



Summary

Draft Environmental Impact Statement for 10 Salmon and Steelhead Hatchery Programs in the Duwamish-Green River Basin

Introduction

Salmon and steelhead have been produced in Puget Sound hatcheries since the early 1900s. The benefit of hatcheries at the outset was to produce hatchery-origin fish for harvest purposes. Hatcheries have contributed 70 to 80 percent of the catch in coastal salmon and steelhead fisheries. As the fish's natural habitat was degraded by human development and activities like passage barriers, forest practices, and urbanization, the role of hatcheries shifted toward mitigation for lost natural production and reduced harvest opportunity. Hatchery production presents risks to natural-origin salmon and steelhead. These include genetic risks from hatchery-origin fish to natural-origin fish as a result of poor broodstock and rearing practices, risks of competition with and predation on naturally spawned populations, and incidental harvest of natural-origin fish in fisheries targeting hatchery-origin fish.

The Washington Department of Fish and Wildlife (WDFW), Muckleshoot Indian Tribe, and Suquamish Tribe (hereafter referred to as the co-managers) have jointly submitted to the National Marine Fisheries Service (NMFS) hatchery and genetic management plans (HGMPs) for 10 hatchery programs that would produce salmon and steelhead in the Duwamish-Green River Basin in Puget Sound. The HGMPs describe the hatchery programs, including fish life stages produced and potential research, monitoring, and evaluation actions to minimize the risk of negatively affecting listed salmon and steelhead (Table S-1). The HGMPs have been submitted for review and approval as a resource management plan (RMP) under Limit 6 of the 4(d) Rule under the Federal Endangered Species Act (ESA). The plans are consistent with

the framework of *United States v. Washington* (1974) for coordination of treaty fishing rights, non-tribal harvest, artificial production objectives, and artificial production levels.

Table S-1. ESA status of listed Puget Sound salmon and steelhead.

Species	Evolutionarily Significant Unit/ Distinct Population Segment	Current Endangered Species Act Listing Status
Chinook salmon (<i>Oncorhynchus tshawytscha</i>)	Puget Sound	Threatened (76 Fed. Reg. 50448, August 15, 2011)
Chum salmon (<i>O. keta</i>)	Hood Canal summer-run (includes Strait of Juan de Fuca summer-run)	Threatened (76 Fed. Reg. 50448, August 15, 2011)
Steelhead (<i>O. mykiss</i>)	Puget Sound	Threatened (76 Fed. Reg. 50448, August 15, 2011)
Coho salmon (<i>O. kisutch</i>)	Puget Sound/Strait of Georgia	Species of Concern (69 Fed. Reg. 19975, April 15, 2004)

Source: NMFS

NMFS’ determination of whether the HGMPs submitted as an RMP achieve the conservation standards of the ESA, as set forth in Limit 6 of the 4(d) Rule, is the Federal action requiring National Environmental Policy Act (NEPA) compliance. Although this environmental impact statement (EIS) itself will not determine whether the HGMPs submitted as an RMP meet ESA requirements—those determinations are made under the specific criteria of the ESA and the 4(d) Rule—the analyses within the EIS will inform NMFS, hatchery operators, and the public about the current and anticipated cumulative environmental effects of operating the 10 salmon and steelhead hatchery programs under the full range of alternatives.

Proposed Action

Under the Proposed Action, NMFS would determine whether the 10 HGMPs submitted as an RMP, meet the requirements of Limit 6 of the 4(d) Rule. The HGMPs for Puget Sound hatcheries would be implemented by the co-managers.

Project Area

The project area covered in this EIS includes the places where the proposed salmon and steelhead hatchery programs would (1) collect broodstock; (2) spawn, incubate, and rear fish; (3) release fish; or (4) remove surplus hatchery-origin adult salmon and steelhead that return to hatchery facilities; and (5) conduct monitoring and evaluation activities. The project area consists of the Duwamish-Green River Basin. These 10 hatchery programs (7 seven current and 3 new hatchery programs) would operate using

four hatchery facilities, three rearing ponds, and two net pens, and would produce up to 13,993,000 juvenile salmon and steelhead per year.

What is the 4(d) Rule?

Section 4(d) of the ESA directs NMFS to issue regulations to conserve species listed as threatened. This applies particularly to "take," which can include any act that kills or injures fish, and may include habitat modification. The ESA prohibits any take of species listed as endangered; however, some take of threatened species that does not interfere with survival and recovery may be allowed.

For salmon and steelhead, the 4(d) Rule applies take prohibitions to all actions except those within the 13 limits to the rule. The limits, or exemptions, describe specified categories of activities that contribute to conserving listed salmon. A separate, but closely related, tribal 4(d) Rule creates an additional limit for tribal RMPs.

Limit 5 of the 4(d) Rule, using specific criteria, provides limits on the prohibitions of "take" for a variety of hatchery purposes, based on NMFS' evaluation and approval of HGMPs submitted by hatchery operators. Limit 6 of the 4(d) Rule provides limits on the prohibitions of "take" for joint tribal and state plans developed under *United States v. Washington* processes, including artificial production actions.

Purpose and Need

The purpose of the Proposed Action from NMFS' perspective is to evaluate the submitted HGMPs for ESA compliance. The need for the Proposed Action is to ensure the sustainability and recovery of Puget Sound salmon and steelhead by conserving the productivity, abundance, diversity, and distribution of listed species of salmon and steelhead in Puget Sound. NMFS will ensure it meets its tribal trust stewardship responsibilities and will also work collaboratively with the Muckleshoot Indian Tribe, Suquamish Tribe, and WDFW to protect and conserve listed species.

The co-managers' objectives in developing and submitting HGMPs and submitting them as an RMP under Limit 6 of the 4(d) Rule is to operate their hatcheries to meet resource management and protection goals with the assurance that any harm, death, or injury to fish within a listed evolutionarily significant unit (ESU) or distinct population segment (DPS) does not appreciably reduce the likelihood of a species' survival and recovery and is not in the category of prohibited take under the 4(d) Rule.

What is an ESU? What is a DPS?

NMFS lists salmon as threatened or endangered according to the status of their evolutionarily significant units (ESUs). An ESU is a salmon population that is 1) substantially reproductively isolated from conspecific populations and 2) represents an important component of the evolutionary legacy of the species.

In contrast to salmon, NMFS lists steelhead under the joint NMFS-U.S. Fish and Wildlife Service (USFWS) policy for recognizing distinct population segments (DPSs) under the ESA. This policy adopts criteria similar to, but somewhat different than, those in the ESU policy for determining when a group of vertebrates constitutes a DPS. A group of organisms is discrete if it is “markedly separated from other populations of the same taxon as a consequence of physical, physiological, ecological, and behavioral factors.” NMFS lists steelhead according to the status of the steelhead DPS.

The co-managers also have as an objective the continued operation of salmon and steelhead hatchery programs using existing facilities for conservation, mitigation, and tribal and non-tribal fishing opportunity pursuant to the Puget Sound Salmon Management Plan implemented under *United States v. Washington*, and treaty rights preservation purposes while meeting ESA requirements. WDFW and the Puget Sound treaty tribes strive to protect, restore, and enhance the productivity, abundance, and diversity of Puget Sound salmon and steelhead and their ecosystems to sustain treaty ceremonial and subsistence fisheries, treaty and non-treaty commercial and recreational fisheries, non-consumptive fish benefits, and other cultural and ecological values.

Relationship between the ESA and NEPA

The relationship between the ESA and NEPA is complex, in part because both laws address environmental values related to the impacts of a Proposed Action. However, each law has a distinct purpose, and the scope of review and standards of review under each statute are different.

The purpose of an EIS under NEPA is to promote disclosure, analysis, and consideration of the broad range of environmental issues surrounding a proposed major Federal action by considering a full range of reasonable alternatives, including a No-action Alternative. Public involvement promotes this purpose. The purpose of the ESA is to conserve listed species and the ecosystems upon which they depend. Determinations about whether hatchery programs in Puget Sound meet ESA requirements are made under section 4(d) or section 7 of the ESA. Each of these ESA sections has its own substantive requirements,

and the documents that reflect the analyses and decisions are different than those related to a NEPA analysis.

It is not the purpose of this EIS to suggest to the reader any conclusions relative to the ESA analysis for this action. While the NEPA Record of Decision (ROD) identifies the selected NEPA alternative, the ROD does not conclude whether that alternative complies with the ESA.

Alternatives Analyzed in Detail

Alternative 1 (No Action)

Under this alternative, NMFS would not make a determination under the 4(d) Rule for any of the 10 HGMPs, and the hatchery programs would not be exempted from ESA section 9 take prohibitions. Although other outcomes are possible, for the purposes of this EIS, NMFS has defined the No-action Alternative as the choice by the applicants to continue the hatchery programs without ESA authorization. The three new fish restoration facility (FRF) programs would produce up to 1,550,000 juveniles, and the locations and life stages of fish released from these programs would differ depending on whether fish passage facilities are provided at Howard Hanson Dam. Up to 13,993,000 salmon and steelhead juveniles would be released from the 10 hatchery programs annually (Table S-2). No new environmental protection or enhancement measures would be implemented.

Table S-2. Maximum annual hatchery releases of juvenile salmon and steelhead in the Duwamish-Green River Basin under the alternatives.

Species	Alternative 1 (No Action)	Alternative 2 (Proposed Action)	Alternative 3 (Termination)	Alternative 4 (Reduced Production)
Fall-run Chinook Salmon	5,100,000	5,100,000	0	2,550,000
Late Winter-run Steelhead	383,000	383,000	0	191,500
Summer-run Steelhead	100,000	100,000	0	50,000
Coho Salmon	3,410,000	3,410,000	0	1,705,000
Chum Salmon	5,000,000	5,000,000	0	2,500,000
Total	13,993,000	13,993,000	0	6,996,500

Source: HGMPs.

Alternative 2 (Proposed Action)

This alternative consists of hatchery operations as proposed under the co-managers' HGMPs. NMFS would make a determination that the HGMPs submitted by the co-managers meet requirements of the 4(d) Rule. The salmon and steelhead hatchery programs in the Duwamish-Green River Basin would be implemented as described in the 10 submitted HGMPs (Table S-2), and, as under Alternative 1, up

to 13,993,000 salmon and steelhead juveniles would be released annually. The hatchery programs would use hatchery capacity as described in the HGMPs for operations, and would be adaptively managed over time to incorporate best management practices as new information is available.

Alternative 3 (Termination)

Under this alternative, NMFS would make a determination that the HGMPs as proposed do not meet the standards prescribed under Limit 5 and Limit 6 of the 4(d) Rule, and the 10 salmon and steelhead hatchery programs in the Duwamish-Green River Basin would be terminated. All salmon and steelhead being raised in hatchery facilities (i.e., fall-run Chinook salmon, late winter-run steelhead, summer-run steelhead, coho salmon, and chum salmon) would be released or killed, and no broodstock would be collected.

NMFS' regulations under the 4(d) Rule do not provide NMFS with the authority to order changes of this magnitude as a condition of approval of the HGMPs submitted as an RMP. NMFS' regulations under the 4(d) Rule require NMFS to make a determination that the HGMPs submitted as an RMP *as proposed* either meet or do not meet the standards prescribed in the rule. Nonetheless, NMFS supports analysis of this alternative to assist with a full understanding of potential effects on the human environment under various management scenarios.

Alternative 4 (Reduced Production)

Under this alternative, the applicants would reduce the number of fish released from each of the 10 proposed hatchery programs by 50 percent (to 6,996,500 salmon and steelhead juveniles) because it represents a mid-point between the Proposed Action (Alternative 2) and termination of the hatchery programs (Alternative 3) (Table S-2). Revised HGMPs would be submitted reflecting these reduced production levels, and NMFS would make a determination that the revised HGMPs submitted as an RMP meet the requirements of the 4(d) Rule.

NMFS' regulations under the 4(d) Rule do not provide NMFS with the authority to order changes of this magnitude as a condition of approval of the HGMPs submitted as an RMP. NMFS' regulations under the 4(d) Rule require NMFS to make a determination that the HGMPs submitted as an RMP *as proposed* either meet or do not meet the standards prescribed in the rule. Nonetheless, NMFS supports analysis of this alternative to assist with a full understanding of potential effects on the human environment under various management scenarios.

A summary of distinguishing features of the alternatives is shown in Table S-3.

Table S-3. Summary of distinguishing features of the alternatives.

Alternative	NMFS Review, Evaluation, and Approval of Plans under the 4(d) Rule	Number of Hatchery-origin Fish Released	Changes in Hatchery Programs	Conservation Benefit to Salmon and Steelhead
Alternative 1 (No Action)	No evaluation and determination under the 4(d) Rule	13,993,000	Similar to existing conditions, except that three new Fish Restoration Facility (FRF) programs would be implemented. Hatchery programs would not be exempt from ESA section 9 take prohibitions. No new environmental protection or enhancement measures would be implemented.	Conservation requirements for listed salmon and steelhead would not be met.
Alternative 2 (Proposed Action)	Evaluation and determination under the 4(d) Rule	13,993,000	Production levels would continue, and conservation measures would be applied to salmon and steelhead hatchery programs to reduce risks and to meet conservation requirements.	Conservation requirements for listed salmon and steelhead would be met.
Alternative 3 (Termination)	Not applicable	0	Hatchery-origin salmon and steelhead programs would be terminated.	Conservation requirements for listed salmon and steelhead would be met, and most risks from hatchery programs would be eliminated over time.
Alternative 4 (Reduced Production)	Same as Alternative 2	6,996,500	Releases of hatchery-origin salmon and steelhead would be reduced 50 percent compared to Alternative 1 and Alternative 2.	Conservation requirements for listed salmon and steelhead would be met.

Summary of Resource Effects

Table S-4 provides a summary of the predicted resource effects under each of the four alternatives. The summary reflects the detailed resource discussions in Chapter 4, Environmental Consequences.

The relative magnitude and direction of impacts is described in Table S-4 using the following terms:

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|---------------|---|
| Undetectable: | The impact would not be detectable. |
| Negligible: | The impact would be at the lower levels of detection, and could be either positive or negative. |
| Low: | The impact would be slight, but detectable, and could be either positive or negative. |
| Moderate: | The impact would be readily apparent, and could be either positive or negative. |
| High: | The impact would be greatly positive or severely negative. |

Preferred Alternative

This draft EIS does not contain a preferred alternative. NMFS will identify the preferred alternative in the final EIS after considering the comments received on this draft EIS. The preferred alternative may be one of the alternatives or a combination of components of more than one alternative, possibly varying for each hatchery program.

How should reviewers approach this EIS?

NMFS encourages reviewers to:

1. Review the draft EIS to gain an understanding of how it is organized and how the alternatives are framed and analyzed.
2. Carefully consider the information provided in Chapter 4, Environmental Consequences, and Chapter 5, Cumulative Effects.
3. After considering the effects, comment on how NMFS should formulate a preferred alternative for publication in the final EIS and ROD.

Table S-4. Summary of environmental consequences for EIS alternatives by resource.

Resource	Alternative 1 (No Action)	Alternative 2 ¹ (Proposed Action)	Alternative 3 ¹ (Termination)	Alternative 4 ¹ (Reduced Production)
Water Quantity and Quality	The hatchery programs would have a low negative effect on water quantity, primarily because water use would generally be non-consumptive and limited by water right permits, and because all surface water diverted would be returned near the points of withdrawal after it circulates through the hatchery facilities.	Same as Alternative 1.	Effects on water quantity would be the same as Alternative 1, because although the proposed salmon and steelhead programs would be terminated, the operators would exercise their water rights for the hatchery facilities.	Although hatchery production would be reduced 50 percent, effects on water quantity would be the same as Alternative 1.
	The hatchery programs would have a negligible negative effect on water quality primarily because hatchery operations would be limited by NPDES permits and would not be expected to contribute substantially to water quality impairments in the basin.	Same as Alternative 1.	The hatchery programs would have a negligible positive effect on water quality because the proposed hatchery programs would be terminated.	Although hatchery production would be reduced 50 percent, effects on water quality would be the same as Alternative 1.
Salmon and Steelhead	The hatchery programs would generally have negligible to high negative genetics, competition, predation, facility operations, masking, incidental fishing, and disease transfer effects; and negligible to moderate positive population viability and nutrient cycling effects, depending on the affected species.	Same as Alternative 1.	Because the hatchery programs would be terminated, all negative and positive effects on salmon and steelhead from the programs would be eliminated.	Because hatchery production would be reduced 50 percent, the negative genetics, competition, predation, facility operations, masking, incidental fishing, and disease transfer effects and the positive population viability and nutrient cycling effects, would be reduced compared to Alternative 1.

Table S-4. Summary of environmental consequences for EIS alternatives by resource, continued.

Resource	Alternative 1 (No Action)	Alternative 2¹ (Proposed Action)	Alternative 3¹ (Termination)	Alternative 4¹ (Reduced Production)
Other Fish Species	The hatchery programs would have negligible negative or negligible positive effects on other fish species, depending on whether the hatchery-origin fish compete with or prey on the species.	Same as Alternative 1.	Because the hatchery programs would be terminated, all negative and positive effects on other fish species as competitors and predators would be eliminated.	Same as Alternative 1 because hatchery production would be reduced 50 percent and the negative effects on other fish species that compete with hatchery-origin fish, and the positive effects on other fish species that benefit from hatchery-origin fish as a food source would be reduced.
Wildlife – Southern Resident killer whale	The hatchery programs would have a negligible positive effect by providing a source of prey for Southern Resident killer whales.	Same as Alternative 1.	Because the hatchery programs would be terminated, there would be a negligible negative effect on Southern Resident killer whales because a source of prey would be eliminated.	Same as Alternative 1 because hatchery production would be reduced 50 percent and the positive effect on Southern Resident killer whales from hatchery-origin fish as source of prey would be reduced.
Socioeconomics	The hatchery programs would have a low positive effect on socioeconomics because personal income and jobs from tribal commercial and non-tribal recreational fisheries, income associated with hatchery operations, and contributions to the local and regional economies, would accrue primarily in King County in the South Puget Sound subregion. In addition, the economic activity and fisheries effects from the hatchery programs would have a relatively small impact on the overall economy of King County and in the broader Puget Sound region. In some of the more remote areas of the river basin	Same as Alternative 1.	Because the hatchery programs would be terminated, there would be a low negative effect on socioeconomics because all commercial and recreational fishing, jobs, and personal income associated with the hatchery programs would be eliminated.	The hatchery programs would have a negligible positive effect on socioeconomics, because hatchery production would be reduced 50 percent resulting in fewer returning adults to be harvested in commercial and recreational fisheries, and contributions to regional and local economies would be less relative to Alternative 1.

Summary

Table S-4. Summary of environmental consequences for EIS alternatives by resource, continued.

Resource	Alternative 1 (No Action)	Alternative 2 ¹ (Proposed Action)	Alternative 3 ¹ (Termination)	Alternative 4 ¹ (Reduced Production)
	and the South Puget Sound subregion more economically dependent on income derived the hatchery programs, effects would likely be greater.			
Environmental Justice	The hatchery programs would have a moderate positive effect on environmental justice, primarily because of their economic impact on communities of concern (King County and the South Puget Sound subregion) and benefits to Native American tribes of concern from fishing for ceremonial and subsistence and commercial purposes.	Same as Alternative 1.	Because the hatchery programs would be terminated, there would be a moderate negative effect on environmental justice because all commercial and recreational fishing in communities of concern associated with the hatchery programs would be eliminated. Tribal ceremonial and subsistence fishing would continue.	Same as Alternative 1 because, although hatchery production would be reduced 50 percent, the hatchery programs would substantially benefit fishing by user groups of concern (commercial fishermen) and Native American tribes of concern from fishing for ceremonial and subsistence and commercial purposes.
Human Health	The hatchery programs would have a negligible negative effect on human health, primarily because the hatchery programs comply with worker safety programs, rules, and regulations; the use of therapeutics would be minimal and in compliance with label requirements; and personal protective equipment would be used that limits the spread of pathogens.	Same as Alternative 1.	Because the hatchery programs would be terminated, the hatchery programs would have a negligible positive effect on human health.	Although hatchery production would be reduced 50 percent, human health effects would be the same as Alternative 1.

¹ Differences between the no-action and the action alternatives are due to differences in the number of hatchery-origin fish produced.