions with wildlife would be limited in time and geographical scope because current conditions limit the removal of natural-origin fish to low levels (1-5 percent) (Table 5), because not all locations in the Action Area would be open year-round, and because many large areas within the Action Area would not accessible to anglers under current conditions (WDFW 2009).

4.5.2 Alternative 2 (Proposed Action) – Issue a determination that the FMEP satisfies the 4(d) Rule

Because fisheries proposed in the FMEP would be implemented under Alternative 2, the potential exists for fishery-related effects on one or more of the more than 250 species of reptiles, amphibians, birds, and mammals that could be present in the Action Area. Effects on wildlife under Alternative 2 would be related to effects on the diet of any affected wildlife species that consumes fish in the Action Area, including double-crested cormorants. Double-crested cormorants' breeding season coincides with juvenile salmon outmigration, and Alternative 2 is expected to alter the number of anadromous fish spawning proportionally (Table 5). However, there is no direct relationship between the removal of a small proportion of potential spawners (0-5 percent of a population, ESU, or DPS) (Table 5) and the number of anadromous salmonid juveniles in streams or outmigrating smolts in any given year that may be available for prey for piscivorous birds like the double-crested cormorants. Therefore, there is no evidence that Alternative 2 would have a measurable effect on wildlife species that prey on juvenile or outmigrating salmonids compared to the No-action Alternative.

Unlike the No-action Alternative, Alternative 2 would result in the removal of a small number potential prey for predators (i.e., adult salmon for large predators and resident fish for smaller predators beyond the location of the fisheries), and the removal of fish by anglers that would have potentially resulted in salmon carcasses for scavengers in the riparian zone (mostly from incidental mortality of natural-origin fish since most hatchery-origin fish would be either caught in the fishery or removed at hatchery weirs) equivalent to the expected harvest summarized in Table 5.

There would be associated human activities in wildlife habitat within the Action Area under Alternative 2. However, similar to the No-action alternative, Alternative 2 would not result in any fishery-related alterations of wildlife habitat such as forest, shrub steppe, agricultural lands, uplands, or transitional steppes where food is abundant for many species in the Action Area (Subsection 3.5, Wildlife) because angles would not use these areas in fishery-related activities. The only potential effects on wildlife or wildlife habitat under Alternative 2 are in floodplains and wetlands. The effect of Alternative 2 on floodplains and wetlands compared to the No-action Alternative would be related to the presence and activity of anglers, and it is expected to be low.

As 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 under Alternative 2. There would be no effect on dredge spoil deposited in rivers and wetlands, reservoir impoundments, tailrace outfalls, riparian/floodplain, shrub steppe, and agricultural lands, which is a component of wildlife habitat in the Action Area, under any alternative because fishing or the lack of fishing would not alter or contribute to dredge spoil depositions.

Under Alternative 2, there may be a small effect on nesting and feeding habitats for gulls in the Action Area compared to the No-action Alternative because fishing activity in or around these types of habitats would occur. The potential small disturbance of wildlife and wildlife habitat in the Action Area under Alternative 2 would be additive to the continued presence of humans engaged in other practices, such as camping, hunting, or boating.

Although the effects of Alternative 2 on wildlife could potentially represent an increased adverse impact over those associated with the No-action Alternative, these potential effects would be limited in time and geographical scope because the FMEP would limit the removal of natural-origin fish to low levels (1-5 percent) (Table 5), because not all locations in the Action Area would be open year-round, and because many large areas within the Action Area would not be accessible to anglers (WDFW 2009).

4.5.3 Alternative 3 (No Steelhead Fisheries) – Issue a determination that only miscellaneous fisheries targeting resident species in the FMEP satisfy the 4(d) Rule

Fisheries targeting hatchery-origin steelhead would not occur under Alternative 3. However, because miscellaneous fisheries would occur under Alternative 3, there is potential for effects on some of the more than 250 species of reptiles, amphibians, birds, and mammals that could be present in the Action Area compared to the No-action Alternative. However, since miscellaneous fisheries would not affect ESA-listed salmonids, this alternative would reduce the effect on the diet of any affected wildlife species that consumes fish in the Action Area compared to

Alternative 2. Alternative 3 is also not expected to alter the number of anadromous fish spawning and thus, would not affect the number of smolts outmigrating on any given year.

Similarly to the No-action Alternative, the absence of steelhead fisheries under Alternative 3 would not remove a small number of potential prey for predators (i.e., adult salmon for large predators and resident fish for smaller predators beyond the location of the proposed fisheries). Also as under the No-action Alternative, the absence of steelhead fisheries under Alternative 3 would also result in a small increase in the number of potential carcasses for scavengers in the riparian zone comparable to Alternative 2 (Table 5).

Since miscellaneous fisheries would occur under Alternative 3, there would be associated human activities in wildlife habitat within the Action Area. However, Alternative 3 would not result in any fishery-related alterations of wildlife habitat such as forest, shrub steppe, agricultural lands, uplands, or transitional steppes where food is abundant for many species in the Action Area (Subsection 3.5, Wildlife) because angles do not use these areas in fishery-related activities. There would be no new construction of fishery access points, roads, permanent camping sites, or any long lasting habitat alterations of any kind under this alternative. The only potential effects on wildlife or wildlife habitat under Alternative 3 are in floodplains and wetlands. There would be no effect on dredge spoil deposited in rivers and wetlands, reservoir impoundments, tailrace outfalls, riparian/floodplain, shrub steppe, and agricultural lands, which is a component of wildlife habitat in the Action Area, under any alternative because fishing or the lack of fishing would not alter or contribute to dredge spoil depositions.

Under Alternative 3, there may be a small effect on nesting and feeding habitats for gulls in the Action Area compared to the No-action Alternative because of fishing activity in or around these types of habitats would occur. The potential small disturbance of wildlife and wildlife habitat in the Action Area under Alternative 3 would be less that under Alternative 2 because of the lack of hatchery-origin steelhead fisheries, and any affect of this alternative would be additive to the continued presence of humans engaged other practices, such as camping, hunting, or boating.

Although the effects of Alternative 3 on wildlife could potentially represent an increased adverse impact over those associated with the No-action Alternative, these potential effects would be limited in time and geographical scope because the FMEP would manage miscellaneous fisheries consistent with self-sustaining populations, because not all locations in the Action Area would be open year-round, and because many large areas within the Action Area would not be accessible to anglers (WDFW 2009).

4.6 Effects on ESA-listed Plants

4.6.1 Alternative 1 (No-action) – Issue a determination that Washington's FMEP does not satisfy the 4(d) Rule

Under the No-action alternative, there would not be any fishing activities in riparian and wetland areas, or any other listed plant habitat area such as pine forests or grassy habitats. Other activities taking place in any of these sensitive plant habitat areas within the Action Area would likely continue and would affect Spalding's catchfly and Ute lady's tresses. However, impacts on these species specifically by anglers would not occur under the No-action Alternative.

4.6.2 Alternative 2 (Proposed Action) – Issue a determination that the FMEP satisfies the 4(d) Rule

Effects on ESA-listed plants under the Alternative 2 would occur as the result of encounters with ESA-listed plants by anglers. Under the Alternative 2, fishing activities would occur in some riparian and wetland areas and lakeside wetland meadows within the Action Area, but not pine forests or grassy habitats. Therefore, the likelihood of an encounter with listed plants by anglers is greater for the Ute lady's tresses than for the Spalding's catchfly, since the former occupies more riparian and wetland areas and lakeside wetland meadows than the latter.

The effects of Alternative 2 on ESA-listed plants would likely result in an increased adverse impact over those associated with the No-action alternative because there would be more angler activity in riparian and wetland areas and lakeside wetland meadows within the Action Area. However, these potential adverse effects of Alternative 2 would be limited in time and geographical scope because not all locations within the southeastern Washington State portions of these species range (i.e., the Action Area of the FMEP) (Figure 1) are open year-round, and because many large areas within the Action Area are not accessible to anglers. Furthermore, most habitats with angler access are currently disturbed by other human activities, and it is not likely that a considerable amount of new disturbance in established, sensitive plant areas would occur under any alternative. Other activities taking place in any of these sensitive plant habitat areas within the Action Area would likely continue and would affect Spalding's catchfly and Ute lady's tresses.

4.6.3 Alternative 3 (No Steelhead Fisheries) – Issue a determination that only miscellaneous fisheries targeting resident species in the FMEP satisfy the 4(d) Rule

Effects on ESA-listed plants under the Alternative 3 would occur as the result of encounters with ESA-listed plants by potential anglers. Under the Alternative 2, fishing activities would occur in some riparian and wetland areas and lakeside wetland meadows within the Action Area, but not pine forests or grassy habitats. Therefore, similar to Alternative 2, the likelihood of encounter of listed plants by anglers is greater for the Ute lady's tresses than for the Spalding's catchfly, since the former occupies more riparian and wetland areas and lakeside wetland meadows than the latter.

The effects of Alternative 3 on ESA-listed plants would likely result in an increased adverse impact over those associated with the No-action Alternative because there would be more angler activity in riparian and wetland areas and lakeside wetland meadows within the Action Area. However, the effects of Alternative 3 on ESA-listed plants would likely result in a decrease in adverse impact over those associated with Alternative 2 because there would be less angler activity in riparian and wetland areas and lakeside wetland meadows within the Action Area without the implementation of the popular fisheries targeting hatchery-origin steelhead. Regardless, these potential adverse effects of Alternative 3 would be limited in time and geographical scope because not all locations within the southeastern Washington State portions of these species range (i.e., the Action Area of the FMEP) (Figure 1) are open year-round, and because many large areas within the Action Area are not accessible to anglers. Furthermore, most habitats with angler access are currently disturbed by other human activities, and it is not likely that a considerable amount of new disturbance in established, sensitive plant areas would

occur under any alternative. Other activities taking place in any of these sensitive plant habitat areas within the Action Area would likely continue and would affect Spalding's catchfly and Ute lady's tresses.

4.7 Effects on Socioeconomics

4.7.1 Alternative 1 (No-action) – Issue a determination that Washington's FMEP does not satisfy the 4(d) Rule

The potential effects of the No-action Alternative on socioeconomics would be a low to moderate adverse impact because the lack of recreational fisheries opportunities could result in less visitors to the Action Area who both fish and hunt, and who may spend financial resources on other tourist attractions while visiting (Subsection 3.7.1, Tourism and Recreation). This lack of visitor tourism for recreational opportunities could then result in reduced community expenditures for licenses, fishing and camping gear, gasoline and supply sales, food, and lodging. This impact may be offset by fishing opportunities from continued pond stocking, but the economic positive effect from this activity alone is likely minimal.

Mendel (2010) provided economic estimates for steelhead fisheries for southeast Washington, which for practical purposes is considered equivalent to the Action Area in this analysis (Figure 1). The potential reduction of direct expenditures by steelhead anglers under the No-action Alternative would be on the order of $30,621,825 million yearly (Subsection 3.7.1, Tourism and Recreation) compared to current conditions. There are no economic data for miscellaneous fisheries in the Action Area.

Additional impacts could occur in the employment sector that supports such tourism and recreational services or the government sector that employs recreational fishery-related staff under the No-action Alternative. However, only 3 percent of the employment sector in the Action Area is supported by the combined agricultural and fishing industry, so the potential negative employment effect on this sector would be low (Subsection 3.7, Socioeconomics). It is unknown how much of the 42 percent of the sector employed by government would be impacted by reduced fishing activities under the No-action Alternative.

There would be no negative or positive effect on the predominant agricultural employment or economic sector in the Action Area under the No-action Alternative because fishing opportunities do not directly support these sectors.

4.7.2 Alternative 2 (Proposed Action) – Issue determination that the FMEP satisfies the 4(d) Rule

Unlike under the No-action Alternative, the potential effects of Alternative 2 on socioeconomics in the Action Area would be a low to moderate positive impact. Such benefits would be realized by Action Area visitors supporting community expenditures for recreational fisheries including purchase of recreational supplies such as fishing gear, license fees, camping equipment, consumables and fuel at local businesses, and lodging expenditures. This positive effect would also be combined with any positive effect realized by fishing opportunities from pond stocking

and related expenditures for other tourist attractions/activities in the Action Area (subsection 3.7.1, Tourism and Recreation).

Mendel (2010) provided economic estimates for steelhead fisheries for southeast Washington, which for practical purposes is considered equivalent to the Action Area in this analysis (Figure 1). The potential increase in direct expenditures by steelhead anglers under Alternative 2 would be on the order of $30,621,825 yearly (Subsection 3.7.1, Tourism and Recreation) compared to the same expected decrease under the No-action Alternative. There is no economic data for trout and miscellaneous fisheries in the Action Area.

As under the No-action Alternative, additional positive impacts could occur in the employment sector that supports such tourism and recreational services or the government sector that employs recreational fishery-related staff under Alternative 2. However, only 3 percent of the employment sector in the Action Area is supported by the combined agricultural and fishing industry, so the potential positive employment effect on this sector would be low (Subsection 3.7, Socioeconomics). As under the No-action Alternative, it is unknown how much of the 42 percent of the sector employed by government would be impacted by fishing activities under Alternative 2.

Similar to the No-action Alternative, there would be no negative or positive effect on the predominant agricultural employment or economic sector in the Action Area under Alternative 3 because fishing opportunities do not directly support these sectors.

4.7.3 Alternative 3 (No Steelhead Fisheries) – Issue a determination that only miscellaneous fisheries targeting resident species in the FMEP satisfy the 4(d) Rule

Steelhead fisheries are the most popular fisheries in the Action Area and would not occur under Alternative 3. If steelhead fisheries were not open to anglers, there would be a low to moderate negative impact to the tourism and recreation economic and employment sectors similar to that described under the No-action Alternative. In contrast to the No-action Alternative, however, Alternative 3 would offer other types of recreational fishing opportunities, which would likely attract area visitors over No-action Alternative. However, there is no economic data for miscellaneous fisheries in the Action Area. The result of the targeted resident species fishery, in addition to any benefit related to visitor attractions, including pond stocking fishing opportunities, would be an overall positive benefit to the economic and employment sector under Alternative 3 compared to the No-action Alternative, but it would not be as beneficial as under Alternative 2 where both a steelhead and targeted resident fishery would be allowed.

Mendel (2010) provided economic estimates for steelhead fisheries for southeast Washington, which for practical purposes is considered equivalent to the Action Area in this analysis (Figure 1). The potential reduction in direct expenditure reduction by the lack of steelhead anglers under Alternative 3 would be on the order of $30,621,825 yearly (Subsection 3.7.1, Tourism and Recreation) compared current conditions and is the same as the reduction expected under the No-action Alternative.

As under the No-action Alternative, Alternative 3 would have no negative or positive effect on the predominant agricultural employment or economic sector in the Action Area because fishing opportunities do not directly support these sectors.

4.8 Effects on Environmental Justice

4.8.1 Alternative 1 (No-action) – Issue a determination that Washington's FMEP does not satisfy the 4(d) Rule

The lack of fishing opportunities under the No-action Alternative would not result in a disproportionate negative impact to any minority or low income population group because the negative economic effect would be realized by all groups in the action area. Because the lack of fishing opportunities would negatively impact the overall tourism and recreation-based economic and employment sector in the action area, all population sectors would be potentially impacted under the No-action Alternative (Subsection 4.7.1, Alternative 1).

4.8.2 Alternative 2 (Proposed Action) – Issue determination that the FMEP satisfies the 4(d) Rule

Alternative 2 would not provide exclusive fishing opportunities to select portions of the population sector and would be made available to all groups. There are no data to suggest that any one population group has a disproportionately greater benefit from fishing opportunities in the Action Area than any other group (e.g., has more employment opportunity over other groups). Because the fishing opportunities would positively benefit the overall tourism and recreation-based economic and employment sector in the action area, all population sectors would potentially benefit under Alternative 2 (Subsection 4.7.2, Alternative 2).

4.8.3 Alternative 3 (No Steelhead Fisheries) – Issue a determination that only miscellaneous fisheries targeting resident species in the FMEP satisfy the 4(d) Rule

The opportunity for miscellaneous fisheries under Alternative 3 would result in an overall positive economic benefit in the Action Area compared to the No-action Alternative. This benefit would be realized by all population sectors because such fishing opportunities would be available to all groups.

There are no data to suggest that any one population group has a disproportionately greater benefit from fishing opportunities in the Action Area than any other group (e.g., has more employment opportunity over other groups). Consequently, low income or minority populations would not be disproportionately impacted by the lack of a steelhead fishery under this alternative because all groups would be negatively affected by this limitation on recreational fishing opportunities.

5.0 Cumulative Impacts

5.1 Other Agency Programs, Plans, and Policies

Cumulative impacts of NMFS' No-action Alternative and the proposed alternative (Alternative 2) under the 4(d) Rule would be minor, if at all measurable. Alternative 3 falls between the No-

action Alternative and Alternative 2 in terms of anticipated impacts on all resources potentially affected by the alternatives. Other Federal, tribal, and state actions are expected to occur within the Action Area, in the Snake River Basin, in other Columbia River tributaries, and in the migration corridor between the Snake River and the Pacific Ocean that would affect the fish populations considered under the Proposed Action. State and tribal fisheries occur in Idaho, Oregon, and Washington portions of the Snake River Basin and in the mainstem Columbia River. Land management and water-use decisions that affect these populations are made inside and outside the Snake 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 when those initiatives would be implemented or by whom, 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 and Snake River basins. In large part, these actions are coordinated through or in association with Federal ESA recovery plans either already developed 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. Federal actions for salmon recovery in the Columbia River Basin that are currently underway include initiatives by the Northwest Power and Conservation Council to mitigate impacts of the Federal Columbia River Power System. Council initiatives include development of sub-basin plans in support of regional planning and recovery efforts. Additionally, NMFS and the USFWS are currently negotiating an ESA section 6 agreement for a state forestry program with Idaho Department of Lands that addresses listed fish species issues raised during the Snake River Basin Adjudication process. 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 expected to help increase salmon and steelhead populations in the Action Area (and elsewhere in the region) because of compatible goals and objectives.

5.2 Conservation Management under the ESA

Fisheries that may impact listed salmon and steelhead within the Action Area are managed based on the impact on ESA-listed fish that are returning to the Snake River. Because the allowable impacts on listed species are based on a maximum allowable incidental impact rate in conjunction with a carefully managed conservation program, if other conservation measures are unsuccessful in returning fish to the area, fishery impacts would remain constrained. If the cumulative effects of other fisheries or conservation efforts do not allow sufficient escapement of returning adult salmon to the Action Area to meet conservation needs plus support the proposed fishery, fishing would be constrained according to the stipulations included in this FMEP. (Note:

Hatchery-origin (i.e., non-ESA-listed fish) fish in the basin are managed for escapement goals. If the cumulative effects of other fisheries do not allow sufficient escapement to hatcheries in the Action Area, fishing would necessarily be constrained according to the stipulations included in this FMEP.)

If the cumulative effects of salmon management efforts fail to provide harvestable fish, then impacts due to fishing in the Action Area would be substantially diminished. Therefore, the cumulative impacts of NMFS' current Proposed Action are expected to be minor, because of reporting and monitoring requirements that would ensure compatibility with other conservation strategies. Conservative management 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 populations and their habitat. The recreational fishing program is coordinated with monitoring and adaptive management measures so that fishery managers can respond to changes in the status of affected listed salmon. Monitoring and adaptive management would help ensure that the affected DPS and ESUs are adequately protected and would help counter-balance any potential adverse cumulative impacts. Healthy and self-sustaining Snake River steelhead and salmon populations would be an important component in long-term recovery of each of the affected species as a whole.

5.3 Climate Change

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

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

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

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

Fish habitat changes due to climate change are likely to create a variety of challenges for ESA-listed species of fish. Higher winter stream flows can scour streambeds, damaging spawning redds and washing away incubating eggs (USGCRP 2009). Earlier peak stream flows could flush young salmon and steelhead from rivers to estuaries before they are physically mature enough for the transition, increasing a variety of stresses and the risk of predation (USGCRP 2009). Lower summer stream flows and warmer water temperatures will degrade summer rearing conditions in many parts of the Pacific Northwest for a variety of salmon and steelhead species (USGCRP 2009), and are likely to reduce the survival of steelhead fry in streams with incubation in early summer. Other likely effects include alterations to migration patterns, accelerated embryo development, premature emergence of fry, and increased competition and predation risk from warm-water, non-native species (ISAB2007). The increased prevalence and virulence of diseases and parasites that tend to tend to flourish in warmer water will further stress salmon and steelhead (USGCRP 2009). Overall, about one-third of the current habitat for the Pacific Northwest's coldwater fish may well no longer be suitable for them by the end of this century as key temperature thresholds are exceeded (USGCRP 2009).

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

While climate change may well have impacts on the abundance and/or distribution of ESA-listed salmonids that are considered under the proposed action, the fishery management scheme described in the FMEP is directly responsive to observed fish abundance, and so, as abundances change, fisheries would be adjusted accordingly.

6.0 AGENCIES CONSULTED

National Marine Fisheries Service
Washington Department of Fish and Wildlife

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8.0 FINDING OF NO SIGNIFICANT IMPACT FOR NMFS' APPROVAL OF A FISHERY MANAGEMENT AND EVALUATION PLAN UNDER ESA SECTION 4(d) LIMIT 4

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

The Fishery Management and Evaluation Plan (FMEP) submitted by the Washington Department of Fish and Wildlife (WDFW 2009) is intended to satisfy the ESA Section 4(d) Rule with respect to fisheries in the Washington portion of the Snake Basin potentially affecting ESA-listed Snake River steelhead and Snake River fall-run Chinook salmon, spring/summer Chinook salmon, and Snake River Sockeye Salmon Evolutionarily Significant Units (ESU).

NMFS= approval of the FMEP 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?**

Response: The target species for the proposed fisheries are hatchery-origin steelhead, hatchery-origin fall Chinook salmon, and game fish (including resident rainbow trout, brook trout, whitefish, bass, walleye, catfish, bullhead, sunfish, crappie, perch, northern pikeminnow, sturgeon, carp, and shad). The effect of the proposed fisheries on hatchery-origin steelhead and hatchery-origin fall Chinook salmon will have no effect on their overall range-wide abundance, distribution, and productivity because hatchery-origin fish are produced for the purpose of harvest and enough broodstock will be allowed to escape fisheries to sustain the desired hatchery production into the future. The effect of the proposed fisheries on game fish species will have no effect on their overall range-wide abundance, distribution, and productivity because the proposed level of harvest is considered consistent with the maintenance of self-sustaining populations.

2. **Can the proposed action reasonably be expected to jeopardize the sustainability of any non-target species?**

Response: The proposed action is not expected to jeopardize the sustainability of non-target species for the following reasons.

Salmonids: There will be some effects on listed or non-listed salmonids from the proposed action. Impacts on listed salmonids include direct contact with fish or alteration of habitat elements. Listed non-target fish include fish belonging to the Columbia River Bull Trout DPS, and natural-origin fish belonging to the Snake River Steelhead DPS, and to the Snake River Fall-run Chinook salmon, Snake River Spring/Summer Chinook salmon, and Snake River Sockeye Salmon ESUs. The proposed action includes direct impacts through catch and release of listed

fish. Habitat parameters are addressed through other resources such as water quality, instream fish habitat, vegetation, and geology and soils. Impacts on listed fish are analyzed in detail during the ESA consultation, and are low because the FMEP is specifically designed to allow fishing while minimizing impacts on listed fish, with maximum allowable harvest limits based on the status of ESA-listed fish.

Impacts on non-listed salmonids also include direct contact with fish or alteration of habitat elements. The non-listed salmonids in the basin include resident rainbow trout rainbow trout, brook trout, and whitefish. The harvest of non-listed salmonids is under the jurisdiction of the State of Washington, and the potential effects would be within the range established by WDFW. The impacts on non-listed salmonids from the proposed action will be low because their harvest will be in a manner consistent with the maintenance of self-sustaining populations.

Other Fish Species: There will be no effects on non-target fish species (subsection 3.3, Non-listed Fish) from the proposed action because the types of gear and fishing methods used in the proposed fisheries are not expected to result in encounter or handle of individuals of these species.

Avian and Terrestrial Wildlife: Impacts on avian and terrestrial wildlife would typically occur through physical contact, disruption of habitat, or avoidance of areas where human activity is high. Activities associated with the fisheries include fishers and boats entering the water, noise associated with talking and vehicle operation, and presence of vehicles, boats, and people. It is not likely that the proposed fisheries would impact or displace wildlife because such activities would be accomplished by using existing roads and pathways, and would occur at levels similar to what currently occurs for recreational activities unrelated to the proposed fisheries. The effects on prey availability for wildlife would be low because the proposed fisheries would leave available a portion of the hatchery fish that are not harvested, and other fish not harvested would be available for wildlife to eat. The fisheries would not include upland activities, therefore, it is not anticipated that nesting or breeding areas would be impacted by fishing activities.

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

Response: There will be no effect on ocean or coastal habitats from the proposed action because the action area is in the lower Snake River, a tributary to the Columbia River, many river miles from its confluence with the ocean. There will be no negative effect on the 303(d) listing impairment status of the Snake River because proposed action in the river will be localized, and will not contribute to the total contaminant load in the Snake River system.

There will be no effect on EFH for Chinook salmon[5] because there will be no impact on water quality or substrate necessary for Chinook salmon to carry out spawning, breeding, feeding, or growth to maturity and because activities associated with the proposed fisheries such as wading, anchoring boats, inadvertently hooking instream structures are unlikely to remove or destroy habitat elements. The controlled harvest of hatchery-origin steelhead and fall Chinook salmon in

[5] EFH has not been defined for steelhead.

the proposed FMEP will have no effect on water quality related to marine-derived nutrients because most hatchery-origin fish that are not harvested will be removed at hatchery weirs and the absence of fisheries would not result in a net increase of marine-derived nutrients in the action area.

4. Can the proposed action be reasonably expected to have a substantial adverse impact on public health or safety?

Response: The proposed action is not reasonably expected to have a substantial adverse impact on public health or safety because recreational fisheries are not associated with any known health hazards directly or indirectly. There is a certain amount of safety risk associated with recreational fisheries because participants are in contact with the river and sometimes inclement weather conditions. However, participation in recreational fisheries is limited to licensed fishers and poses no risk to public safety in general.

5. Can the proposed action reasonably be expected to adversely affect endangered or threatened species, marine mammals, or critical habitat of the species?

Response: The proposed action will have a minor, adverse impact ESA-listed Snake River steelhead, Snake River fall Chinook salmon, and Snake River spring/summer Chinook salmon because a small fraction of natural-origin fish will be caught and released during the proposed fisheries and catch-and-release results in a small fraction of the released fish dying (5 to 10 percent of the fish caught and released die as a result of injuries). Based on the management regime, which ensures that fisheries are reduced at low run sizes, an incidental mortality of up to 10 percent of natural-origin fish is not expected to adversely affect the survival and recovery of any of these species (see Table 5 in the EA).

There are no expected measurable impacts on Snake River sockeye salmon. The percent mortality resulting from the proposed fisheries will not have a discernible effect on their overall range-wide abundance, distribution, and productivity because the resulting mortality of any harvest that might occur is limited to a small fraction of the population according to an associated biological opinion (NMFS 2010). There are no expected impacts on critical habitat for endangered or threatened species because activities associated with the proposed fisheries (such as wading, anchoring boats, or inadvertently hooking instream structures) are unlikely to remove or destroy critical habitat elements.

There are no expected indirect impacts on marine mammals, such as removing fish that would otherwise be available as prey, because marine mammals are not usually present in the action area, and the fish subject to removal by the fisheries (through kept catch or incidental mortality) would not later be subject to potential predation by marine mammals because of their anadromy. Also, no indirect effect on marine mammal habitat is expected because shore-based activities and boating is not inconsistent with marine mammal behavior or habitat. Because marine mammals are not usually present in the action area, no direct impacts on any marine mammal species resulting from fishing activities would occur as a result of the proposed action.

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)?**

Response: 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 because of the limited scope, both in area and time, because the fish to be removed are primarily hatchery-origin fish that would not be present without the intent to provide for fisheries, and because hook-and-line gear are very specific and interact almost exclusively with the target species. The harvest of natural-origin target species (such as rainbow trout and whitefish) is managed specifically to preserve biodiversity and ecosystem function.

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

Response: Impacts on socioeconomics will be moderately beneficial for local businesses supplying recreational fishing commodities because the proposed fisheries will result in an increase 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 solely or primarily as a result of the proposed fisheries. The proposed fisheries are expected to draw moderate numbers of people from certain distances outside of the action area and, therefore, fisheries would be expected to add moderately 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 would likely be low at this scale.

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

Response: 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 fishery over several prior years and are positive impacts for the affected communities.

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

Response: The proposed action is not expected to result in substantial impacts on unique areas, such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas because it does not involve the construction of any new infrastructure, and because all of the fishing activity occurs either in the mainstem Snake River within the borders of Washington State or from river bank access points already in place in Snake River tributaries and utilized by fishers year-round.

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

Response: The effects on the human environment are all known impacts, allowing for recreational fishing, which has the potential to generate revenue for the surrounding communities, such as bait and tackle sales and other incomes associated with tourism. No unique or unknown risks have been identified after applying the results of research conducted over several years in this action area on this and other species.

11. Is the proposed action related to other actions with individually insignificant, but cumulatively significant, impacts?

Response: The cumulative impacts of the proposed action have been considered in the EA and in the associated biological opinion (NMFS 2010). The take of ESA-listed species would be limited to a maximum level considered to result in a no-jeopardy ESA determination when considering all existing fishery conditions, all other permits, and other actions in the area affecting these conditions and permits.

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?

Response: The proposed action is not likely to 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 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?

Response: The proposed action would not result in the introduction or spread of a non-indigenous species because the action considered in this EA is limited to incidental impacts on ESA-listed species from fisheries in the Snake River. The proposed action may actually result in local and transitory reduction of non-indigenous species because some of the proposed fisheries actually target these non-indigenous species.

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?

Response: 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 fisheries actions in the action area over the past several years, and has a limited, authorized implementation period before additional analyses on a subsequent fisheries request was undertaken. This is the first NEPA review for this particular proposal in the action area, but steelhead fisheries in the mainstem Columbia River under the *U.S. v Oregon* 10-year agreement were analyzed through new ESA

determinations and NEPA reviews. Future take increase requests in the action area would be analyzed through new ESA determinations and NEPA reviews.

The Environmental Assessment (EA) for the proposed action was prepared pursuant to regulations implementing the 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. Recovery plans are in place or being developed for most parts of the Columbia River system in which anadromous fish occur (for example, see NMFS 2005; NMFS 2009; Snake River Salmon Recovery Board 2006; a recovery plan for the Snake River Basin is currently under development by NMFS' Northwest Regional Office). Typically, development and on-going implementation of these plans includes participation by multiple Federal, tribal, state, and local agencies and stakeholder groups. These recovery plans contain (1) measurable goals for delisting, (2) a comprehensive list of the actions necessary to achieve delisting goals, and (3) an estimate of the cost and time required to carry out those actions.

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?

Response: 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 ESA is consistent with all other laws related to species conservation at the Washington State and local levels. Fisheries permits related to this action would be issued under state laws that are also consistent with Federal and local laws related to environmental protection.

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

Response: The proposed action will not result in substantial cumulative adverse effects on target or non-target species because the take of ESA-listed species would be limited to a maximum level considered to result in a no-jeopardy ESA determination when considering all existing fishery conditions, all other permits, and other actions in the area affecting these conditions and permits. The cumulative impacts of the proposed action have been considered in the EA and in the associated biological opinion (NMFS 2010).

8.1 List of Reviewers

- Kathe Hawe, NWR NEPA Coordinator
- Robert Bayley, Salmon Management Division QA/QC Coordinator
- Barry Thom, NWR Deputy Regional Administrator
- Laurie Beale, General Counsel

8.2 References

WDFW (Washington Department of Fish and Wildlife). 2009. Fisheries Management and Evaluation Plan for the Incidental Take of Listed Species Submitted Under ESA Section 10/4(d): WDFW Recreational Fisheries for summer steelhead, warmwater fish, sturgeon, carp and other species. December 16, 2009.

NMFS. 2005. Endangered and threatened species; final listing determinations for 16 evolutionarily significant units of West Coast salmon, and final 4(d) protective regulations for threatened salmonid ESUs. Final rule. Federal Register 70:123(28 June 2005):37160-37204.

NMFS. 2009. Middle Columbia River Steelhead Distinct Population Segment ESA Recovery Plan. November 30, 2009.

NMFS (National Marine Fisheries Service). 2010. Biological Opinion on the effects of Washington's State Steelhead and Miscellaneous Fisheries in Washington's portion of the Snake River and the Grande Ronde and Tucannon Rivers on Snake River Steelhead and Chinook Salmon Species Listed Under the Endangered Species Act.

Snake River Salmon Recovery Board. 2006. Technical Document Snake River Salmon Recovery Plan for SE Washington. December 2006.

8.3 Determination

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

Barry Thom, Deputy Regional Administrator

April 19, 2011
Date