

**4(d) Rule Limit 5
Evaluation and Recommended Determination**

Title: Hatchery and Genetic Management Plans for Nine Salmonid Hatchery Programs in the Lower Columbia River Funded Pursuant to the Mitchell Act

Plans Submitted by: Oregon Department of Fish and Wildlife
Washington Department of Fish and Wildlife

ESU/DPS: Columbia River Chum
Lower Columbia River Chinook
Lower Columbia River Coho
Lower Columbia River Steelhead

4(d) Rule Limit: ESA 4(d) Rule Limit 5

Associated NMFS Tracking Numbers: WCR-2017-6344, WCR-2017-6348;
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TABLE OF CONTENTS

1	Background	5
2	Described Hatchery Programs	5
3	Evaluation	7
3.1	5(i)(A) The HGMP has clearly stated goals, performance objectives, and performance indicators that indicate the purpose of the program, its intended results, and measurements of its performance in meeting those results.....	7
3.2	5(i)(B) The HGMP utilizes the concepts of viable and critical salmonid population thresholds, consistent with the concepts contained in the technical document entitled “Viable Salmonid Populations.”	9
3.3	5(i)(C) Taking into account health, abundances, and trends in the donor population, broodstock collection programs reflect appropriate priorities.	10
3.4	5(i)(D) The HGMP includes protocols to address fish health, broodstock collection and spawning, rearing and release of juveniles, disposition of hatchery adults, and catastrophic risk management.	10
3.5	5(i)(E) The HGMP evaluates, minimizes, and accounts for the propagation programs’ genetic and ecological effects on natural populations, including disease transfer, competition, predation, and genetic introgression caused by straying of hatchery fish.	13
3.6	5(i)(F) The HGMP describes interrelationships and interdependencies with fisheries management.	13
3.7	5(i)(G) Adequate artificial propagation facilities exist to properly rear progeny of naturally spawned broodstock, to maintain population health and diversity, and to avoid hatchery-influenced selection and domestication.	14
3.8	5(i)(H) Adequate monitoring and evaluation exist to detect and evaluate the success of the hatchery program and any risks potentially impairing the recovery of the listed ESU.	14
3.9	5(i)(I) The HGMP provides for evaluating monitoring data and making any revisions of assumptions, management strategies, or objectives that data show are needed.	14
3.10	5(i)(J) NMFS provides written concurrence of the HGMP which specifies the implementation and reporting requirements.	15
3.11	5(i)(K) The HGMP is consistent with plans and conditions set within any Federal court proceeding with continuing jurisdiction over tribal harvest allocations.....	15
4	Public Review and Comments	15
5	Recommended Determination	15
6	Reevaluation Criteria	16
7	References	16

LIST OF TABLES

Table 1. Nine proposed hatchery programs rearing salmon and steelhead in the lower Columbia River.	6
Table 2. Proposed production levels by hatchery program.....	6
Table 3. Typical HGMP program performance standards and indicators.	8
Table 4. Federal Register notices for the final rules that list species, designate critical habitat, or apply protective regulations to a listed species considered in this evaluation.	9
Table 5. Number of broodstock collected and spawning approach for nine hatchery programs in the lower Columbia River.	11
Table 6. Fish release details for nine hatchery programs in the lower Columbia River.	12

1 BACKGROUND

NOAA's National Marine Fisheries Service (NMFS) issued a final Endangered Species Act (ESA) 4(d) Rule adopting regulations (50 CFR 223.203) necessary and advisable to conserve salmonid species listed as threatened under the ESA (65 FR 42422, July 10, 2000; 70 FR 37160, June 28, 2005). The 4(d) Rule exempts the take of salmon and steelhead listed as threatened species under the ESA if the entity follows a Hatchery and Genetic Management Plan (HGMP) that meets the 4(d) Rule criteria and is approved by NMFS (July 10, 2000, 65 FR 42422, amended June 28, 2005, 70 FR 37160).

Under limit 5 of the 4(d) Rule—the limit that addresses hatchery programs described in HGMPs developed by state or federal agencies—ESA section 9 take prohibitions described in paragraph (a) of the 4(d) Rule (50 C.F.R. 223.203(a)) do not apply for species listed as threatened under the ESA to hatchery activities associated with artificial propagation programs provided that the elements of the 4(d) Rule are met, as discussed in section 3, below.

2 DESCRIBED HATCHERY PROGRAMS

The Washington Department of Fish and Wildlife (WDFW) and the Oregon Department of Fish and Wildlife (ODFW) have provided NMFS with nine¹ HGMPs (ODFW 2016a; ODFW 2016b; WDFW 2014a; WDFW 2014b; WDFW 2014c; WDFW 2014d) proposed for implementation in the lower Columbia River region (Table 1). The applicants have provided the HGMPs for review, determination, and approval by NMFS pursuant to 4(d) Rule limit 5.

Eight of the proposed HGMPs share similar objectives for: providing hatchery-origin fish for harvest; contributing adult escapement to each pertinent watershed; shared salmon and steelhead population recovery; broodstock collection methodology; monitoring and evaluation actions; and funding sources. The Big Creek Hatchery chum salmon program is unique among the nine programs: the long-term goal of this program is not to support harvest but to reintroduce chum salmon to the Oregon side of the lower Columbia River. In the short term, the program is intended to develop a source of broodstock for the recovery program by establishing a hatchery chum salmon population in Big Creek. All nine HGMPs were assembled consistent with the broader objectives regarding artificial propagation in the Columbia River funded by the Mitchell Act.

NMFS worked with the applicants during the development of the HGMPs to provide technical assistance, to exchange information, and to discuss what would be needed to conserve ESA-listed species. Much of this discussion took place during development of a larger set of hatchery plans funded by the Mitchell Act, and during formal consultation under section 7(a)(2) of the ESA for that funding action. The biological opinion on NMFS funding of hatchery programs under the Mitchell Act concluded that such funding and the implementation of funded programs would not

¹ An additional HGMP was provided for the Elochoman Type-N coho salmon program, and was included in this set of HGMPs when these plans were made available for public comment. However, this additional program was not analyzed in full in the Mitchell Act biological opinion, and so will not be included in this evaluation document.

jeopardize the continued existence of ESA-listed salmon, steelhead, and eulachon, nor destroy or adversely modify designated critical habitat (NMFS 2017). The following discussion evaluates whether the submitted plans address the criteria in section 223.203(b)(5) of the 4(d) rule for salmon and steelhead.

Table 1. Nine proposed hatchery programs rearing salmon and steelhead in the lower Columbia River.

Hatchery Program	Program Purpose	Agency
Clackamas River winter steelhead	Integrated harvest	ODFW
Big Creek Hatchery Chum salmon recovery	Recovery/reintroduction	ODFW
Grays River Hatchery Type-N Coho	Integrated/segregated harvest	WDFW
Kalama River wild summer steelhead	Integrated harvest	WDFW
Kalama River late winter steelhead	Integrated harvest	WDFW
North Toutle Hatchery Fall Chinook	Integrated harvest	WDFW
North Toutle Hatchery Type-S coho	Integrated harvest	WDFW
Washougal River Fall Chinook	Integrated harvest	WDFW
Washougal River Type-N coho	Integrated/segregated harvest	WDFW

Table 2. Proposed production levels by hatchery program.

Hatchery Program	Program Operator	Integrated or Isolated	Recent Average (2015-2016) Release Number	Maximum Number of Fish that Can Be Released in Spring of 2022
Big Creek chum salmon	ODFW	Integrated	154,000	300,000
Clackamas winter steelhead	ODFW	Integrated	106,000	165,000
Grays River coho salmon	WDFW	Integrated	161,000	75,000
North Fork Toutle coho salmon	WDFW	Integrated	163,000	90,000
Kalama summer	WDFW	Integrated	83,000	90,000 (Int/Iso)

steelhead (integrated)				
North Fork Toutle fall Chinook salmon (tule)	WDFW	Integrated	1,394,000	1,100,000
Kalama winter steelhead (integrated)	WDFW	Integrated	56,000	135,000 (Int/Iso)
Washougal fall Chinook salmon (tule)	WDFW	Integrated	1,976,000	1,200,000
Washougal coho salmon	WDFW	Integrated	154,000	108,000

3 EVALUATION

Limit 5 of the 4(d) Rule for salmon and steelhead states that, for an HGMP to qualify for the limitation of take prohibitions, the following elements must be met:

(5)(i) A state or Federal Hatchery and Genetics Management Plan (HGMP) has been approved by NMFS as meeting the following criteria

National Marine Fisheries Service (NMFS) will approve an HGMP if it meets the specific criteria specified in 50 CFR 223.203(b)(5)(i). The following is an evaluation of whether the submitted HGMPs meet these criteria.

3.1 5(i)(A) The HGMP has clearly stated goals, performance objectives, and performance indicators that indicate the purpose of the program, its intended results, and measurements of its performance in meeting those results.

Each of the HGMPs has clearly stated its goal, performance objectives, and methods for measuring the progress toward achieving those objectives. The general program goals described in section 1.7 of each HGMP (ODFW 2016a; ODFW 2016b; WDFW 2014a; WDFW 2014b; WDFW 2014c; WDFW 2014d) for propagating hatchery fish in the lower Columbia River tributaries are:

For all programs except the Big Creek chum salmon program, performance objectives include the following:

- Provide escapement to the given watershed and help meet harvest goals, including: Ocean recreational and commercial harvest, Lower Columbia River recreational and commercial harvest, and tributary recreational harvest.
- Serve as mitigation for development (including hydro-power) and habitat degradation
- Use hatcheries to reduce extinction risk of natural populations through adult management and protocols related to improved genetic practices
- Mark program fish to enable selective harvest, broodstock management, and monitoring of the spawning population.

The Big Creek chum salmon program’s performance objective include the following:

- Reintroduce chum salmon to the Oregon side of the lower Columbia River and establish self-sustaining natural chum salmon populations

Performance objectives derived from the Northwest Power Planning Council Artificial Production Review (Northwest Power Planning Council 2001), and performance indicators that would be used to gauge compliance with each objective, are described in section 1.10 of each HGMP.

Evaluation and monitoring to ensure standards and indicators are met is further described in section 3.8 of this document. HGMP implementation would generally be designed to determine:

1. Program consistency with proposed hatchery actions and intended results (e.g., juvenile fish release and adult return levels)
2. Measurement of the program’s success or failure in attaining results
3. Effects of the program on listed natural-origin fish populations in the lower Columbia River and its tributaries

Table 3. Typical HGMP program performance standards and indicators.

Standard	Indicator
Produce fish for harvest while minimizing excess hatchery returns	<ul style="list-style-type: none"> • Measure adult harvest and escapement • Mass marking to allow selective fisheries
Supplement natural population (integrated only)	<ul style="list-style-type: none"> • Increasing proportion of natural-origin fish • Increasing natural smolt levels
Proper broodstock collection and adult management	<ul style="list-style-type: none"> • Collected randomly throughout the run • Weir/trap checked regularly • Proportion of natural-origin fish • Designated mating scheme, sex ratio • Adheres to spawning guidelines (Seidel 1983) • Stray rates
Meet hatchery juvenile production goal	<ul style="list-style-type: none"> • Egg to fry or smolt survival is as expected • Release target
Minimize interactions of releases with natural-origin fish	<ul style="list-style-type: none"> • Juveniles released at sea-water ready life stages • Size and time of release accounts for listed stocks
Life history characteristics of the natural population do not change	<ul style="list-style-type: none"> • Stable life history patterns of natural fish • Age and size data for natural population
Natural population genetic variation does not change due to artificial propagation	<ul style="list-style-type: none"> • Proportion of natural-origin fish used in broodstock • Proportion of naturally spawning hatchery fish • Genetic assessment
Limit pathogen amplification and transmission	<ul style="list-style-type: none"> • Follows co-manager fish health policy described in the HGMPs

3.2 5(i)(B) The HGMP utilizes the concepts of viable and critical salmonid population thresholds, consistent with the concepts contained in the technical document entitled “Viable Salmonid Populations.”

HGMPs proposed for consideration under the 4(d) Rule considered the concepts of viable and critical thresholds as defined in the NMFS Viable Salmonid Population (VSP) document (McElhany et al. 2000) in Section 2.2.2 of each HGMP. Application of these VSP concepts is needed to adequately assess and limit the take of listed salmonids for the protection of the species. Section 2.2.2 of each HGMP describe the status of the listed Chinook salmon, chum salmon, coho salmon, and steelhead populations relative to “critical” and “viable” population thresholds within the Columbia River. In addition, all nine programs described in Table 2 have been evaluated for their effects on the ESA-listed Chinook, coho, and chum salmon, and ESA-listed steelhead listed in Table 4 (NMFS 2017).

Table 4. Federal Register notices for the final rules that list species, designate critical habitat, or apply protective regulations to a listed species considered in this evaluation.

Species	Listing Status	Critical Habitat	Protective Regulations
Chinook salmon (<i>Oncorhynchus tshawytscha</i>)			
Lower Columbia River	Threatened, 79 FR 20802, April 14, 2014	70 FR 52706, September 2, 2005	70 FR 37160, June 28, 2005
Upper Columbia River spring-run	Endangered, 70 FR 20816, April 14, 2014	70 FR 52732, September 2, 2005	Issued under ESA Section 9
Snake River spring/summer-run	Threatened, 79 FR 20802, April 14, 2014	64 FR 57399, October 25, 1999	70 FR 37160, June 28, 2005
Snake River fall-run	Threatened, 79 FR 20802, April 14, 2014	58 FR 68543, December 28, 1993	70 FR 37160, June 28, 2005
Upper Willamette River	Threatened, 79 FR 20802, April 14, 2014	70 FR 52720, September 2, 2005	70 FR 37160, June 28, 2005
Coho salmon (<i>O. kisutch</i>)			
Lower Columbia River	Threatened, 79 FR 20802, April 14, 2014	81 FR 9252, February 24, 2016	70 FR 37160, June 28, 2005
Chum salmon (<i>O. keta</i>)			
Columbia River	Threatened, 79 FR 20802, April 14, 2014	70 FR 52746, September 2, 2005	70 FR 37160, June 28, 2005
Sockeye salmon (<i>O. nerka</i>)			
Snake River	Endangered, 79 FR 20802, April 14, 2014	70 FR 52630, September 2, 2005	Issued under ESA Section 9
Steelhead (<i>O. mykiss</i>)			
Lower Columbia River	Threatened, 79 FR 20802, April 14, 2014	70 FR 52833, September 2, 2005	70 FR 37160, June 28, 2005
Upper Columbia River	Threatened, 79 FR 20802, April 14, 2014	70 FR 52630, September 2, 2005	71 FR 5178, February 1, 2006

Snake River Basin	Threatened, 79 FR 20802, April 14, 2014	70 FR 52769, September 2, 2005	70 FR 37160, June 28, 2005
Middle Columbia River	Threatened, 79 FR 20802, April 14, 2014	70 FR 52808, September 2, 2005	70 FR 47160, June 28, 2005
Upper Willamette River	Threatened, 79 FR 20802, April 14, 2014	70 FR 52848, September 2, 2005	70 FR 37160, June 28, 2005

3.3 5(i)(C) Taking into account health, abundances, and trends in the donor population, broodstock collection programs reflect appropriate priorities.

A prioritized purpose of a broodstock collection program using listed fish is to re-establish an indigenous salmonid population for conservation purposes, including restoration of similar at-risk populations within the same ESU, and reintroduction of at-risk populations to under-seeded habitat. Under this 4(d) rule criterion, as described in the 4(d) rule, listed salmonids may be intentionally taken for broodstock only if they meet one of the following criterion:

1. The donor population is currently at or above the viable threshold and the collection will not impair its function, or
2. The donor population is not currently viable but the sole objective is to enhance the propagation or survival of the listed ESU, or
3. The donor population is shown with a high degree of confidence to be above the critical threshold although not yet functioning at viable levels, and the collection will not appreciably slow attainment of viable status for that population.

All of the programs are integrated, meaning they incorporate natural-origin fish into their broodstock. Moreover, all nine hatchery programs fall within criterion 1 or 2 as listed above.

3.4 5(i)(D) The HGMP includes protocols to address fish health, broodstock collection and spawning, rearing and release of juveniles, disposition of hatchery adults, and catastrophic risk management.

The proposed HGMPs include protocols, or “best management practices” (BMPs), for fish health, broodstock collection, broodstock spawning, rearing and release of juveniles, disposition of hatchery adults, and catastrophic risk management. These practices, when implemented, would be appropriate for the purpose of adequately limiting the risk of substantial direct and incidental adverse effects on listed fish in the lower Columbia region.

Fish Health (HGMP sections 7, 9, and 10 of each HGMP): All of the hatchery programs would be operated in compliance with Federal, State, and Tribal fish health policies. The policies are designed to limit the spread of fish pathogens between and within watersheds by regulating the transfers of eggs and fish. The policies also outline standard fish health diagnosis, maintenance, and hatchery sanitation protocols to reduce the risk of pathogen amplification and transmission within the hatchery and to fish in the natural environment during broodstock collection and mating as well as fish incubation, rearing, and release. Fish health specialists and pathologists

from WDFW or the ODFW would provide fish health management support and diagnostic fish health services.

Broodstock Collection and Spawning (HGMP sections 6, 7 and 8): To minimize the risk of intentional artificial trait selection, broodstock are collected over the course of the run for each species under propagation. The BMPs for broodstock spawning are described in section 8 of the HGMPs. As summarized in **Error! Reference source not found.**, spawnings are conducted either pairwise (1x1) or factorial (2x2; eggs from a single female are fertilized by multiple males and a single male fertilizes multiple females). Pairwise spawning is logistically easier, but factorial spawning conserves genetic diversity by limiting the risk of a sterile adult (Busack and Knudsen 2007).

Table 5. Number of broodstock collected and spawning approach for nine hatchery programs in the lower Columbia River.

Program	# Collected	Natural-origin fish in broodstock?	Sex Ratio (Female:Male)	Spawning Approach ²
Grays River Type-N coho—on-station	33 adults	Yes- integrated	1:1	1 x 1
Peterson	22 adults			
Deep River	305 adults			
N. Toutle Fall Chinook	330 pairs	Yes- integrated	1:1	1 x 1
Kalama late winter steelhead	80 adults	Yes- integrated	1:1	1 x 2 or 1 x 1
N. Toutle Type-S coho	40 pairs	Yes- integrated	1:1	1 x 1
Washougal Fall Chinook	390 pairs	Yes- integrated	1:1	1 x 1
Kalama wild summer steelhead	48 pairs	Yes- integrated	1:1	2 x 2
Clackamas winter steelhead	95 pairs	Yes- integrated	1:1	1 x 1
Big Creek Hatchery chum salmon	240 pairs	Yes- integrated	1:1	2 x 2 ³
Washougal Type-N coho—integrated	50 pairs	Yes- integrated	1:1	1 x 1
segregated	1,230 pairs			

¹NA = not applicable

²The spawning approach can be either with one female and one male (1 x 1), one female with multiple males (e.g., 1 x 2), or with multiple females and multiple males (e.g., 2 x 2).

³ If shortage of males, individual males may be spawned with more than one female.

Rearing and Release of Juveniles (HGMP sections 9 and 10): All fish would be released as seawater-ready, migrating smolts to ensure rapid emigration downstream through watershed areas where interactions with rearing listed fish may occur. All Chinook salmon, coho salmon, and steelhead would receive a mark or tag prior to release to allow for their differentiation from natural-origin salmon or steelhead. In addition, all fish would be released at times consistent with requirements set forth in NMFS’s Mitchell Act biological opinion (NMFS 2017) to limit interactions (e.g., competition and predation) with emigrating ESA-listed natural-origin fish.

Release numbers, life stage, mark/tag types, and dates for all hatchery programs are detailed in **Error! Reference source not found.**

Table 6. Fish release details for nine hatchery programs in the lower Columbia River.

Program	Release #	Life Stage	Release Location	Mark	Release Date
Big Creek Hatchery chum	300,000	fed fry	Big Creek	100%	Early April
	100,000	egg	Perkins Creek/ Stewart Creek	0%	
	TBD	fed/unfed fry	TBD		
	TBD	adult	TBD		
Washougal fall Chinook	1.2 million	sub-yearling	Washougal River	100%	June
Washougal type-N coho on-site Y/KFP ¹	108,000	yearling	Washougal River	100%	May/June
	2.5 million	yearling	Klickitat River	100%	April
Grays River type-N coho	75,000	yearling	Grays River	100%	April
	39,000	fry	Columbia River	100%	April/May
Clackamas winter steelhead	115,000	smolt	Clackamas Hatchery	100%	March/April
	100,000	smolt	Eagle Creek NFH	100%	March/April
	50,000	smolt	Foster Creek accl. Pond	100%	March/April
North Toutle fall Chinook	1,1 million	sub-yearling	North Fork Toutle	100%	June/July
North Toutle type-S coho	90,000	yearling	Cowlitz River	100%	May
Kalama River winter steelhead	45,000	yearling	Kalama River	100%	April/May
Kalama River wild summer steelhead	90,000	yearling	Kalama River		April/May

Disposition of Hatchery Adults (Section 7.5 of the HGMPs): In general, spawned hatchery carcasses are either sold to a contracted fish buyer, provided to food banks, or given to tribes for subsistence or ceremonial use. Fish treated for pathogens or otherwise unfit for human consumption are buried in approved land-fills.

Catastrophic Risk Management (Section 5.8 of the HGMPs): All hatchery programs identified in **Error! Reference source not found.** adhere to the applicants' fish health policies (NWIFC and WDFW 2006; USFWS 2004) and apply BMPs to reduce the risk of catastrophic loss of fish under propagation. Furthermore, all hatcheries have staff on site and low-water alarms.

3.5 5(i)(E) The HGMP evaluates, minimizes, and accounts for the propagation programs' genetic and ecological effects on natural populations, including disease transfer, competition, predation, and genetic introgression caused by straying of hatchery fish.

The HGMPs provide evaluations of potential genetic and ecological effects on listed salmon and steelhead in section 2 and risk minimization measures in sections 6 through 10.

Genetic effects: Artificial fish production may result in a loss of within-population genetic diversity (the reduction in quantity, variety and combinations of alleles in a population), outbreeding depression (loss in fitness caused by changes in allele frequency or the introduction of new alleles) and/or hatchery-influenced selection (Busack and Currens 1995).

The HGMPs account for and minimize genetic risks to ESA-listed salmon and steelhead populations through implementation of the following measures:

- Broodstock are randomly collected throughout the adult return to ensure full representation of run timing, return location, age class, and sex ratio
- Factorial mating ensures that all fish contribute to the production of progeny to retain genetic diversity
- Straying is monitored to assess spawning proportions of hatchery- and natural-origin salmon and steelhead
- Juveniles are acclimated at their site of release to decrease straying potential

Ecological effects: The primary ecological risks to natural-origin salmon and steelhead populations posed by salmon and steelhead hatchery programs are increased pathogen transfer, competition, and predation. As noted in the HGMPs and earlier in this document, all hatchery actions would be implemented in accordance with the co-manager fish health policies as a means to account for and minimize the risks of pathogen amplification and transmission.

The HGMPs account for and minimize ecological risks to listed salmon and steelhead populations through implementation of the following measures:

- Juveniles are acclimated at their site of release to decrease straying potential
- Monitoring of residuals (PIT tag arrays and/or visual inspections prior to release)

3.6 5(i)(F) The HGMP describes interrelationships and interdependencies with fisheries management.

Descriptions of this criterion occur in section 3 of the HGMPs. As described in the HGMPs, state recreational and tribal fisheries for hatchery-origin species produced through the programs may incidentally affect natural-origin Chinook, sockeye salmon, and steelhead, but these fisheries are not considered interrelated with or interdependent on these programs because these programs are not the sole producers of fish for the fisheries.

3.7 5(i)(G) Adequate artificial propagation facilities exist to properly rear progeny of naturally spawned broodstock, to maintain population health and diversity, and to avoid hatchery-influenced selection and domestication.

As described in sections 4 and 5 of the HGMPs, the hatchery facilities used to implement the programs have adequate surface and groundwater sources, fish trapping and holding facilities, egg incubation and fish rearing vessels, and fish release facilities to ensure proper rearing. As mentioned previously, fish health is maintained throughout rearing by adhering to fish health policies and using pathogen-free water sources when possible (HGMP sections 7, 9 and 10). Minimization of catastrophic loss and genetic risks associated with these programs were addressed in sections 3.4 and 3.5, respectively, of this document.

3.8 5(i)(H) Adequate monitoring and evaluation exist to detect and evaluate the success of the hatchery program and any risks potentially impairing the recovery of the listed ESU.

Monitoring and evaluation actions to identify the performance of each program and hatchery-related effects on ESA-listed fish are also proposed. These actions are summarized in section 1.10 of each HGMP and further described in section 11 of each HGMP. Monitoring and evaluation actions that would be implemented include:

- Spawning ground/redd surveys and hatchery escapement to determine total escapement and percent of hatchery-origin spawners spawning naturally (possible for marked fish only)
- The number and distribution of marked, unmarked, and otolith-marked fish to determine the status of the natural- and hatchery-origin salmon returns and harvest relative to goal levels
- Abundance, timing, age class, sex ratio, and fish health condition data collected for broodstock to assess run traits of the target populations
- Water withdrawal and effluent discharge to ensure compliance with permitted levels
- Monitoring of broodstock collection, egg take, fish survival rates, and smolt release levels for each program to determine compliance with program goals
- Fish health monitoring and reporting in compliance with fish health policies

3.9 5(i)(I) The HGMP provides for evaluating monitoring data and making any revisions of assumptions, management strategies, or objectives that data show are needed.

Under section 1.10 of the HGMPs, data collected relating to hatchery program performance and effects would be evaluated by the ODFW and WDFW to determine whether performance standards were met. In addition, we note that the programs would be reviewed within the greater context of the full suite of programs funded by the Mitchell Act as prescribed by (NMFS 2017). Annual reports for the programs assembled by the applicants would be jointly reviewed by NMFS to document program results, and to determine if adjustments to the programs assumptions and management strategies are warranted. Any changes would be incorporated into Annual Operating

Plan documents, the HGMPs as necessary, and/or annual Future Brood Documents produced by the co-managers and Hatchery Action Implementation Plans produced by local watersheds.

3.10 5(i)(J) NMFS provides written concurrence of the HGMP which specifies the implementation and reporting requirements.

Written concurrence with an HGMP is a requirement specific to Limit 5 of the 4(d) Rule. With the current document, as well as after consulting with itself under section 7 of the ESA, NMFS has documented its recommended determination for all nine HGMPs. NMFS will notify the ODFW and WDFW of our determination, final decision, and any implementation and reporting requirements specified herein [50 CFR 223.203(b)(5)(i)(J)].

3.11 5(i)(K) The HGMP is consistent with plans and conditions set within any Federal court proceeding with continuing jurisdiction over tribal harvest allocations.

The HGMPs are one component of an effort to preserve and recover to a fishable status listed salmon and steelhead in the Columbia River Basin. The final recovery plans for ESA listed Columbia River Basin salmonids have hatchery and habitat components, and include monitoring, research, and restoration recommendations to complement artificial production. The hatchery actions proposed in the HGMPs are included within, and consistent with, these recovery plans. There are no other plans or conditions set within Federal court proceedings—including memorandums of understanding, court orders, or other management plans—that direct operation of the proposed salmon and steelhead hatchery programs.

4 PUBLIC REVIEW AND COMMENTS

As required in (5)(iv) of section 223.203 of the 4(d) rule for salmon and steelhead, the Secretary published notice of the availability of these plans for public review and comment (82 FR 13434, March 13, 2017). We received comments from two commenters. One commenter sent a letter of support for the Clackamas River winter steelhead hatchery program. The other commenter offered suggestions for improving the HGMPs, but the comments did not address the consistency of the HGMPs with 4(d) Rule limit 5 criteria. None of the comments resulted in edits to the HGMPs.

5 RECOMMENDED DETERMINATION

NMFS has reviewed the nine HGMPs, described above, and evaluated them together against the requirements of Limit 5 of the 4(d) rule for salmon and steelhead. Based on this review and evaluation, including consideration of public comments and the associated biological opinion (NMFS 2017), NMFS' recommended determination is that activities implemented, as described in the HGMPs, would not appreciably reduce the likelihood of survival and recovery of ESA-listed salmon or steelhead ESU/DPSs in the Columbia River (NMFS 2017). If the Regional Administrator concurs with this determination, take prohibitions described for ESA-listed salmon

and steelhead in the Columbia River basin would not apply to activities implemented in accordance with the nine HGMPs listed in Table 1.

6 REEVALUATION CRITERIA

NMFS will reevaluate this determination in accordance with 50 CFR 223.203(b)(5)(vi). Factors for judging the effectiveness of each HGMP in protecting and achieving a level of salmonid productivity commensurate with the conservation of the listed salmonids may include, but are not limited to, whether: (1) the actions described by the HGMPs are modified in a way that causes an effect on the listed species that was not previously considered in NMFS' evaluation; (2) new information or monitoring reveals effects that may affect listed species in a way not previously considered; or (3) a new species is listed or critical habitat is designated that may affect NMFS' evaluation of the HGMPs.

7 REFERENCES

- Busack, C., and K. P. Currens. 1995. Genetic risks and hazards in hatchery operations: Fundamental concepts and issues. *AFS Symposium* 15:71-80.
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