

HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

Hatchery Program:

Wells Hatchery Summer Chinook Program for Southern Resident Orca Recovery and Support

Species or Hatchery Stock:

Upper Columbia River Summer Chinook
(*Oncorhynchus tshawytscha*)

Agency/Operator:

Washington Department of Fish and Wildlife: Funder
Douglas PUD: Facility owner and operator.

Watershed and Region:

Mid-Upper Columbia Sub-basin/Columbia Cascade Province

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HATCHERY SUMMER CHINOOK

ACRONYM LIST

BAMP	Biological Assessment and Management Plan
BY	brood year
CCT	Colville Confederated Tribes
cfs	cubic feet per second
Chelan PUD	Public Utility District No. 1 of Chelan County
CV	Coefficient of Variance
CWT	coded-wire tag
Douglas PUD	Public Utility District No. 1 of Douglas County
DMV	Doctor of Veterinary Medicine
DPS	Distinct Population Segment
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FERC	Federal Energy Regulatory Commission
FL	Fork Length
fpp	fish per pound
gpm	gallons per minute
HxH	hatchery by hatchery
HxW	hatchery by wild
HCP	Habitat Conservation Plan
HGMP	Hatchery Genetic Management Plan
HRR	hatchery replacement rate
HSRG	Hatchery Scientific Review Group
IHOT	Integrated Hatchery Operations Team
INAD	Investigational New Animal Drug
ITS	Incidental Take Statement
JFP	Joint Fisheries Parties
M&E	Monitoring and Evaluation
mm	millimeter
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRR	natural replacement rate
NTTOC	non-target taxa of concern
O&M	operation and maintenance
pHOS	proportion hatchery-origin spawners
PIT	passive integrated transponder
PNFHPC	Pacific Northwest Fish Health Protection Committee
PNI	Proportionate Natural Influence
PRCC	Priest Rapids Coordinating Committee
RKm	river kilometer
RMIS	Regional Mark Information System
Rs	<i>Renibacterium salmoninarum</i>
SAR	smolt to adult returns
UCR	Upper Columbia River
USFWS	U.S Fish and Wildlife Service

WxW	wild by wild
WDFW	Washington Department of Fish and Wildlife
Wells HCP	Wells Hydroelectric Project Anadromous Fish Agreement and Habitat Conservation Plan
WRIA	Water Resource Inventory Area
YN	Yakama Nation

SUMMARY

This document is the Hatchery Genetic Management Plan (HGMP) for the new Wells Hatchery summer Chinook program for Southern Resident Orca Recovery and Support funded by the State of Washington via Washington Department of Fish and Wildlife (WDFW) and operated by the Public Utility District No 1. of Douglas County (Douglas PUD), and is submitted as a requirement to support Endangered Species Act (ESA) compliance for the operation of the program. This document includes details about the program facilities and operation, as well as information on the potential effects of the program on ESA-listed fish species and measures to avoid, minimize, or eliminate those various effects. The document is organized as follows:

- Section 1 describes the program, including contact information, justification for the program, and performance standards.
- Section 2 provides information on expected and potential effects on ESA-listed salmonid populations from the program.
- Section 3 relates the program to other management objectives for the species.
- Sections 4 through 10 describe details of fish handling, rearing, collection, and release.
- Section 11 discusses the monitoring and evaluation necessary to maintain the program.
- Section 12 summarizes ongoing or future research related to the program.

The State of Washington created the Southern Resident Orca Task Force in response to the alarming decline in the endangered southern resident orca population. The Task Force, as part of their overall recommendations, proposed increasing hatchery production of certain stocks of Chinook salmon to augment the diet of orcas based on data that indicated an insufficient food supply for the orcas, and their preference for those stocks. In response to these recommendations, the Washington State Legislature and Governor's office passed a budget in 2019 with funding earmarked for Public Utility District production of hatchery Chinook.

Douglas PUD proposed to the State of Washington to produce up to 1,000,000 summer Chinook subyearling salmon at Wells Hatchery to aid in orca recovery. This production was in part funded by the State budget passed in 2019. This HGMP outlines the program justification, description, and supporting information. The program will be funded by the State of Washington and operated by Douglas PUD at the Wells Hatchery. This production will be in addition to the subyearling summer Chinook production Douglas PUD already produces under the Wells Habitat Conservation Plan (Wells HCP).

Wells Hatchery summer Chinook are released directly into the Columbia River, rather than into tributaries of the Columbia, to minimize the potential impact on natural populations. The in-hatchery evaluation will be under the existing Douglas PUD monitoring and evaluation program. Additional evaluation will be conducted by WDFW from the point of release to adults returning for broodstock and surplus distribution. WDFW shall also evaluate contributions to orca recovery, contribution to fisheries, and ecological interaction. The degree of straying and potential impacts of Wells Hatchery summer Chinook contribution on the natural spawning population will be controlled through harvest and adult management of returns at Wells Hatchery.

The program will be propagated entirely at Wells Hatchery, with broodstock collection through the Wells Hatchery volunteer trap, or Wells Dam ladder traps if necessary, and adult holding, spawning, incubation, and rearing to release all at Wells Hatchery. Broodstock (up to 756) will be of hatchery origin returns to Wells Hatchery. Grow-out and acclimation occur in a large lined pond providing Columbia River surface water for imprinting and natural temperature regimes, a rearing environment with a degree of natural feed available, and low rearing densities. Fish are released directly into the Columbia River from Wells Hatchery, located immediately downstream of Wells Dam at river kilometer 829. Volitional release of subyearlings occurs in May. In addition to meeting its primary goal of supporting recovery and sustainability of southern resident orcas, the program will also provide harvest opportunities for commercial, tribal, and recreational fisheries.

1.0 GENERAL PROGRAM DESCRIPTION

1.1 Name of Hatchery or Program

Wells Hatchery Summer Chinook Program for Southern Resident Orca Recovery and Support

1.2 Species and Population (or Stock) under Propagation, and ESA Status

Upper Columbia River (UCR) summer Chinook salmon (*Oncorhynchus tshawytscha*); summer-run component upstream of Priest Rapids Dam.

Endangered Species Act (ESA) Status: Not listed and not a candidate for listing. In the 1997 “Status Review of Chinook Salmon from Washington, Idaho, Oregon, and California,” National Marine Fisheries Service (NMFS) indicated that summer/fall Chinook salmon in this Evolutionarily Significant Unit (ESU) were not in danger of extinction, nor were they likely to become so in the foreseeable future (Myers et al.1998).

1.3 Responsible Organization and Individuals

Name (and title): Kelly Sussewind, Director

Agency or Tribe: Washington Department of Fish and Wildlife (WDFW)

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Name (and title): Gary R. Ivory, General Manager

Agency or Tribe: Public Utility District No. 1 of Douglas County (Douglas PUD)

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Douglas PUD and WDFW are joint permit holders for the existing Wells Hatchery Summer Chinook Program, for which Douglas PUD owns, operates, and maintains Wells Hatchery and funds hatchery program monitoring and evaluation (M&E), and WDFW is Douglas PUD’s current implementing contractor for the associated M&E Plan. The State of Washington shall fund and contract with Douglas PUD for additional summer Chinook subyearling production for Southern Resident Orca (SRO) recovery and sustainability. Future contractors for Douglas PUD, whether for operating Wells Hatchery or for implementing Douglas PUD’s hatchery M&E program, would also jointly hold the permit as agents of WDFW and Douglas PUD.

Other agencies, tribes, co-operators, or organizations involved, including contractors, and extent of involvement in the program:

- NMFS: HCP Hatchery Committee (HCP HC) representative; Administration of the ESA
- U.S. Fish and Wildlife Service (USFWS): HCP HC representative; Administration of the ESA
- WDFW: HCP HC representative
- Confederated Tribes of the Colville Reservation (CCT): HCP HC representative
- Confederated Tribes and Bands of the Yakama Nation (YN): HCP HC representative

The five entities in the bulleted list above comprise the Joint Fisheries Parties (JFP) signatory to the Wells HCP. The HCP HC oversees production programs for HCP mitigation, but not the SRO program. Nevertheless, the HCP HC will engage as necessary on issues of interaction between existing HCP production programs at Wells Hatchery and the proposed SRO program.

1.4 Funding Source, Staffing Level, and Annual Hatchery Program Operational Costs

The State of Washington through the Washington Department of Fish and Wildlife (WDFW) shall fund the SRO program (Engrossed Substitute House Bill 1109; 2019; page 232; see excerpt below), which will not include funding for Douglas PUD’s normal operating and maintenance costs associated with their existing program obligations.

(14) \$425,000 of the general fund—state appropriation for fiscal year 2020 and \$175,000 of the general fund—state appropriation for fiscal year 2021 are provided solely to grant to public utility districts for additional hatchery production that is prioritized to increase prey abundance for southern resident orcas and other species that are critical to the marine food web. Of the amounts provided in this subsection, \$250,000 in fiscal year 2020 is for Puget Sound energy for wells and generators at the Baker River fish hatchery.

Douglas PUD owns and operates Wells Hatchery. The staffing level at Wells Hatchery is currently 6.6 full-time-equivalent staff. For fiscal year 2019 the overall operational, maintenance and study budgeted costs for the Wells Program are \$3,386,164.

1.5 Location(s) of Hatchery and Associated Facilities

Table 1.1. Hatchery facility locations associated with the Wells Hatchery summer Chinook program (located in Water Resource Inventory Area [WRIA] 47; Wells Hatchery/Columbia River/RKm 829.0/Mid-Upper Columbia).

Activity	Facility
Broodstock collection	Wells Hatchery outfall, Wells Dam ladder traps
Adult holding	Wells Hatchery
Spawning	Wells Hatchery
Incubation	Wells Hatchery
Rearing	Wells Hatchery
Acclimation	Wells Hatchery

1.6 Type of Program

This HGMP addresses a new Segregated Harvest Program.

1.7 Goal and Purpose of Program

1.7.1 Goal

The goal of this new subyearling summer Chinook artificial propagation program at Wells Hatchery is to provide increased numbers of summer Chinook for Southern Resident Orca (SRO) recovery and sustainability.

Other summer Chinook programs are reared at Wells Hatchery (see “Wells Hatchery Summer Chinook Program HGMP,” May 28, 2013).

1.7.2 Purpose

The purpose of this hatchery program is to aid SRO recovery and sustainability.

1.8 Justification for the Program

Excerpted from the “Southern Resident Orca Task Force Report and Recommendations,” November 16, 2018 (Purse and Sloan [2018]; accessed June 26, 2019; [Orca Task Force report and recommendations](#))

The Southern Resident orca population travels in pods from central Southeast Alaska to central California, spending most of the year in the Salish Sea near the San Juan Islands, on the outer coast of Washington and along the outer coast of southern Vancouver Island. The Southern Resident orca was classified as endangered in Canada under the Species at Risk Act in 2003 and in the United States under the federal Endangered Species Act in 2005. Washington State classified orcas as endangered in 2004. (Page 4)

Key Threats: Lack of Prey.

The Southern Resident orca diet is composed primarily of Chinook salmon. Several runs of Chinook salmon that could provide important prey for Southern Resident orcas are listed as threatened or endangered under the Endangered Species Act. To be abundant, diverse and sustainable, Chinook need productive and protected habitat as well as a reliable supply of forage fish to feed on. Development activities and fish passage barriers such as impassable dams, tide gates and culverts have led to habitat loss for both salmon and forage fish. Predators such as sea lions, harbor seals, fish and birds consume Chinook and reduce the number available to the orcas where their foraging areas overlap. Salmon harvesting in fisheries in Alaska, British Columbia, off Washington’s coast or in Washington’s inland waters can further reduce the number of Chinook available for the orcas. Hatchery production could play an important role in increasing prey abundance for Southern Residents but also poses genetic and ecological risks to wild populations if not managed carefully. Addressing lack of prey therefore requires addressing all these issues:

habitat, forage fish, hydropower, predation, harvest and hatcheries.... (Page 5)

Goal 1: Increase Chinook abundance

Habitat restoration and acquisition: Increase Chinook abundance by restoring and acquiring salmon habitat and food sources

Hatcheries: Provide additional Chinook through increased hatchery production
Recommendation 6: Significantly increase hatchery production and programs to benefit Southern Resident orcas consistent with sustainable fisheries and stock management, available habitat, recovery plans and the Endangered Species Act. Hatchery increases need to be done in concert with significantly increased habitat protection and restoration measures.

Authorize/provide funding for the Washington Department of Fish and Wildlife and comanagers to significantly increase hatchery production at facilities in Puget Sound, on the Washington Coast and in the Columbia River basin in a manner consistent with sustainable fisheries and stock management and the ESA. Decisions on hatchery production are made by WDFW and tribal co-managers, with Endangered Species Act consultation from the National Oceanic and Atmospheric Administration and the U.S. Fish and Wildlife Service where appropriate. The Washington Fish and Wildlife Commission adopted a policy statement in 2018 indicating support for hatchery increases of approximately 50 million smolts beyond 2018 levels to produce more Southern Resident orca prey and fisheries benefits; the task force supports significant increases in hatchery production and habitat protection and restoration. (Page 46)

Wells Hatchery began operation in 1967 and is located on the Columbia River west bank of the Wells Dam tailrace. This facility was constructed and is funded by Douglas PUD to mitigate for loss of summer Chinook salmon spawning habitat inundated by Wells Dam. Originally built as a spawning channel, it was reprogrammed to serve as an extended rearing facility in 1977. It currently produces both subyearling (484,000) and yearling (320,000) summer Chinook salmon (referred to hereafter as HCP Programs). In addition, up to 1,000,000 subyearling Chinook shall be produced for SRO recovery and sustainability (referred to hereafter as SRO Program).

The SRO program will target the recovery and sustainability of the Southern Resident Orca population, in accordance with the Southern Resident Orca Task Force recommendations.

1.8.1 Legal Agreements & Requirements

The State of Washington shall contract with Douglas PUD to produce the SRO program.

1.8.1.1 Douglas PUD's Wells HCP

The SRO program is not governed under the Wells HCP. However, the majority of the fish production at Wells Hatchery is governed under the Wells HCP and the information is provided here for context and completeness.

The Wells HCP has been included in the license for the Wells Project (Federal Energy Regulatory Commission [FERC] No. 2149). The Wells HCP is a long-term adaptive management plan for Plan Species and their habitat as affected by the Project. Parties to this agreement include the NMFS, USFWS, WDFW, CCT, YN, Douglas PUD and the four Wells Project power purchasers. Section 8 of the Wells HCP details the objectives, responsibilities, and requirements of hatchery programs required as mitigation, as follows:

8.1 Hatchery Objectives

8.1.1 The District shall provide hatchery compensation for all of the Permit Species including; a) spring Chinook salmon, b) summer/fall Chinook salmon, c) sockeye salmon d) summer steelhead as further described in Section 8 [of the Wells HCP] (Hatchery Compensation Plan)....

8.4.6 Of the existing production commitment of ...32,000 pounds of yearling summer Chinook at about 10 fish per pound (320,000 fish) and 24,200 pounds of subyearling summer Chinook, at about 20 fish per pound (484,000 fish), is compensation for original inundation and shall not be subject to adjustment...

1.8.1.2 Responsibilities of Applicants

Douglas PUD HGMP Actions Implementing the SRO Program

Within this HGMP, the following are Douglas PUD Actions:

- Provide water sources and implement risk-aversion measures as described or similar to those described in Section 4 “Water Source.”
- Provide facility capacity to rear the fish as described in Section 5 “Facilities.”
- Provide broodstock collection facilities—Wells Hatchery outfall and Wells Dam ladder traps — and an operator for broodstock collection as described in Section 6 “Broodstock Origin and Identity” and Section 7 “Broodstock Collection.”
- Perform activities described in Section 8 “Mating,” Section 9 “Incubation and Rearing,” and Section 10 “Release.”
- Provide data to WDFW for ESA Section 10 reporting.

WDFW HGMP Actions

WDFW (State of Washington) shall fund the production of the SRO Program, including fish culture and hatchery production costs, marking and tagging, ESA annual reporting, and monitoring and evaluation costs.

WDFW is also the funding source for or implementer of elements of the hatchery programs that are not Douglas PUD’s obligations under the HCP or the FERC license for the Wells Project. In particular, WDFW is responsible for performing the management of returning adult summer Chinook that are in excess of or do not conform to program management criteria. WDFW shall also be responsible for all such adult Wells Hatchery summer Chinook from the point at which adult fish are removed from Douglas PUD’s trapping facilities and placed in holding containers or are captured in a fishery (adult management is not part of this program or explicitly included in

this HGMP). The Co-Managers will determine the disposition of the adult fish once they are removed from the river for purposes other than broodstock.

WDFW shall provide annual ESA reporting to National Oceanic and Atmospheric Administration (NOAA) Fisheries.

1.8.2 Program Description

The Wells Hatchery summer Chinook SRO program is described in the subsequent subsections and includes (1) broodstock collection and program size; (2) spawning, incubation, rearing, and release of juvenile summer Chinook; (3) escapement and management of returning adults; and (4) monitoring and evaluation.

The SRO Program is a segregated harvest program intended to help recover and sustain the Southern Resident Orca population (see Section 1.8).

Anticipated returns from the program were estimated based on the maximum, minimum, and mean smolt-to-adult returns (SARs; overall SAR including harvest) from the 18 recent complete brood-year returns (1994-2010). The anticipated returns are as follows:

Program Component (numbers of smolts released)	Anticipated Number of Adults Returned		
	Minimum SAR	Mean SAR	Maximum SAR
SRO Subyearling (1,000,000)	30	1,468	5,440

1.8.2.1 Broodstock Collection and Program Size

Numeric goals for broodstock collection by both programs were modeled based on average fecundity, egg-to-smolt survival, and an assumed equal sex ratio targeting a 99% chance of meeting full program production.

The proposed smolt-release numbers of up to 1,000,000 subyearling summer Chinook requires the collection of up to 756 adults.

Table 1.2. Total broodstock collection necessary to meet production targets for the Wells Hatchery summer Chinook program.

Program	Release Location	Smolt Objective	Expected Brood
SRO Subyearling	Columbia River	1,000,000	756 ^a

^a Values based on a current, mean fecundity of 4,171 (H) and 4,662 (W), an egg-to-smolt survival of 0.805 (subyearling) and 0.853 (yearling), a 1:1 male:female ratio, and 97.9% pre-spawn adult survival. Broodstock numbers reflect a ~ 99% chance of meeting the program production targets.

The SRO Program will use only hatchery origin broodstock. The proposed program would continue to collect hatchery-origin broodstock at the Wells Hatchery volunteer channel, or Wells Dam ladder traps if necessary.

Douglas PUD and WDFW will annually develop broodstock collection protocols for this program. These objectives and protocols may be adjusted in season to meet changes in the abundance, composition, and location of adult returns, and to minimize impacts on non-target fish.

When in operation, trap facilities will be checked and emptied daily, with fish retained for broodstock for holding and spawning, and all other hatchery-origin fish removed to control proportion hatchery-origin spawners (pHOS), and natural-origin fish released to the Columbia River.

The following procedures will be employed to minimize potential adverse impacts on summer Chinook and other incidental species associated with broodstock collection activities:

- All species will be held for a minimal duration in the traps (less than 24 hours).
- Traps and holding areas will be locked or secured against tampering or vandalism.
- Non-target fish will be released immediately without harm.

1.8.2.2 Spawning, Incubation, Rearing and Release of Juvenile Summer Chinook

Spawning will occur at the Wells Hatchery. The spawning facilities are integrated into the broodstock-holding facilities, allowing the sorting of broodstock for sexual maturity followed immediately by spawning. Fertilization, incubation, and rearing also occur at the Wells Hatchery.

1.8.2.3 Escapement Goals for Natural Spawning Areas

The HCP Wells Hatchery summer Chinook SRO Program is a segregated harvest program. Adult returns are not intended to spawn naturally; therefore, there is no escapement goal for natural spawning areas. However, the goal for the stray rate of Wells Hatchery summer Chinook to natural spawning areas is to comprise less than 5% of the naturally spawning recipient population.

1.8.2.4 Annual Decision-Making Regarding Broodstock Collection and Spawning Escapement

Douglas PUD and WDFW will cooperatively conduct decision-making for the SRO Program, which is not governed under the Wells HCP process. WDFW, as funder, will determine the duration of funding for the program.

1.8.2.5 Marking Strategy

All juvenile releases will be marked according to WDFW policy and in coordination with marking schemes for other summer Chinook releases in the Upper Columbia. Currently, all Wells Hatchery HCP summer Chinook are adipose clipped and coded-wire tagged. See Section 10.1.7 for additional details.

1.8.2.6 Management of Excess Hatchery Fish

The Wells Hatchery summer Chinook SRO Program is a segregated program and returns shall be subject to fisheries. Excess escapement (straying) of hatchery fish in relation to wild spawners and

habitat capacity may pose genetic and ecological risks to natural populations. Thus, management of adult returns is necessary to meet program objectives. Wells Hatchery summer Chinook are available for harvest in ocean and Columbia River commercial, tribal, and recreational fisheries. Hatchery-origin escapement from fisheries will be removed when fish return to Wells Hatchery through the volunteer channel or as approved by co-managers.

Hatchery summer Chinook removed at locations and by methods described above will be provided to WDFW, and WDFW will assume responsibility for their disposition. WDFW is responsible for funding gene-flow management activities from the point at which fish are removed from Douglas PUD's trapping facilities and placed in holding containers, or for a recreational fishery. The Joint Fisheries Managers will determine the disposition of the adult fish once they are removed from the river for purposes other than broodstock.

Permit Holder: Although Douglas PUD, as the hatchery operator, and WDFW, as the funder and M&E contractor/implementer of the SRO Program, are joint permit holders for the Wells Hatchery summer Chinook SRO program, Douglas PUD is not a fish-management agency with authority over fisheries, or for determining the disposition of fish surplus to program needs, and thus cannot hold a permit for such activities. Therefore, WDFW will obtain and hold the necessary permit(s) for gene-flow management activities beyond the point at which summer Chinook are removed from Douglas PUD's trapping facilities and placed in holding containers or transport vessels, and will also hold any necessary permits for any fisheries on returning adults from the Wells Hatchery SRO summer Chinook program.

Conservation Fishery

A conservation fishery is not a component of the proposed Wells Hatchery summer Chinook SRO program, and thus is not explicitly included as part of this HGMP. Recreational fisheries on adult returns from the Wells Hatchery summer Chinook programs are currently allowed and are managed by WDFW and permitted under Section 10 (a)(1)(B) Permit 1554, separately from this HGMP.

1.8.2.7 Monitoring and Evaluation

M&E plays an important role in measuring program results and determining potential future modifications (adaptive management). M&E information is collected directly from, or derived from broodstock sampling, coded-wire tagging (CWT), adipose clipping, genetic sampling, and disease sampling.

WDFW shall fund M&E activities for the SRO Program that fall outside the normal in-hatchery scope of Douglas PUD M&E activities at Wells Hatchery.

1.9 List of program "Performance Standards"

See Tables 1.3 and 1.4 in Section 1.10.

1.10 List of program “Performance Indicators,” designated by “benefits” and “risks”

1.10.1 “Performance Indicators” Addressing Benefits

The performance indicators in Tables 1.3 and 1.4 are from the M&E Plan for Douglas PUD programs developed and approved by the HCP Hatchery Committees, titled Monitoring and Evaluation Plan for PUD Hatchery Programs (Hillman et al., 2017). WDFW shall use in-hatchery data collected under the Douglas PUD M&E program for in-hatchery evaluation. WDFW shall collect and analyze data for performance standards outside of Wells Hatchery.

Table 1.3. Performance indicators addressing benefits.

Performance Standards	Performance Indicators ¹	Monitoring and Evaluation
1. Determine if the hatchery adult-to-adult survival (i.e., hatchery replacement rate, HRR) is greater than target hatchery survival rate.	Ho: $HRR \geq \text{Target Value}$	Evaluate annually
2. Determine if the stray rate of hatchery fish is below the acceptable levels to maintain genetic variation among stocks.	Ho: Stray rate _{Hatchery fish} < 5% of total brood return Ho: Stray hatchery fish < 5% of spawning escapement of other independent populations. Ho: Stray hatchery fish < 10% of spawning escapement of any non-target streams within independent population.	Monitor and evaluate hatchery stray rates and proportional contribution to natural spawning aggregates.
3. Determine if hatchery fish were released at the programmed size and number.	Ho: Hatchery fish _{Size} = +/- 10% of Programmed _{Size} Ho: Hatchery fish _{Number} = +/- 10% of Programmed _{Number}	Monitor fish size and number at release.
4. Assess adverse impacts to non-target taxa of concern (NTTOC).	Uses PCR-Risk model and expert panel to address risk containment goals set by the HCP HC.	This is a regional objective, the implementation of which requires collaboration among all parties to the Wells HCP. This collaboration has been initiated, including the complicated process for determining the potential for and magnitude of impacts of target species on NTTOC.

Performance indicators concerning benefits of the SRO Program shall be assessed by WDFW.

1.10.2 “Performance Indicators” Addressing Risks

Table 1.4. Performance indicators addressing risks.

Performance Standards	Performance Indicators	Monitoring and Evaluation
1. Artificial propagation activities comply with ESA responsibilities to minimize impacts and/or interactions to ESA listed fish	Program complies with Section 10 permit conditions including juveniles released from the hatchery at a time that fosters rapid migration downstream. 100% adipose clip and up to 50% CWT fish to identify them from naturally produced fish.	As identified in the HGMP: Monitor size, number, date of release and mass mark quality. Additional monitoring metrics include, straying, effects on NTTOC, and fish health documentation.
2. Ensure hatchery operations comply with state and federal water quality and quantity standards through proper environmental monitoring.	All facilities meet WDFW water-right permit compliance and National Pollution Discharge Elimination System (NPDES) requirements (NPDES permit No.WAG-5011).	Flow and discharge reported in monthly NPDES reports. Environmental monitoring of total suspended solids, settleable solids, in-hatchery water temperatures, in-hatchery dissolved oxygen, nitrogen, ammonia, and pH will be conducted and reported as per permit conditions.
3. Water intake systems minimize impacts to listed wild salmonids and their habitats.	<u>Intake screens</u> – designed and operated to assure approach velocities and operating conditions provide protection to wild salmonid species.	Intake system designed to deliver permitted flows. Operators monitor and report as required Hatcheries participating in the programs will maintain all screens associated with water intakes in surface water areas to prevent impingement, injury, or mortality to listed salmonids.
4. Hatchery operations comply with all ESA permit requirements.	Section 10 annual reports are submitted in compliance with permits.	Section 10 annual reports are submitted in compliance with permits.
5. Artificial production facilities are operated in compliance with all applicable fish health guidelines, facility operation standards and protocols including IHOT, Co-Managers Fish Health Policy and drug usage mandates from the Federal Food and Drug Administration	Hatchery goal is to prevent the introduction, amplification or spread of fish pathogens that might negatively affect the health of both hatchery and naturally reproducing stocks and to produce healthy smolts that will contribute to the goals of this facility.	DPUD Fish Health Doctor of Veterinary Medicine (DVM) monitors program at least weekly. Exams performed at each life stage may include tests for virus, bacteria, parasites and/or pathological changes, as needed

Performance Standards	Performance Indicators	Monitoring and Evaluation
6. The risk of catastrophic fish loss due to hatchery facility or operation failure is minimized.	<p><u>Staffing</u> allows for rapid response for protection of fish from risk sources (water loss, power loss, etc.).</p> <p><u>Backup generators</u> to provide an alternative source of power to supply water during power outages.</p> <p><u>Protocols</u> in place to test standby generator and all alarm systems on a routine basis.</p> <p><u>Alarm</u> systems installed and operating at each rearing vessel to detect loss of or reduced flow and reduced operating head in rearing vessels.</p> <p><u>Densities</u> at minimum to reduce risk of loss to disease.</p> <p><u>Sanitation</u> – all equipment is disinfected between uses on different lots of fish including nets, crowders, boots, raingear, etc.</p>	<p><u>Hatchery engineering design and construction</u> accommodate security measures.</p> <p><u>Operational funding</u> accommodates security measures.</p> <p><u>Training</u> in proper fish handling, rearing, and biological sampling for all staff. Staff are trained to respond to alarms and operate all emergency equipment on station.</p> <p><u>Maintenance</u> is conducted as per manufacturer’s requirements and according to hatchery maintenance schedules.</p>
7. Broodstock collection and release of juveniles to minimize ecological effects on listed wild fish.	<p>All summer Chinook encountered in hatchery broodstock collection operations will be held for a minimal duration in the traps; generally less than 24 hours and follow permit protocols.</p> <p>Juveniles released are imprinted to Wells Hatchery and released at a size and condition to promote migration and return to the facility.</p>	<p>Fish culture and evaluation staff monitor behavior, coefficient of variation in length, and condition. Fish health DVM will certify all hatchery fish before release.</p> <p>Broodstock collection protocols developed each season.</p>

Performance indicators concerning risks of the SRO Program shall be assessed by WDFW.

1.11 Expected Size of Program

1.11.1 Proposed Annual Broodstock Collection Level

Broodstock collection will occur at Wells Hatchery and Wells Dam ladder traps. Annual total collection will be up to 756 adults.

1.11.2 Proposed Annual Fish Release Levels By Life Stage and Location

Table 1.5. Proposed annual fish release levels by life stage and location.

Life Stage	Release Location	Maximum Annual Release Level
SRO Subyearling	Columbia River	1,000,000

The SRO Program is new and therefore, has no release history. See “Wells Hatchery Summer Chinook Program HGMP” (May 28, 2013) for background on summer Chinook release histories.

1.12 Current Program Performance, including Estimated Smolt-to-Adult Survival Rates, Adult Production Levels, and Escapement Levels

The SRO Program is new and therefore, has no release history. Data from the Wells Summer Chinook program is presented in this section to indicate the expected similar performance of the SRO program.

1.12.1 In-hatchery Survival Measures

Table 1.6. Developmental stage survivals in the hatchery environment for Wells Hatchery summer Chinook, brood years 2011-2015 (Snow et al. 2018).

Brood year	Collection to spawning		Unfertilized egg-eyed	Eyed egg-ponding	30 d after ponding	100 d after ponding	Ponding to release	Unfertilized egg-release
	Female	Male						
Yearling 2005-2009	98.2	97.8	92.1	98.5	99.1	94.1	94.5	85.3
Subyearling 2005-2009	98.2	97.8	94.4	94.5	90.7	88.4	88.3	80.5
Standard	90.0	85.0	92.0	98.0	97.0	93.0	90.0	81.0

1.12.2 Hatchery Replacement Rates (HRR) and Smolt-to-Adult Returns (SARs)

Table 1.7. Number of summer Chinook broodstock spawned for the yearling program (including pre-spawn mortalities), smolts released, adult returns, SARs, smolts/adult, and HRR by brood year (1992-2010) for the Columbia River releases from Wells Hatchery.

Brood year	Number of broodstock	Smolts released	Adult returns	SAR (%)	# Smolts/ adult	HRR
<i>Wells yearling summer Chinook salmon</i>						
1992	205	331,353	527	0.159	33	2.6
1993	225	388,248	1,627	0.419	39	7.2
1994	185	365,000	142	0.039	36	0.8
1995	144	290,000	1,120	0.386	29	7.8
1996	193	356,707	1,582	0.444	36	8.2
1997	189	381,867	10,782	2.823	38	57
1998	207	457,770	10,137	2.214	46	49
1999	176	312,098	1,607	0.515	31	9.1
2000	175	343,423	8,319	2.422	34	47.5
2001	248	185,200	2,723	1.470	19	11
2002	182	306,810	3,831	1.249	31	21
2003	144	313,509	1,922	0.613	31	13.3
2004	176	312,980	3,614	1.155	31	20.5
2005	164	333,587	1,715	0.514	33	10.5
2006	200	311,880	6,766	2.169	31	33.8
2007	179	318,902	1,178	0.369	32	6.6
2008	191	336,881	4,577	1.359	34	24
2009	164	350,000	5,733	1.638	35	35
2010	203	350,218	3,195	0.912	35	15.7
Geometric mean 1992-2010	185	329,613	2,457	0.745	33	13.3

In brood years 2003 through 2007 a study was conducted to test the effect of release date on SARs for the subyearling program. Fish had typically been released in mid-June. The study tested a mid-May release date against the traditional mid-June release date. The findings were positive for a switch to an earlier mid-May release, which resulted in substantially higher smolt-to-adult returns.

Table 1.8. Number of summer Chinook broodstock spawned for the subyearling program (including pre-spawn mortalities), smolts released, adult returns, SARs, smolts/adult, and HRR by brood year (1993-2010) for the Columbia River releases from Wells Hatchery.

Brood year	Number of broodstock	Smolts released	Adult returns	SAR (%)	# Smolts/adult	HRR
<i>Wells subyearling summer Chinook salmon</i>						
1993	173	187,382	41	0.022	19	0.2
1994	255	450,935	14	0.003	47	0.1
1995	221	408,000	126	0.031	41	0.6
1996	336	473,000	686	0.145	47	2
1997	274	541,923	221	0.041	54	0.8
1998	179	370,617	349	0.094	37	1.9
1999	212	363,600	515	0.142	36	2.4
2000	257	498,500	187	0.038	49	0.7
2001	210	376,027	801	0.213	38	3.8
2002	265	473,100	128	0.027	47	0.5
2003	224	425,271	152	0.036	42	0.7
2004	293	471,123	710	0.151	47	2.4
2005	262	430,203	2,340	0.544	43	8.9
2006	333	396,538	537	0.135	40	1.6
2007	334	499,365	1,269	0.254	50	3.8
2008	279	427,131	526	0.123	43	1.9
2009	254	464,137	1,478	0.318	46	5.8
2010	323	442,821	1,440	0.325	44	4.5
Geometric mean 1993-2010	255	418,970	353	0.084	42	1.42

1.13 Date Program Started, or is Expected to Start

The proposed SRO Program would begin in 2019, pending approval by NMFS. The first year of operation of Wells Hatchery was 1967 and the HCP Programs are ongoing.

1.14 Expected Duration of Program

The SRO Program is expected to operate for at least 10 years.

1.15 Watersheds Targeted by Program

Columbia River, Chelan Water Resource Inventory Area/Columbia Cascade Province, WRIA 47.

1.16 Indicate Alternative Actions Considered for Attaining Program Goals, and Reasons Why Those Actions are NOT Being Proposed

The SRO Program is funded by the State of Washington and implemented by Douglas PUD for Orca recovery and sustainability. This new program is one of a suite of new actions intended to improve prey availability for SROs (see Purse and Sloan 2018).

2.0 PROGRAM EFFECTS ON NMFS ESA-LISTED SALMONID POPULATIONS

2.1 List All ESA Permits or Authorizations In Hand for the Hatchery Program

2.1.1 Section 10(a)(1)(B) Permit Type: Incidental take (artificial propagation of unlisted salmon): Permit Number 23193

Artificial production of Upper Columbia River (UCR) summer Chinook.

Issued for applicant counter signature September 10, 2019.

Activities described in the application for this permit have been authorized under terms and conditions of the Biological Opinion (No. WCR-2015-3607) on the Section 10 Permit No. 23193 (NMFS 2019). WDFW submits annual reports as conditioned by Section 10 permit No. 23193 covering the period from January 1 to December 31 each year.

The SRO Program requires new permitting.

2.2 Provide Descriptions, Status, and Projected Take Actions and Levels for NMFS ESA-listed Natural Populations in the Target Area

See the “Wells Hatchery Summer Chinook Program HGMP” (May 28, 2013).

2.2.1 Description of NMFS ESA-listed Salmonid Population(s) Affected by the Program

See the “Wells Hatchery Summer Chinook Program HGMP” (May 28, 2013).

2.2.2 Identify the NMFS ESA-listed Population(s) that may be Directly Affected by the Program

None.

2.2.3 Identify the NMFS ESA-listed Population(s) that may be Incidentally Affected by the Program

See the “Wells Hatchery Summer Chinook Program HGMP” (May 28, 2013).

2.2.4 Describe Hatchery Activities, Including Associated Monitoring and Evaluation and Research Programs, that may Lead to the Take of ESA-listed Fish in the Target Area, and Provide Estimated Annual Levels of Take.

2.2.4.1 Hatchery Program Activities

See the “Wells Hatchery Summer Chinook Program HGMP” (May 28, 2013).

2.2.4.2 Gene Flow Management Activities

Hatchery origin summer Chinook that volunteer to Wells Hatchery will be retained. Trapping may incidentally capture listed fish. All incidentally trapped non-target fish will be released unharmed immediately.

2.2.4.3 Responsibilities

The funding entity, permit holder, and agent for the activities discussed in this section are as follows:

2.2.4.4 Harvest

Funding: WDFW

Permit Holder: WDFW

2.2.4.5 Adult Removal at Trapping Facilities – Gene Flow Management

WDFW is responsible for coordinating the funding for gene-flow management activities from the point at which fish are placed in holding containers when removed and/or for any fisheries on returning adults from the Wells Hatchery summer Chinook program (see “Harvest” above). The Co-Managers will determine the disposition of the fish placed in the holding containers.

Permit Holder: Douglas PUD and WDFW will be co-permit holders for gene-flow management activities up to the point at which summer Chinook are removed from Douglas PUD’s trapping facilities and placed in holding containers. WDFW will be the permit holder for adult management activities from the point at which fish are removed from Douglas PUD’s trapping facilities and placed in holding containers. WDFW will also hold permits for any fisheries on adults returning from the Wells Hatchery summer Chinook program.

3.0 RELATIONSHIP OF PROGRAM TO OTHER MANAGEMENT OBJECTIVES

3.1 Describe Alignment of the Hatchery Program with any ESU-wide Hatchery Plan or Other Regionally Accepted Policies. Explain any Proposed Deviations from the Plan or Policies

See the “Wells Hatchery Summer Chinook Program HGMP” (May 28, 2013).

3.2 List All Existing Cooperative Agreements, Memoranda of Understanding, Memoranda of Agreement, or other Management Plans or Court Orders under which the Program Operates

See the “Wells Hatchery Summer Chinook Program HGMP” (May 28, 2013).

3.3 Describe Fisheries Benefiting from the Program, and Indicate Harvest Levels and Rates for Program-origin Fish for the Last Twelve Years (1998-2009), if Available

See the “Wells Hatchery Summer Chinook Program HGMP” (May 28, 2013).

3.4 Relationship to Habitat Protection and Recovery Strategies

This is a segregated program designed to contribute to SRO recovery and harvest opportunity. It is not related to habitat protection or recovery strategies.

3.5 Ecological Interactions

See the “Wells Hatchery Summer Chinook Program HGMP” (May 28, 2013).

3.5.1 Populations that Could be Negatively Impacted by Program

See the “Wells Hatchery Summer Chinook Program HGMP” (May 28, 2013).

3.5.2 Populations that Have a Positive Impact on the Program

Not applicable.

3.5.3 Populations Positively Impacted by the Program

The SRO Program is designed to benefit the recovery and sustainability of Southern Resident Orcas. The continuing HCP Program will similarly benefit Southern Resident Orcas.

4.0 WATER SOURCE

4.1 Provide a Quantitative and Narrative Description of the Water Source (Spring, Well, Surface), Water Quality Profile, and Natural Limitations to Production Attributable to the Water Source

See the “Wells Hatchery Summer Chinook Program HGMP” (May 28, 2013).

4.2 Indicate Risk Aversion Measures that will be Applied to Minimize the Likelihood for the Take of Listed Natural Fish as a Result of Hatchery Water Withdrawal, Screening, or Effluent Discharge

See the “Wells Hatchery Summer Chinook Program HGMP” (May 28, 2013).

5.0 FACILITIES

5.1 Broodstock Collection Facilities (or methods)

Broodstock collection facilities consist of the Wells Hatchery volunteer channel and the Wells Dam east and west fish ladder traps, if needed. The volunteer channel is the primary source for Wells Hatchery SRO summer Chinook broodstock.

5.2 Fish Transportation Equipment (Description of Pen, Tank Truck, or Container Used)

Not required. Fish are collected, reared, acclimated, and released on-station.

5.3 Broodstock Holding and Spawning Facilities

Integrated Hatchery Operations Team (IHOT) adult holding guidelines are followed for adult holding, density, water quality, alarm systems and predator-control measures to provide the necessary security for the broodstock. Broodstock are held in concrete raceways and adults are crowded, sorted, killed and spawned in spawning facilities designed for water-to-water transfer and efficient handling of adult fish (Table 5.1).

Table 5.1. Broodstock Holding and Spawning Facilities.

Ponds (No.)	Pond Type	Volume (cu. ft)	Length (ft)	Width (ft)	Depth (ft)	Available Flow (gpm)
3	Large Adult Ponds	4,840	39.8	20	5	750
3	Small Adult Ponds	2,200	39.8	20	5	750

5.4 Incubation Facilities

Incubation facilities include seven biosecure incubation rooms in the new hatchery building and the incubation room in the old hatchery building.

Table 5.2. Incubation Facilities.

Incubator Type	Trays (number)	Flow (gpm)	Loading-Eyeing (eggs/unit)	Loading-Hatching (eggs/unit)
Heath Vertical – Half Stack Units at 7 trays per ½ Stack	1,664	3 - 5	~4,500	~5,500

5.5 Rearing Facilities

See Section 5.6 below.

5.6 Acclimation/Release Facilities

Table 5.3. Rearing/Acclimation/Release Facilities.

Ponds (No.)	Pond Type	Volume (cu. ft)	Length (ft)	Width (ft)	Depth (ft)	Flow (gpm)	Max. Flow Index	Max. Density Index
40	Rectangular Start Tanks	25	15.3	2.1	2.8	--	--	--
4	Large Start Tanks	133	14.6	3.8	3.0	40	1.5	0.20
12	Start Tanks	12	14.0	1.8	2.0	20	1.5	2.00
10	Concrete Raceways	2,474	93.5	9.8	2.7	400	1.8	0.12
4	Concrete Raceways	3,459	97.4	9.8	3.6	400	1.8	0.12
12	Circular Tanks	1,335	20.0	--	3.6	350	1.5	0.20
1	Lined (DP-1)	212,000	530	100	1.0	2,500	1.85	0.06
1	Lined (DP-3A)	126,000	350	90	4.0	2,500	1.85	0.06
1	Lined (DP-3B)	133,200	370	90	4.0	2,500	1.85	0.06
1	Lined (DP-4A)	118,800	330	90	4.0	2,500	1.85	0.06
1	Lined (DP-4B)	86,400	240	90	4.0	2,500	1.85	0.06

5.7 Describe Operational Difficulties or Disasters that Led to Significant Fish Mortality

See the “Wells Hatchery Summer Chinook Program HGMP” (May 28, 2013).

5.8 Indicate Available Back-up Systems, and Risk Aversion Measures that Will Be Applied, that Minimize the Likelihood for the Take of Listed Natural Fish that May Result from Equipment Failure, Water Loss, Flooding, Disease Transmission, or other Events that Could Lead to Injury or Mortality

See the “Wells Hatchery Summer Chinook Program HGMP” (May 28, 2013).

6.0 BROODSTOCK ORIGIN AND IDENTITY

See the “Wells Hatchery Summer Chinook Program HGMP” (May 28, 2013).

6.1 Supporting Information

See the “Wells Hatchery Summer Chinook Program HGMP” (May 28, 2013).

6.2 Indicate Risk Aversion Measures that will be Applied to Minimize the Likelihood for Adverse Genetic or Ecological Effects to Listed Natural Fish that May Occur as a Result of Broodstock Selection Practices

The broodstock protocols were designed to mitigate for potential genetic effects from hatchery domestication and to avoid introgression with fish from other spawning aggregates.

7.0 BROODSTOCK COLLECTION

7.1 Life-history Stage to be Collected (adults, eggs, or juveniles)

Adults will be collected as broodstock.

7.2 Collection or Sampling Design

Broodstock will be collected across the run to ensure representation of the population and reduce the potential for inadvertent selection.

7.3 Identity

Hatchery origin fish are identified by excised adipose fin and CWT or excised adipose fin only.

7.4 Proposed Number to be Collected

Up to 756 adults.

See the “Wells Hatchery Summer Chinook Program HGMP” (May 28, 2013).

7.5 Disposition of Hatchery-origin Fish Collected Surplus to Broodstock Needs

Surplus fish are the responsibility of WDFW and will be made available to Native American Tribes, food banks, used for nutrient enhancement, or other measures as appropriate.

7.6 Fish Transportation and Holding Methods and Holding of Fish, Especially if Captured Unripe or as Juveniles. Include Length of Time in Transit

No transportation used.

Fish held in adult holding ponds.

7.7 Describe Fish Health Maintenance and Sanitation Procedures Applied

See the “Wells Hatchery Summer Chinook Program HGMP” (May 28, 2013).

7.8 Disposition of Carcasses

See the “Wells Hatchery Summer Chinook Program HGMP” (May 28, 2013).

7.9 Indicate Risk Aversion Measures that will be Applied to Minimize the Likelihood for Adverse Genetic or Ecological Effects to Listed Natural Fish Resulting from the Broodstock Collection Program

Broodstock will be collected from the Wells Hatchery volunteer channel. This will greatly minimize encounters with non-target fish. Non-target fish encountered will be released unharmed. If Wells Dam ladder traps must be used for trapping, trap operators can select which fish to trap, reducing capture of non-target fish. Non-target fish that are captured will be released unharmed.

8.0 MATING

8.1 Describe Fish Mating Procedures that will be Used, Including Those Applied to Meet Performance Indicators Identified Previously

See the “Wells Hatchery Summer Chinook Program HGMP” (May 28, 2013).

8.2 Indicate Risk Aversion Measures that will be Applied to Minimize the Likelihood for Adverse Genetic or Ecological

Effects to Listed Natural Fish Resulting from the Mating Scheme

Not applicable. Summer Chinook are not listed.

9.0 INCUBATION AND REARING

9.1 Specify Any Management Goals (e.g., “egg to smolt survival”) that the Hatchery is Currently Operating under for the Hatchery Stock in the Appropriate Sections Below. Provide Data on the Success of Meeting the Desired Hatchery Goals

9.1.1 Incubation

See the “Wells Hatchery Summer Chinook Program HGMP” (May 28, 2013).

9.1.1.1 Cause for and Disposition of Surplus Egg Takes

Permit conditions specify a maximum number of broodstock that can be collected as determined by expected pre-spawning survival of broodstock, fecundity, and survival-to-release of progeny. To facilitate achievement of the production target of 1,000,000 subyearlings, annual estimates of broodstock needs will be based on updated estimates of age, fecundity, and life-stage survival values. Therefore, surpluses at any life stage may result when one or several actual life-stage survival values exceed estimates used in calculating broodstock needs. In the case of surplus eggs or fish, the surplus will be supplied to another appropriate program, released in non-anadromous waters, or destroyed.

9.1.1.2 Loading Densities Applied During Incubation

IHOT species-specific incubation recommendations will be followed for water quality, flows, temperature, substrate, and incubator capacities. Incubation conditions are based on loading densities recommended by Piper et al. (1982).

9.1.1.3 Incubation Conditions

Eggs are incubated full-term (green egg to emergence) at the Wells Hatchery.

9.1.1.4 Ponding

Summer Chinook fry are transferred from incubation trays for ponding at swim-up (determined by fry having <1mm gap in yolk sac). Ponding generally occurs after the accumulation of 1,650 to 1,750 temperature units. Unfed fry are transferred to start tanks and then to final rearing ponds. Fry are ponded at approximately 1,200 fish per pound.

9.1.1.5 Fish Health Maintenance And Monitoring

Eggs are examined daily by hatchery personnel. Prophylactic treatment of eggs for the control of

fungus is prescribed by the fish-health Doctor of Veterinary Medicine (DVM), and may include treatment with formalin or other accepted fungicides. Non-viable eggs are removed by bulb-syringe or syphon tube and optical egg counters. Adherence to WDFW, Pacific Northwest Fish Health Protection Committee, and IHOT (1995) fish disease-control policies reduces the incidence of diseases in fish produced and released from the Wells Hatchery.

9.1.1.6 Indicate Risk Aversion Measures that will be Applied to Minimize the Likelihood for Adverse Genetic and Ecological Effects to Listed Fish During Incubation

Not applicable. Summer Chinook are not listed.

9.1.2 Rearing

See the “Wells Hatchery Summer Chinook Program HGMP” (May 28, 2013).

9.1.2.1 Density and Loading Criteria (Goals and Actual Levels)

The rearing conditions at Wells Hatchery are designed on loading densities recommended by Piper et al. (1982; 6 lb/gpm and 0.75 lb/ft³) and Banks (1994; 0.125 lb/ft³/in) (BAMP 1998).

9.1.2.2 Fish Rearing Conditions

Fish are reared on a combination of well and river water. Temperature, dissolved oxygen and pond turnover rate are monitored. IHOT standards are followed for water quality, alarm systems, predator control measures (netting) to provide the necessary security for the cultured stock, loading, and density. Settleable solids, unused feed, and feces are removed regularly to ensure proper cleanliness of rearing containers. Temperature and dissolved oxygen are monitored and recorded daily during fish rearing.

9.1.2.3 Indicate Biweekly or Monthly Fish Growth Information (average program performance), Including Length, Weight, and Condition Factor Data Collected During Rearing, if Available

These data are not collected monthly at the Wells Hatchery.

9.1.2.4 Indicate Monthly Fish Growth Rate and Energy Reserve Data (average program performance), if Available

These data are unavailable at the Wells Hatchery.

9.1.2.5 Indicate Food Type Used, Daily Application Schedule, Feeding Rate Range (e.g., % B.W./day And lbs/gpm inflow), and Estimates of Total Food Conversion Efficiency During Rearing (average program performance)

Table 9.1. Food Type Information.

Rearing Period	Food Type	Application Schedule (#feedings/day)	Feeding Rate Range (%B.W./day)	Lbs. Fed Per gpm of Inflow	Food Conversion During Period
December-January	BioPro Starter	3-4	1.0-3.0	0.025	0.6
February-March	BioPro Starter	2-3	1.0-2.0	0.02	0.8
April-May	BioPro 2	2	1.0-2.0	0.02	1.0
June-September	BioPro 2	1-2	1.0-1.5	0.02	1.0
October-April	BioPro 2	1	1.0	0.02	1.0

9.1.2.6 Fish Health Monitoring, Disease Treatment, and Sanitation Procedures

Standard fish-health monitoring will be conducted by a fish health DVM at frequencies appropriate to the life stage and susceptibility to disease. Significant fish mortality attributable to unknown cause(s) will be sampled appropriately for study (i.e., viral assay, bacterial culture, and histopathology). Fish health maintenance strategies are described in IHOT (1995). Incidence of viral pathogens in summer Chinook broodstock will be determined by sampling fish at spawning in accordance with the Salmonid Disease Control Policy of the Fisheries Co-Managers of Washington State. Populations of particular concern may be sampled at the 100 percent level and may require segregation of eggs/progeny in early incubation or rearing.

Fish are monitored daily by staff during rearing for signs of disease, through observations of feeding behavior and monitoring of daily mortality trends. A fish-health specialist will monitor fish health often as determined necessary. More frequent care will be provided as needed if disease is noted. Hatchery Specialists under the direction of the fish health DVM will provide treatment for disease. Sanitation will consist of raceway cleaning as necessary by brushing, and disinfecting equipment. Fish-health examinations are performed on all summer Chinook production lots throughout the rearing period and pre-release.

All equipment (nets, tanks, boots, etc.) is disinfected between different fish/egg lots. Tank trucks are disinfected between the hauling of adult and juvenile fish. Foot baths containing disinfectant are strategically located on the hatchery grounds to prevent spread of pathogens.

The general policy is to dispose of dead juvenile fish and eggs in an approved landfill to minimize the risk of disease transmission to natural fish. Adult summer Chinook carcasses will be disposed of in an approved landfill. All adults injected with maturation accelerating hormones (such as sGnRH_a implants) will be disposed of in an approved landfill, consistent with Investigational New Animal Drug (INAD) requirements.

9.1.2.7 Smolt Development Indices (e.g., Gill ATPase Activity), if Applicable

See the “Wells Hatchery Summer Chinook Program HGMP” (May 28, 2013).

9.1.2.8 Indicate the Use of "Natural" Rearing Methods as Applied in the Program

Currently, natural rearing methods are approached through the transfer of subyearling Chinook to large, lined ponds. These ponds provide very low rearing densities.

9.1.2.9 Indicate Risk Aversion Measures that will be Applied to Minimize the Likelihood for Adverse Genetic and Ecological Effects to Listed Fish Under Propagation

Not applicable. Summer Chinook are not listed.

10.0 RELEASE

10.1 Describe Fish Release Levels, and Release Practices Applied Through the Hatchery Program

10.1.1 Proposed Fish Release Levels

Table 10.1. Release life stages, numbers, and locations for the Wells Summer Chinook program.

Age Class	Maximum Number	Release Date	Location
Eggs	0	--	--
Unfed Fry	0	--	--
Fry	0	--	--
Fingerling	0	--	--
Subyearling	1,000,000	May	Columbia River
Yearling	0	--	--

Subyearling summer Chinook released volitionally directly into the Columbia River from Wells Hatchery via the Wells Hatchery volunteer channel.

10.1.2 Specific Location(s) of Proposed Release(s)

Stream, river, or watercourse: Columbia

Release point: Wells Hatchery, Rkm 829.0/Mid-Upper Columbia

Major watershed: Columbia

Basin or Region: Columbia

Fish are released on station from the Wells Hatchery to the Columbia River at Rkm 829.0, located immediately downstream of Wells Dam.

10.1.3 Actual Numbers and Sizes of Fish Released by Age Class Through the Program

The SRO Program is new. Data from the “Wells Hatchery Summer Chinook Program HGMP” (May 28, 2013) provided for context.

Table 10.2. Wells Hatchery summer Chinook releases, 1992-2010.

Brood	Wells summer Chinook salmon		
	Subyearling	Yearling	Total
2010	442,821	350,218	793,039
2009	471,286	446,313	917,599
2008	427,131	336,881	764,012
2007	402,527	310,063	712,590
2006	396,538	311,880	708,418
2005	430,203	333,587	763,790
2004	471,123	312,980	784,103
2003	425,271	313,509	738,780
2002	473,100	306,810	779,910
2001	376,027	185,200	561,227
2000	498,500	343,423	841,923
1999	363,600	312,098	675,698
1998	370,617	457,770	828,387
1997	541,923	381,687	923,610
1996	473,000	356,707	829,707
1995	408,000	290,000	698,000
1994	450,935	365,000	815,935
1993	187,382	388,248	575,630
1992	- -	331,353	331,353

10.1.4 Actual Dates of Release and Description of Release Protocols

Volitional release: subyearlings in May (~15th). Subyearlings are forced out by the end of May. The vast majority of fish have volitionally released prior to force-out. Release dates coincide with natural migration timing.

10.1.5 Fish Transportation Procedures, if Applicable

Not applicable. No transportation used.

10.1.6 Acclimation Procedures (methods applied and length of time)

Fish will be term reared at the facility on river water from December through May. All fish are acclimated and volitionally released from Wells Hatchery into the Columbia River.

10.1.7 Marks Applied, and Proportions of the Total Hatchery Population Marked, to Identify Hatchery Adults

HCP Program is one hundred percent adipose-fin clipped and 100% CWT. SRO Program will be 100% adipose clipped. Additional marking will be applied as needed for evaluation purposes.

10.1.8 Disposition Plans for Fish Identified at the Time of Release as Surplus to Programmed or Approved Levels

Broodstock and egg collections are designed to minimize the potential for releases of surplus fish. The DPUD and WDFW will monitor survival at successive life stages to identify the probability of surplus fish at release, and will determine corrective measures (such as culling or transferring surpluses to other programs) at those life stages as necessary. Thus, surplus smolts are not expected.

10.1.9 Fish Health Certification Procedures Applied Pre-release

Fish health and disease condition are continuously monitored in compliance with the requirements of the “Salmonid Disease Control Policy of the Fisheries Co-Managers of Washington State” (Co-Managers 1998), requirements of the current Section 10 ESA permit (No. 1347), and guidelines of IHOT (1995). Summer Chinook are monitored daily by staff during rearing for signs of disease, through observations of feeding behavior, and monitoring of daily mortality trends. A fish health DVM monitors fish health at least weekly; these inspections must adhere to the disease prevention and control guidelines established by the Pacific Northwest Fish Health Protection Committee. More frequent care will be provided as needed if disease is noted. Prior to release, the population health and condition is established by the fish health DVM. This is commonly done 1-3 weeks pre-release, and up to 6 weeks pre-release on systems with pathogen free water and little or no history of disease.

10.1.10 Emergency Release Procedures in Response to Flooding or Water System Failure

See the “Wells Hatchery Summer Chinook Program HGMP” (May 28, 2013).

10.1.11 Indicate Risk Aversion Measures that will be Applied to Minimize the Likelihood for Adverse Genetic and Ecological Effects to Listed Fish Resulting from Fish Releases

See the “Wells Hatchery Summer Chinook Program HGMP” (May 28, 2013).

11.0 MONITORING AND EVALUATION OF PERFORMANCE INDICATORS

11.1 Monitoring and Evaluation of “Performance Indicators” Presented in Section 1.10

See sections 1.8.2.7 and 1.10 for a description of M&E and performance indicators.

11.1.1 Describe Plans and Methods Proposed to Collect Data Necessary to Respond to Each “Performance Indicator” Identified for the Program

The M&E Plan (Appendix B) thoroughly describes the program objectives, their respective

hypotheses, measured variables, derived metrics, and analyses.

11.1.2 Indicate Whether Funding, Staffing, and Other Support Logistics are Available or Committed to Allow Implementation of the Monitoring and Evaluation Program

Douglas PUD funds the M&E activities for the HCP Program. WDFW, as M&E contractor to Douglas PUD and co-holder of the permit, currently provides the personnel and equipment for conducting these activities. In-hatchery data collection will be performed under this plan. Performance indicators outside of Wells Hatchery will be assessed by WDFW.

WDFW will fund and implement the SRO Program M&E activities from the point of juvenile release through adult returns, focusing on orca recovery, fisheries, and ecological interactions.

11.2 Indicate Risk Aversion Measures that will be Applied to Minimize the Likelihood for Adverse Genetic and Ecological Effects to Listed Fish Resulting from Monitoring and Evaluation Activities

Trapping for broodstock at the Wells Dam east ladder trap is active (personnel on site at all times) and is selective for target fish. The traps in the west ladder and Wells Hatchery volunteer channel will be checked a minimum of once every 24 hours, and more often as conditions require. Non-target fish will be released unharmed. Normally, all broodstock are collected in the volunteer channel traps for the Wells Hatchery summer Chinook programs.

12.0 RESEARCH

Specific research on this program is not planned. However, WDFW shall participate in broader research on the recovery of orcas, with this program as a component of that research.

13.0 ATTACHMENTS AND CITATIONS

- Banks, J. L. 1994. Raceway density and water flow as factors affecting spring Chinook salmon (*Oncorhynchus tshawytscha*) during rearing and after release. *Aquaculture* 119-201-217.
- Biological Assessment and Management Plan (BAMP). 1998. Mid-Columbia River hatchery program. Mid- Columbia Hatchery Work Group. Chelan PUD, Wenatchee, WA. 176 p.
- Co-Managers (Washington Department of Fish and Wildlife and Western Washington Treaty Indian Tribes). 1998. Co-Managers of Washington fish health policy. Washington Dept. Fish and Wildlife, 600 Capitol Way N, Olympia, WA. 98501-1091.
- DCPUD (Public Utility District No. 1 of Douglas County). 2002. Anadromous Fish Agreement and Habitat Conservation Plan Wells Hydroelectric Project FERC1 License No. 2149, Douglas PUD Wells HCP Agreement.
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- ESA. 1973. Endangered Species Act of 1973 - as amended through 1988. Senate and House of Representatives of the United States of America. 75 pp.
- Hatchery Scientific Review Group (HSRG). 2009. Columbia River Hatchery Reform System-Wide Report.
- Habitat Conservation Plan Hatchery Committees (HCP HC) Revised 2007. Conceptual Approach to Monitoring and Evaluation for Hatchery Programs funded by Douglas County Public Utility District. Last modified: September 2007. Included as Appendix A.
- Hillman, T., T. Kahler, G. Mackey, A. Murdoch, K. Murdoch, T. Pearsons, M. Tonseth, and C. Willard. 2017. Monitoring and Evaluation Plan for PUD Hatchery Programs: 2017 Update. Prepared for the HCP and PRCC Hatchery Committees, November 16, 2013.
- IHOT (Integrated Hatchery Operations Team). 1995. Policies and procedures for Columbia Basin anadromous salmonid hatcheries. Annual Report 1994. Bonneville Power Administration, Portland, OR. Project Number 92-043.
- Lewis, S. T. 2012. Biological Opinion for the Proposed Relicensing of the Wells Hydroelectric Project, FERC Energy Regulatory Commission, U.S Fish and Wildlife Service Reference Numbers: 13410-2011-F-0090 & 13260-2006-P-0009, Hydrologic Unit Code 17-02-00-18-07. U.S Fish and Wildlife Service Central Washington Field Office, Wenatchee, WA.
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District and the Wells Habitat Conservation Plan Hatchery Committee. 348 p

Myers, J.M., R.G. Kope, G.J. Bryant, D. Teel, L.J. Lierheimer, T.C. Wainwright, W.S. Grant, F.W. Waknitz, K. Neely, S.T. Lindley, and R.S. Waples. 1998. Status review of Chinook salmon from Washington, Idaho, Oregon, and California. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-35, 443 pp.

NMFS. 2017. National Marine Fisheries Service Endangered Species Act (ESA) Section 7 Consultation Biological Opinion and Magnuson-Stevens Act Chinook Salmon Essential Fish Habitat Consultation for Four Summer/Fall Chinook Salmon and Two Fall Chinook Salmon Hatchery Programs in the Upper Columbia River Basin. Consultation No. WCR-2015-3607. December 26, 2017. National Marine Fisheries Service. Portland, Oregon. 186p.

Piper, R.G., I.B. McElwain, L.E. Orme, J.P. McCraren, L.G. Fowler, and J.R. Leonard. 1982. Fish Hatchery Management. United States Department of the Interior. Fish and Wildlife Service. Washington D. C. 517 p.

Purse, L. and S. Sloan (co-chairs). 2018. Southern Resident Orca Task Force Report and Recommendations, November 16, 2018. Report to Washington Governor Jay Inslee. 147 p.

Snow, C., C. Frady, D. Grundy, B. Goodman, and A. Hukenes. Bell. 2018. Monitoring and evaluation of Wells and Methow hatchery programs: 2017 Annual Report. Prepared for Douglas County Public Utility District and Wells Habitat Conservation Plan Hatchery Committee. 227 p


14.0 CERTIFICATION LANGUAGE AND SIGNATURE OF RESPONSIBLE PARTY

“I hereby certify that the information provided is complete, true and correct to the best of my knowledge and belief. I understand that the information provided in this HGMP is submitted for the purpose of receiving limits from take prohibitions specified under the Endangered Species Act of 1973 (16 U.S.C.1531-1543) and regulations promulgated thereafter for the proposed hatchery program, and that any false statement may subject me to the criminal penalties of 18 U.S.C. 1001, or penalties provided under the Endangered Species Act of 1973.”

Name, Title, and Signature of Applicant:

Name: Eric Kinne Name: _____

Title: Hatchery Division Manager Title: _____

Signature:  Signature: _____

Date: 10/9/19 Date: _____

Table 1. Estimated listed UCR Spring Chinook take levels of by hatchery activity.

Listed species affected: <u>UCR Spring Chinook</u> ESU/Population: <u>Methow, Entiat, Wenatchee Populations</u> Activity Program				
Location of hatchery activity: <u>Wells Hatchery, Wells Dam</u> Dates of activity: <u>Broodstock collection: July-September April and May</u> Hatchery program operator: <u>Douglas PUD</u>				
Type of Take		Annual Take of Listed Fish By Life Stage (<i>Number of</i>)		
		Egg/Fry	Juvenile/Smolt	Adult
Observe or harass	a)			
Collect for transport	b)			
Capture, handle, and release	c)			Up to 100 adults
Capture, handle, tag/mark/tissue sample, and release	d)			
Removal (e.g. broodstock)	e)			
Intentional lethal take	f)			
Unintentional lethal take	g)			Up to 10 adults
Other Take (specify)	h)			

- a. Delay of listed fish at ladder traps.
- b. Take associated with weir or trapping operations where listed fish are captured and transported for release. N.A.
- c. Take associated with trapping operations where listed fish are captured, handled and released upstream or downstream.
- d. Take occurring due to tagging and/or bio-sampling of fish collected through trapping operations prior to upstream or downstream release.
- e. Listed fish removed from the wild and collected for use as broodstock. N.A.
- f. Intentional mortality of listed fish, usually as a result of spawning as broodstock. N.A.
- g. Unintentional mortality of listed fish, including loss of fish during transport or holding prior to release into the wild.
- h. Other takes not identified above as a category. N.A.

Table 2. Estimated listed UCR Summer Steelhead take levels of by hatchery activity.

Listed species affected: <u>UCR Summer Steelhead</u> ESU/Population: <u>Methow, Okanogan, Entiat, Wenatchee Popul</u>			
Activity: <u>Implement Hatchery Program</u>			
Location of hatchery activity: <u>Wells Hatchery, Wells Dam</u> Dates of activity: <u>Broodstock collection: July-September</u>			
<u>April and May</u> Hatchery program operator: <u>Douglas PUD</u>			
Type of Take		Annual Take of Listed Fish By Life Stage (<i>Number of</i>)	
		Egg/Fry	Juvenile/Smolt
Observe or harass	a)		
Collect for transport	b)		
Capture, handle, and release	c)		Up to 1,000 adu
Capture, handle, tag/mark/tissue sample, and release	d)		
Removal (e.g. broodstock)	e)		
Intentional lethal take	f)		
Unintentional lethal take	g)		Up to 10 adults
Other Take (specify)	h)		

- a. Contact with listed fish through stream surveys, carcass and mark recovery projects, or migrational delay at trapping locations.
- b. Take associated with weir or trapping operations where listed fish are captured and transported for release. N.A.
- c. Take associated with trapping operations where listed fish are captured, handled and released upstream or downstream.
- d. Take occurring due to tagging and/or bio-sampling of fish collected through trapping operations prior to upstream or downstream release, or through carcass recovery programs.
- e. Listed fish removed from the wild and collected for use as broodstock. N.A.
- f. Intentional mortality of listed fish, usually as a result of spawning as broodstock. N.A.
- g. Unintentional mortality of listed fish, including loss of fish during transport or holding prior to release into the wild.
- h. Other takes not identified above as a category. N.A.

Table 3. Estimated listed UCR Bull Trout take levels of by hatchery activity.

**Listed species affected: UCR Bull Trout DPS/Population: Methow, Okanogan, Entiat, Wenatchee Populations
Activity: Implement Hatchery Program**

**Location of hatchery activity: Wells Hatchery, Wells Dam Dates of activity: Broodstock collection: July-September
April and May Hatchery program operator: Douglas PUD**

Please see the Wells Hydroelectric Project Bull Trout Biological Opinion for bull trout take levels:

Lewis, S. T. 2012. Biological Opinion for the Proposed Relicensing of the Wells Hydroelectric Project, FERC Energy Project No. 13260-2006-P-0009, U.S Fish and Wildlife Service Reference Numbers: 13410-2011-F-0090 & 13260-2006-P-0009, Hydrologic Unit 13260-0001, U.S Fish and Wildlife Service Central Washington Field Office, Wenatchee, WA.